Conference of Directors and Representatives of Agricultural Knowledge Systems (AKS) (Agricultural Research, Extension and Higher Education)

THE AKS ADDRESSING FOOD SAFETY ISSUES

COUNTRY NOTES

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Conference of Directors and Representatives of Agricultural Knowledge Systems - AKS
(Agricultural Research, Extension and Higher Education)

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AUSTRIA

1. Introduction

One of the goals of the EU expressly articulated in Article 3) of the Maastricht Treaty is to improve the standard of health. Food quality makes a significant contribution towards this goal.

The Austrian food industry faces unprecedented challenges with reference to positioning itself in national and international markets, promoting existing competitive advantages and achieving gastronomic innovations. Accordingly, the future of the Austrian food industry will depend on the targeted promotion and development of quality products with a strong regional character.

In view of the division of labour in the Austrian manufacturing and service industries, the provision of food is based on a system comprised of numerous actors with different economic interests. This system can be defined as the food sector and represents a key subdivision of the Austrian economy. The food sector covers harvesting, processing, distribution, preparation, import and export of all kinds of foods; in other words, the entire provision of food from agricultural production to the consumption and disposal of food. All substances which are used for human consumption are classified as foods, including drinking water.

Approximately ATS 265 billion of added value is earned in the food sector. This corresponds to approximately 12 per cent of the annual GDP. The food sector is currently characterised by strong predatory pricing policy with different processes of concentration and diversification within individual segments as well as between segments.

The food industry, which has been suffering setbacks for several years now, has declined by 5 per cent since 1998, which contrasts with the international development of food industries which show robust growth rates. Long-term growth in the Austrian food sector stands at 2.3 per cent per year as against 3.6 per cent for the industry as a whole. Employment has fallen by approximately one quarter, from 41 000 jobs (1990) to approximately 31 000 jobs (1998). Weaknesses related to the site and economic deficits of individual companies are likely to continue. However, appropriate action may achieve a successful link with internationally successful developments in the industry.

Growing competitive pressures in Europe and more stringent food legislation (93/43/EEC) are forcing agricultural and processing companies to prove their qualitative competence in terms of hygienic production and food hygiene. The provisions and legal measures applied in Austria to guarantee a high level of food safety for consumer protection will be presented below, with particular reference to milk as an example.
Due to topographical conditions, Austrian agriculture is characterised by its small-scale structure. The average farm size is 13 ha, very small in comparison to the rest of the EU, the proportion of grassland is about 57 per cent, considerably above the European average of 35 per cent. With reference to natural production conditions (high proportion of grassland) within existing farm ownership structures and

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1. English version of text of above graph.
considering national eating habits, the processing of animal products (milk and meat) plays a very important role, with a value added component of approximately two-thirds. Milk production represents the largest contribution to the final production value of agriculture.

**Final production of the animal sector in ATS millions**

![Pie chart showing final production of the animal sector in ATS millions]

In 1998, raw milk production amounted to a total of just under 3.1 million tonnes. The dairy industry processed 2.4 million tonnes. The remaining cow milk was used for direct marketing, for internal farm consumption, and for animal feed.

From the milk supplied, the following were produced:

- Liquid milk: 517,146 tonnes
- Unperished milk: 76,980 tonnes
- Whipping cream: 29,140 tonnes
- Cream for coffee and single cream: 22,771 tonnes
- Butter: 40,308 tonnes
- Cheese: 80,122 tonnes
- Cottage cheese: 22,095 tonnes

Entry into the EU and the associated changes in the agricultural system have brought about a dramatic reduction in the producer price of agricultural products. Milk, with a decline of one third, faced the most drastic price reductions. In order to achieve higher earnings, farmers in Austria have begun to sell their produce, primarily milk products, directly to consumers. It is assumed that already more than 10 per cent of all Austrian farms regularly sell their produce directly to consumers.
2. Description of topic-related government policy

- Increasing liberalisation and internationalisation of food markets have added a new dimension to discussions on the quality of foods. The evaluation standard of food quality has become extremely complex, the concept of which is used differently by suppliers and consumers depending on their position in the market and their relative interests.

- The key quality criteria for industrial food processing include the fulfilment of legal standards, customer acceptance and profitability. Grocery retailers also focus primarily on the criterion of food safety. For suppliers of community provisions, nutritional criteria are taking on an increasingly important role alongside the safety criterion.

- The most important quality criteria for the consumer are freshness, place of origin and naturalness of the food.

- The liberalisation of the food market has also led to a growth in the importance of food markings. While the EU has been pursuing strict marking regulations for many years now, Austria has been prescribing strict production specifications (Food Code). The more stringent EU provisions on marking were adopted by Austrian law at the time of EU membership negotiations.

- The control of foodstuffs has also become more important in view of liberalisation and the associated disappearance of border controls within the EU.

- The level of food monitoring in Austria can be classified as very high by international comparison.

Food monitoring can be subdivided into the following areas:

- Official food monitoring:
  - In compliance with the stipulations of the Austrian Food Act (§ 36 LMG), the Consumer Protection Section of the Office of the Federal Chancellor has to prepare an annual sampling and assessment plan according to which the relevant 300 000 or so import companies, food producers and trading companies in Austria are monitored on a spot-check basis. The control organs can take samples of goods without giving prior notification. Every year, between 40 000 and 50 000 samples are taken and passed on to the relevant food analysis institutes. The decision regarding whether to take samples and which samples to take is always made at the discretion of the food control organs. Samples are often taken as a result of suspicions having been raised; approximately half are taken on a routine basis.
  - Federal quality control: on the basis of various EU standards which have already come into force through the amendment of the Quality Classification Act of 13 July 1995 and the implementation regulations of 25 August 1995, the following foodstuffs are now subject to quality control provisions: fruit, citrus fruits, vegetables, bananas, sides of beef, sides of pork, poultry meat and hens’ eggs.
  - The federal controllers co-ordinate and monitor the observance of quality standards in accordance with the Quality Classification Act.

- Federal wine cellar inspection – wine control: In accordance with §37 of the Austrian Wine Act, Austria has a specific wine control system. In 1995, 11 582 inspections were implemented by 25 federal wine cellar inspectors. These checks covered 8 944 producers, 2 063 wine merchants, 532 vine-grower co-operatives, 44 restaurants and/or food retailers.
During the course of these inspections, 1,147 wine samples were taken, representing a very high density of control.

- **Control of organically produced food:** Implemented on the basis of the EU Regulation 2092/91 on organic farming within the context of indirect federal administration in the area of competence of the provincial heads of government. Organic farms are controlled by independent, largely private organisations which sign private control agreements.

3. **Description of existing regulations (for the dairy sector)**

When Austria joined the EU, the relevant Austrian law (steering system for dairy, cereal, meat and animal industries) was replaced by the directly applicable EU organisation for agricultural markets. The Common Agricultural Policy (CAP) is now regulatory instrument of Austrian agriculture and the goal to which all relevant policies aspire.

A series of legal rulings, such as the “Milk Reporting Regulation” (Federal Law Gazette 298/1995) and the Regulation on Guaranteed Quantities for Milk (Federal Law Gazette 28/99) apply to the dairy industry. The Regulation on Guaranteed Quantities for Milk specifies evaluation criteria for milk with reference to food safety and suitability for processing in the form of threshold values for bacteria and cell counts.

Monitoring circulation of foods, consumables, additives, cosmetics and consumer goods is regulated in accordance with the Austrian Food Act (LMG75 - Federal Law Gazette 86/75).

With reference to general hygiene regulations for foods and consumables, the *Food Hygiene Regulation* (Federal Law Gazette 31/98) has been in force since 1 March 1999. According to this regulation, the owner or managing director of a food company must establish the points critical to food safety in the relevant process and must then ensure that appropriate safety measures, in accordance with the principles of the HACCP concept, are specified, implemented, observed and monitored.

With particular reference to the dairy industry, the 10 February 1998 version of the Milk Hygiene Regulation (Federal Law Gazette 897/93) is in vigour. This regulation specifies requirements for animal stocks and milking conditions, prerequisites for the production of milk and dairy products, hygiene specifications which have to be met, threshold values, and conditions applicable for direct marketing.

Moreover, numerous provisions relate, for example, to the marking of foods such as the Regulation on Packaging, the Regulation on Additives, the Regulation on Colourings and Flavourings, the Regulation on the Marking of Nutritional Values, etc.

4. **The responsibility structure of the AKS**

*What kind of knowledge products*

Consumers obtain information on food safety primarily through the daily and weekly press, via popular medical articles in various magazines, and through radio and television reports. Negative reports usually have a large impact in the media and contribute to consumer uncertainty. For instance, one daily newspaper (Wiener Zeitung, 9/10/April, 1999) reported “Basically healthy products such as milk or yoghurt are “pepped up” with pro-biotic bacteria; water and starch give light products a modern, light image. These apparently healthy products usually contain considerably more additives, preservatives, artificial flavourings and often plenty of sugar to mask the taste of the fine chemicals added”.” Consumers
tend to be less well informed about the possibility of disease prevention through food, for example dairy products with an increased health value, preventive and pre-biotic functional flavonoid-rich foods, etc. Nevertheless, on no account should risks, such as those taken when inadequately heated foods are consumed, be suppressed.

Producers

Milk producers and also specialists working in the processing and preparation industry have comprehensive sources of information and a range of further education courses at their disposal.

For milk producers in particular, there are:

- relevant articles in newsletters by the chambers of agriculture
- informative folders and brochures
- working instructions, e.g. check-lists for the implementation of the Milk Hygiene Regulation (also available as software)
- information brochures from the Federal Ministry of Agriculture and Forestry (BMLF), e.g. “Quality Milking”
- comprehensive information, e.g. in the advice manual Milk and Dairy Products in Direct Farm Marketing of the Federal Ministry of Agriculture and Forestry (BMLF).

By way of in-service training for milk producers and direct marketing organisations, the Federal Dairy Institutes offer one to three-day seminars in addition to specialist conferences designed to increase the level of knowledge in the fields of technology, hygiene, control, quality assurance, sensor technology, marketing and food legislation. Milk and dairy products are produced during the course of these events. Quality certification courses with respect to milk processing are offered.

The following in-service training opportunities are available for specialists working in the preparation and processing industry:

- specialist periodicals and books
- results from research projects
- attendance of specialist conferences and seminars
- attendance of various courses, e.g. at the Federal Dairy Institutes
  - further education courses for specialists in dairy and cheese industries (duration: one semester)
  - preparatory courses for the master’s examination in the dairy and cheese industries (four months)
  - training as a dairy laboratory technician (duration: four months)
  - degree in the Dairy Industry and Food Technology from the Federal Institute of Higher Agricultural Learning (HLBLA) Francisco Josephinum (duration of five years including the “Matura” [school-leaving examination at Austrian secondary schools])
  - university course in the Food Technology and Biochmiical Engineering at the University of Agricultural Sciences (BOKU) in Vienna.
The need for consumer information on questions relating to food safety is confirmed by the results of customer surveys. For example, 68 per cent of Austrians specified the freshness of foods as an important criterion. For 27 per cent, naturalness or absence of chemicals and additives is a major quality criterion. The place of origin of the food is important to 20 per cent, while 15 per cent place particular emphasis on directly perceived features such as aroma. Food safety is not specifically named; it is assumed as an absolute prerequisite.

The need for information for producers -- associated either with direct marketing or with the preparatory or processing industry -- is ensured by the fact that constantly rising demands for food safety and intensified competition between products on the market necessitate on-going improvements in the level of know-how.

Description of existing fora

Questions of food safety are discussed in the various subcommissions of the Code Commission (commission for the publication of the Austrian Food Code). These subcommissions also prepare statements which they present to the Standing Committee on Hygiene for ratification. The relevant ministry -- presently Section VI of the Office of the Federal Chancellor -- publishes rules in the form of decrees or regulations.

There are various types of groups of discussion in the dairy industry, such as the Association for Agricultural Suppliers of School Milk for school milk producers. Questions on food safety are dealt with at discussions held periodically between representatives of the dairy industry in the provinces under the direction of the Federal Ministry of Agriculture and Forestry (BMLF).

Specialists from the chambers of agriculture, the Agricultural Market of Austria (AMA), food inspection authorities, veterinary authorities and the Federal Ministry of Agriculture and Forestry discuss current questions relating to quality and hygiene within the dairy industry in a number of working groups.

The requirements for know-how can be derived from discussions, operational talks, in-service educational events, product complaints, etc.

5. How AKS is addressing the topic

Identification of problems and description of desired outcomes

Problems in the food industry, and especially the dairy industry, generally arise as a result of structural influences or new insights pertaining, for example, to health.

Austria’s entry into the EU and the associated decline in milk prices for producers has induced many farmers to start processing raw products and marketing finished produce directly. Farms have become “grocery stores”. Difficult production conditions and lack of specialist know-how lead to increased hygiene risk. Evaluating the microbial sources of risk in foodstuffs -- caused by bacteria, viruses, yeasts, moulds, algae, parasitic protozoa, toxins and their metabolites -- has become a new area of responsibility. The goal must be to estimate the risk of a microbial hazard in the food supply. In the case of many established “food pathogens”, the hazards are already well documented and the formal requirement for information and data is minimal. However, there is a need for better identification of new or recurring “food pathogens”, and for this reason specifically targeted medical studies, epidemiological monitoring and micro-biological techniques must be developed. This necessitates basic research, applied research and experimental developments.
Representatives from the agricultural industry, interest groups, machine manufacturers, additive suppliers, retailers and consumers hold joint discussions on questions of food safety; topics are subdivided into categories such as basic research, applied research and experimental developments to be dealt with by universities, government institutions, such as the Federal Institutes, private organisations and companies, depending on the human and technical resources required. Examples of current research projects include:

- L No. 865/94, “Securing the quality of raw milk in organically operated farms in Austria, taking into consideration the operational applications for the observance of the Milk Hygiene Regulation of 1993”.
- BAL No. 992216 (Federal Institute for Alpine Agriculture [BAL]) “The influence of butter preservation and milking hygiene on the content of listeria and clostridia in raw milk” (duration 1999-2001).
- BAMW 34/98 “Options for using lupin-protein for human consumption with reference to processing technology as well as nutritional and physiological aspects”.

**How the AKS can influence programme planning and development**

The AKS can contribute to improving the level of know-how in the field of food safety by interpreting the results of research, providing information and comments from practical experience and by accepting commissions from companies.

Following the trend for developing high-quality, healthy foods with special functions such as pre-biotics, pro-biotics and symbiotics, functional foods, designer foods, nutraceuticals and foods with special relevance to young, older or sick people, it is now necessary to use:

- rapid, safe and environmentally compatible detection systems for ingredients and complexes as well as product properties,
- detection procedures for hazardous substances specific to the product or the production process (toxins, micro-organisms, mycotoxins, pesticide residues, heavy metals, environmental chemicals, etc.), and
- methods for measuring quality.

**Qualifications for implementing the programme and description of shortcomings in qualifications**

The implementation of research projects requires specialists with relevant scientific training, who are capable of designing and realising new concepts, products, processes, techniques and systems. There is also a need for technical staff who can carry out technical services under the direction and supervision of a scientist. In Austria, specialists lack certain basic elements of food technology and process technology that are required for research in the food industry.

**Description of strategies and instruments required for handling and implementing a project at different levels**

Food safety occupies a broad agenda in all seminars, conferences and training events on this topic. Specific topics are handled at all educational levels. Special hygiene training seminars are held in the
context of direct marketing and quality management seminars are held for production specialists. An essential feature is the logical dissemination of the course content and the execution of practical exercises.

Two projects relating to the implementation of programmes are quoted by way of example:

a) “Quality Management with Milk and Milk Products in the Context of Direct Farm Marketing”.

This is a 5b project with the goal of

- developing a quality assurance and certification system for direct farm marketing of milk and dairy products,
- improving the income of small and medium sized farms in an agricultural setting based on small-scale structures,
- securing employment in a region typical of the Alpine foothills,
- avoidance of emigration from these areas in which tourism can be developed,
- securing product quality and therefore also sales opportunities for the agricultural products that are produced,
- improving and stabilising the income situation in an economically weak area and developing an acknowledged quality certification agency for milk and dairy products.

b) “Determining the contamination of Austrian raw milk with chemical residues”

Within the framework of a raw milk monitoring system, the content of pesticides, PCBs, heavy metals, and occasionally also aflatoxins found in raw milk, is investigated in order to fulfil the requirements of the Milk Hygiene Regulation. These projects are implemented in collaboration with farmers and the representatives of their interests or with dairies and food inspection authorities in the individual Provinces.

How is the AKS integrated in the formulation of new directives?

The AKS is represented by experts in working groups in which the topic of food safety is discussed and/or in which documents for directives, decrees and regulations are prepared. For example, reference may be made to collaborative work

- in the Food Code subcommission for milk and dairy products
- in various specialist standards committees of the Austrian Standards Institute
- in the National Committee of the International Dairy Marketing Association, etc.

6. Description of forms of co-operation

The AKS fosters intensive collaboration with relevant institutes of the Universities of Agricultural Sciences and Veterinary Medicine, maintains contact with domestic and foreign research and control facilities and works closely with, for example, the provincial associations for direct marketing in Austria. This co-operation is documented through joint publications and events.
Collaboration with educational facilities such as tertiary, secondary and specialist colleges is ensured by the fact that students and pupils carry out practical assignments in food hygiene and therefore receive intensive training in the importance of food hygiene.

Collaboration with private enterprises exists in as much as food companies submit products for investigation within their obligations regarding self-monitoring and in order to obtain a certificate of fulfilment of the food hygiene regulations. Private companies share orders for the development of new products which require a risk analysis to be carried out before moving onto large-scale production.
7. Financing the programmes

Research projects are primarily financed using budget resources of the Federal Ministry of Agriculture and Forestry (BMLF). Private project sponsors have to provide the costs for the personnel and materials required. Programmes may also be funded through the EU, through industrial research sponsorship funds and through private organisations. Unfortunately, some sources of funding are underused by the food industry.

8. Evaluation of results

In Austria, the topic of food safety meets with maximum interest on the part of consumers, farmers, processing and preparing industries and from the public institutions responsible for monitoring. This is expressed through the fact that the most recent knowledge on food-related influences on human health is always discussed in conferences and seminars, and that a great many research projects are concerned with the subject of food safety, especially because consumers are very sensitive in their response to any negative report.

Strengths

• Austria has a well-developed network for monitoring food safety through official food control bodies.
• The high level of responsibility in the food processing and preparing industries towards the consumer is expressed in the industry’s encouragement of continued further training of specialist personnel.
• The allocation of responsibilities on questions concerning food safety is clearly set out by the government.

Weaknesses

• In view of the major structural changes and tough competitive situation, forward-looking projects are seldom adopted in the food industry.
• Training in the field of biology ought to be intensified at all levels of education.
• The number of people working in food research is very small; this is attributable to a lack of large food groups.

Opportunities

In view of the organisational transparency of research and development in the field of the food industry, the opportunity should be taken to better co-ordinate the various activities in order to exploit existing resources more effectively.

9. Summary and conclusions

This report has attempted to illustrate the importance of food safety in Austria for consumers, agriculture and the food processing and preparing industries, as well as to show the ways in which the AKS is affected and how it influences questions pertaining to food safety.
Food safety in Austria has been established primarily on the basis of a well-functioning control system. However, direct marketing, with its major disadvantages in production in comparison with traditional food processing and preparing companies, still presents a certain hygiene risk.
BELGIQUE

1. L’innocuité des denrées alimentaires

Les lignes qui suivent sont extraites d’un document du CRIOC (Centre de Recherche et d’Information des Organisations de Consommateurs) intitulé "La sécurité dans mon assiette : c’est aussi une histoire de date" qui est lui-même le fruit d’une collaboration entre les organisations de consommateurs, le CRIOC, les autorités fédérales concernées (les services d’inspection du Ministère des Classes moyennes et de l’Agriculture, du Ministère de la Santé publique et du Ministère des Affaires économiques), de l’Association Interprofessionnelle pour la Viande Belge (IVB), de la Fédération de l’Industrie Alimentaire (FEVIA) et de la Fédération des Entreprises de Distribution (FEDIS).

Ce document s’intéresse tout particulièrement à la qualité microbiologique des denrées alimentaires qui est susceptible d’évoluer très rapidement et de manière défavorable entre la mise sur le marché du produit frais ou préparé et sa consommation effective. En outre le consommateur peut, tout au long de sa démarche qui va de l’achat à la consommation d’un produit, réaliser des vérifications et prendre des précautions pour s’assurer que ses aliments ne présentent aucun risque pour sa santé.

D’autres aspects de la qualité des denrées alimentaires tels que l’absence de résidus de pesticides, de traces de médicaments vétérinaires, d’hormones ou de métaux lourds ne sont pas examinés, considérant que le consommateur, lorsqu’il effectue ses achats ou prépare ses repas, est dans l’impossibilité de vérifier que les aliments qu’il a devant lui sont exempts de ces substances. Cette vérification impliquant le recours à des analyses extrêmement complexes, seuls les services de contrôle sont en mesure de les effectuer et de prendre les mesures qui s’imposent en cas de dépassement des normes ou de présence de substances interdites. Dans ce domaine, le consommateur doit faire confiance aux autorités qui suivent avec application les règles et agissent avec rapidité et détermination lorsque cela s’avère nécessaire.

Il convient de savoir que les réglementations applicables sur tout le territoire de la Belgique relèvent de la compétence du pouvoir fédéral qui a lui-même édicté des lois et règlements, ou transposé en législation belge des directives et/ou des règlements définis au niveau de l’Union européenne et parfois même au niveau mondial.

Le Ministère des Classes moyennes et de l’Agriculture ayant une compétence limitée en matière de denrées alimentaires, le présent document ne peut en aucune façon être considéré comme passant en revue de manière tout à fait complète la situation belge. Il brosse un tableau bien évidemment incomplet de la réalité, mais il permet cependant de montrer à quel point la problématique des denrées alimentaires est prise au sérieux dans l’intérêt du consommateur et de la santé publique, et que divers organismes et institutions suivent de près la qualité des aliments destinés à la consommation humaine.

1. The English version of this report can be found in the Annex of this paper.
2. **La durée de conservation des aliments est limitée**

Les magasins regorgent de produits alimentaires. Il n’est pourtant pas aisé pour le consommateur d’avoir une alimentation saine et équilibrée. Les aliments sont devenus tellement complexes qu’il se demande de plus en plus comment manger sainement.

**La qualité, évidemment**

La législation définit la qualité minimale de nombreux aliments. Ils peuvent contenir des micro-organismes ou parasites qui pourraient être responsables de maladies ou d’altérations et/ou produire des toxines. Le consommateur peut cependant difficilement évaluer la qualité microbiologique des produits alimentaires. En effet, la contamination d’un aliment par des micro-organismes indésirables n’est pas détectable lors d’un examen visuel par le consommateur. Celui-ci compte sur la prise de responsabilité du producteur et surtout sur l’efficacité des pouvoirs publics compétents. Plusieurs services d’inspection sont en effet impliqués dans le contrôle de la qualité des denrées alimentaires. Le consommateur ne possède généralement pas les informations qui lui permettent de faire un choix éclairé. La distance entre les producteurs et les consommateurs y contribue. Une enquête montre que le consommateur se base plus souvent sur l’apparence de l’aliment (odeur, couleur, aspect général). Il exige de la fraîcheur et de la saveur; tels sont pour lui les critères déterminants lors de ses achats alimentaires. En outre, le consommateur attend des produits alimentaires achetés qu’ils se conservent encore un certain temps à son domicile.

**Les denrées alimentaires n’ont pas une durée de vie illimitée**

Les produits alimentaires ne se conservent pas éternellement. Si l’on peut attendre d’un vin qu’il se bonifie avec le temps, il n’en va pas de même pour les autres produits alimentaires. La plupart se dégradent avec le temps; le lait surit, les graisses deviennent rances, les légumes se décolorent et pourrissent. Ou encore, des micro-organismes se développent et rendent le produit impropre à la consommation. Par leur nature, les produits alimentaires ne sont pas stériles. Des problèmes peuvent apparaître si l’aliment n’est pas traité selon les règles de l’art. Le consommateur peut cependant les éviter en connaissant les risques de contamination et en évitant les conditions qui permettent aux germes infectieux de se développer. Chacun, de l’agriculteur au consommateur, a sa part de responsabilités.

**Pourquoi la date de durabilité est-elle importante ?**

Une des exigences du consommateur est la fraîcheur du produit. Lors de l’achat, il vérifie que les produits sont frais. Toutefois, la plupart des produits alimentaires sont préemballés. Il peut à peine les voir, il ne peut pas les sentir et, pour des raisons d’hygiène, il est évident qu’il ne peut pas les toucher. Dans ces conditions, l’étiquette du produit, par les informations qu’elle contient, joue un rôle important. L’étiquette des produits alimentaires préemballés doit mentionner la durée de conservation du produit. Pour les marchandises très périssables, l’étiquette indique de façon précise la date limite de consommation autorisée. Pour les autres produits alimentaires, l’étiquette mentionne la date de durabilité. Ce délai de conservation n’est valable que si le produit est conservé et manipulé dans de bonnes conditions. Le chapitre suivant décrit la manière de préciser la date sur l’étiquette. Toutefois, il n’y a pas toujours de date et lorsqu’il y en a une, elle n’est pas toujours lisible.
3. Quelle est la durée de vie d’un produit alimentaire ? l’étiquette donne la réponse !

Date de conservation, date de péremption, date de fraîcheur, … autant de noms communément utilisés pour désigner la “date de durabilité minimale” qui figure sur les produits alimentaires préemballés. Le législateur définit cette “date de durabilité minimale” comme étant “la date jusqu’à laquelle une denrée alimentaire conserve ses propriétés spécifiques dans des conditions de conservation appropriées”. Depuis 1986, la législation belge impose sur les produits alimentaires préemballés la mention d’une date indiquant clairement le délai de conservation. Cette législation, adoptée en application d’une réglementation européenne, impose aussi d’autres mentions. C’est ainsi, qu’à côté de la date de durabilité, on doit trouver des indications telles que la dénomination du produit, la liste des ingrédients qui le composent, les conditions particulières de conservation, etc.

2.1. Quelle date peut-on lire sur une étiquette ?

Sur l’étiquette des aliments préemballés, on peut trouver une des trois mentions suivantes: “A consommer jusqu’au...”, “A consommer de préférence avant le...” ou “A consommer avant fin...” suivie d’une date. Celle-ci peut être remplacée par un renvoi à l’endroit où la date est indiquée; par exemple, “voir au verso de la boîte” ou “voir sur le couvercle”.

Pour les denrées alimentaires très périssables, le législateur exige la mention d’une “date limite de consommation”. On entend par denrées alimentaires très périssables, des aliments tels que le poisson frais, la viande crue et surtout la viande hachée, les plats préparés, les légumes prédécoupés, etc. Il s’agit de produits alimentaires microbiologiquement très fragiles, ayant un délai de conservation très court. La “date limite de consommation” indique de manière précise la fin de la période durant laquelle le producteur garantit la qualité de son produit, moyennant bien sûr des conditions de conservation adéquates. On entend par garantie de qualité (entre autres microbiologique et organoleptique) l’assurance que l’aliment peut être consommé en toute sécurité. La date limite de consommation” est indiquée par la mention “A CONSOMMER JUSQU’AU...” suivie de la date exprimée en jour, mois et éventuellement année.

Sur les denrées alimentaires supportant d’être conservées plus longtemps, on trouve une “date de durabilité minimale”. Cette "date de durabilité minimale" peut être indiquée de deux manières :

- soit par la mention “A CONSOMMER DE PRÉFÉRENCE AVANT LE” suivie de la date en jour, mois et année;
- soit par la mention “A CONSOMMER DE PRÉFÉRENCE AVANT FIN” suivie de la date en mois et année.

La date de durabilité ne doit cependant pas toujours être indiquée en jour, mois, année. C’est ainsi que :

- Pour les denrées alimentaires qui se conservent moins de 3 mois, l’indication du jour et du mois suffit;
- Pour les denrées alimentaires qui se conservent entre 3 et 18 mois, l’indication du mois et de l’année suffit;
- Pour les denrées alimentaires qui se conservent plus de 18 mois, l’indication de l’année suffit.
Quelques denrées alimentaires préemballées font cependant exception à la règle. Pour ces aliments, la mention d’une date de durabilité minimale ou d’une date limite de consommation n’est pas obligatoire. Il s’agit des produits suivants :

- les légumes et fruits frais, y compris les pommes de terre, qui ne sont ni épluchés, ni coupés et qui n’ont subi aucun autre traitement similaire;
- les vins et boissons contenant plus de 10 pour cent d’alcool;
- les boissons rafraîchissantes, jus et nectar de fruits contenus dans des emballages de plus de 5 litres destinés à être livrés aux collectivités;
- le vinaigre;
- le sel de cuisine;
- le sucre et les confiseries;
- le chewing-gum;
- la glace en portion individuelle;
- le chocolat;
- le pain et la pâtisserie qui par leur nature sont consommés dans les 24 heures.

2.2. Que signifie la date de durabilité ?

La date de durabilité minimale ou la date limite de consommation est une mention du producteur qui indique le délai pendant lequel il garantit la qualité de son produit, pour autant que les conditions de conservation mentionnées sur l’étiquette soient respectées. Les conditions de conservation sont donc très importantes et doivent d’ailleurs être décrites sur l’étiquette lorsqu’elles sont particulières. Il est donc essentiel de bien faire le lien entre la date de durabilité et les conditions de conservation. Ceci induit la responsabilité de tous les maillons de la chaîne agro-alimentaire dans la qualité du produit consommé. Du producteur au consommateur (pendant et après l’achat) en passant par les intermédiaires (grossistes, transporteurs, commerçants), tout le monde est impliqué.

Une fois l’emballage ouvert, la garantie disparaît

La qualité du produit est garantie tant que l’emballage reste intact. Dès que l’emballage est ouvert, le produit alimentaire redevient un produit périssable qui s’altère rapidement. Par exemple :

- le lait UHT peut être conservé pendant des mois à température ambiante; mais une fois le carton ouvert, il doit être placé au frigo et consommé dans les 48 heures;
- une viande surgelée peut être conservée au congélateur à -18°C pendant plusieurs mois, mais une fois sortie du congélateur, elle doit être dégelée au frigo et cuisinée dans les 24 heures.

Malheureusement, il n’y a généralement aucune indication de la part du producteur, sur le délai de conservation du produit après ouverture de l’emballage. La question qui en découle est la suivante : Qui détermine la date de durabilité minimale et de quelle manière ? La réponse à cette question se trouve au point 5.
2.3. *Qu’en est-il des produits alimentaires qui ne sont pas préemballés?*

Il n’existe aucune obligation légale concernant l’étiquetage des denrées alimentaires non préemballées. Concrètement, cela signifie que le consommateur ne reçoit aucune indication quant à la durabilité des produits qui lui sont proposés non préemballés. Il doit donc se fier à ses sens pour évaluer la fraîcheur du produit. L’aspect général de la denrée, son odeur éventuelle, sa couleur, sa consistance, ..., sont autant de critères qui peuvent guider le choix. Cela peut paraître simple pour un chou-fleur, mais cela s’avère plus difficile pour du poisson, des plats préparés, de la pâtisserie, de la viande ou des oeufs. Par ailleurs, le consommateur peut également se baser sur la relation de confiance qu’il entretient avec le commerçant. Ce dernier a tout intérêt à bien servir et à bien informer ses clients.

3. *Du champ à l’assiette : qualité garantie ?*

3.1. *Qualité : une responsabilité partagée*

Chaque personne intervenant dans la chaîne alimentaire influence la qualité des aliments. La maîtrise de la qualité dépend donc de l’implication et de la vigilance de chacun : de l’agriculteur au revendeur et, pour une part également, du consommateur. Les pouvoirs publics ont également un rôle important à jouer. Actuellement, en Belgique la protection de la santé des consommateurs a pour cadre légal la loi du 24 janvier 1977 et ses arrêtés d’application. A cela s’ajoute également toute une réglementation à caractère agricole et économique.

*Le Contrôle de qualité à chaque à chaque maillon de la chaîne*

A l’origine, le législateur partait du principe que le *produit fini* devait répondre à toutes les exigences en matière de qualité et de sécurité. Par conséquent, les contrôles étaient effectués sur le résultat final du processus de production. Dans les années 80, il est apparu que le processus de production en soi devait également s’effectuer selon *certaines règles fondamentales de bonnes pratiques*. Il devait lui aussi être soumis à des contrôles. Dans les grandes lignes, il s’agissait de définir les règles au niveau de l’infrastructure, des équipements, du transport, de la gestion de l’eau et des déchets, de l’hygiène du personnel, etc. Les contrôles restaient toutefois limités : ils étaient ponctuels et les erreurs étaient toujours décelées *a posteriori*. Actuellement, le législateur va plus loin. Il part de l’idée de base d’un *système de contrôle de la qualité reposant sur la prévention*. L’objectif est de prévenir les problèmes à tous les stades de la production et de la distribution. C’est la raison pour laquelle on adhère de plus en plus au concept de *contrôle total de la filière*. La force de la chaîne dépend du maillon le plus fragile. La réglementation actuelle en matière d’hygiène est basée sur l’obligation pour le secteur agro-alimentaire de mettre en œuvre *des procédures de sécurité*, parfois désignées par le terme HACCP (Hazard Analysis Critical Control Point).

3.2. *Qui contrôle l’alimentation en Belgique ?*

De nombreux services sont concernés et collaborent pour le contrôle de la qualité des denrées alimentaires et du respect de la loi. Lorsqu’une infraction à la législation est constatée, l’inspeccion peut prendre différents types de sanctions, elle peut :

- donner un avertissement
− dresser un procès-verbal qui vaut jusqu’à preuve du contraire. Ce procès-verbal peut donner lieu à paiement d’une amende administrative ou à des poursuites judiciaires;
− retirer des marchandises du commerce et les détruire;
− fermer une entreprise s’il y a un risque pour la santé publique.

3.2.1. Le Ministère Fédéral desClasses moyennes et de l’Agriculture

Au sein du Département Fédéral des Classes moyennes et de l’Agriculture, différents services sont chargés de contrôler le processus total de production dans l’agriculture et l’élevage. Ils font partie de deux administrations. Le contrôle va de l’utilisation de matières premières au sein de l’exploitation agricole au produit fini.

L’Administration de la Qualité des Matières Premières et du Secteur végétal (DG4)

L’Inspection Générale des Matières Premières et des Produits Transformés est active au niveau des entreprises de production d’aliments pour le bétail et des exploitations agricoles. Ce service contrôle :
− la expériences menées en agriculture, avec des organismes génétiquement modifiés.

L’Inspection Générale des Végétaux et des Produits Végétaux est active au niveau des exploitations agricoles, des criées et des marchés de fruits et légumes. Elle se charge :
− de la lutte contre les parasites des végétaux;
− du contrôle de résidus (contrôle de la présence de résidus de pesticides dans les fruits et légumes);
− de l’agrément et du contrôle de méthodes alternatives de culture (culture intégrée, agriculture biologique).

L’Administration de la Santé Animale et de la Qualité des Produits Animaux (DG5)

− L’Inspection Générale des Services vétérinaires est active au niveau des exploitations agricoles dans le domaine : qualité des aliments pour le bétail;
− la qualité des matières premières (maïs, ...);
− la composition des engrais;
− du dépistage et de la lutte contre les maladies animales (maladie de la vache folle, tuberculose, peste porcine, ...);
− de la prévention de maladies animales;
− de la recherche et de la lutte contre l’utilisation de produits interdits (hormones et autres produits stimulant la croissance);
− de l’utilisation de médicaments vétérinaires.

L’Inspection Générale de la Qualité des Produits Animaux est active au niveau des exploitations agricoles, des laiteries et des abattoirs. Elle procède au contrôle :
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- de la composition et de la qualité du lait et des produits laitiers ainsi que de l’hygiène au sein des établissements;
- de la qualité des œufs;
- de la classification des carcasses.

Le Ministère des Classes moyennes et de l’Agriculture peut également bénéficier de l’assistance scientifique du Centre de Recherches Vétérinaires et Agrochimiques (CERVA). Ce centre suit notamment la problématique de la maladie de la vache folle (ESB).

3.2.2. Le Ministère Fédéral des Affaires Sociales, de la Santé Publique et de l’Environnement

L’Inspection Générale des Denrées Alimentaires (IGDA) fait partie de l’Administration de la protection de la santé du Ministère des Affaires sociales, de la Santé publique et de l’Environnement. Le service comprend une administration centrale établie à Bruxelles et un certain nombre de services extérieurs. L’Administration centrale veille aux adaptations de la législation alimentaire. La réglementation européenne influence actuellement la législation belge dans une large mesure. Les inspecteurs et contrôleurs des services extérieurs de l’Inspection générale des denrées alimentaires effectuent les inspections et les contrôles.

Tâches, missions et compétence de l’IGDA

Une tâche de l’Inspection générale des denrées alimentaires est de promulguer et d’actualiser la législation alimentaire. Elle est compétente pour les denrées alimentaires pour autant qu’il ne s’agisse pas d’aspects économiques ou agricoles. La législation alimentaire fixe des normes en matière de composition, d’additifs, de contaminants, d’étiquetage, de publicité, d’hygiène, etc. des denrées alimentaires et autres produits. Ces autres produits sont entre autres les cosmétiques, les produits du tabac, les détergents et produits de nettoyage, les aérosols, les additifs et arômes, les matériaux en contact avec les aliments, les jouets, les textiles, etc.


Information

L’IGDA assure l’information des consommateurs, renseigne les fabricants et commerçants, les organisations professionnelles, traite des demandes d’autorisation, des dossiers de notification, etc. Les fonctionnaires des services extérieurs veillent au respect de la législation alimentaire pour protéger le consommateur et combattre les fraudes et les falsifications.
Inspection et contrôle

Les fonctionnaires assurent la protection de la santé des consommateurs en écartant autant que possible les risques sanitaires dus aux denrées alimentaires proprement dites ou à une mauvaise manipulation (contamination, présence de résidus ou d’additifs nocifs, altération, ...).

A cette fin, le Service contrôle l’hygiène :

− des locaux de fabrication et de commerce, du secteur HORECA et des cuisines et salles de consommation des collectivités (cantines, homes, hôpitaux, écoles, etc.);
− du personnel (manipulation, hygiène personnelle, tenue vestimentaire);
− des distributeurs automatiques de denrées alimentaires;
− l’Inspection générale des denrées alimentaires veille au respect des procédures de sécurité axées sur l’hygiène, selon le principe HACCP (Hazard Analysis Critical Control Point).
− Les fabricants et commerçants doivent dès lors disposer d’une autorisation d’exploitation.

L’Inspection générale des denrées alimentaires recherche les germes pathogènes et les substances chimiques pouvant être nuisibles à la santé du consommateur, il s’agit entre autres :

− des nitrates, métaux lourds, résidus de pesticides, dioxines et autres contaminant, pour lesquels des limites maximales sont fixées;
− d’additifs non autorisés ou présents en quantité trop élevée.

Le Service examine aussi la composition et la qualité nutritionnelle des denrées alimentaires. Par exemple, une teneur maximale en matière grasse est fixée pour les viandes hachées et est régulièrement contrôlée.

L’Institut d’Expertise Vétérinaire (IEV)

L’Institut d’Expertise Vétérinaire (IEV) assure la protection de la santé des consommateurs dès qu’il s’agit de viande ou de poisson et de leurs produits dérivés. L’IEV se charge du contrôle de la viande, du poisson, de la volaille, du gibier, des lapins, ..., de l’abattoir à la distribution, en passant par toute la chaîne des ateliers de découpe et l’industrie de transformation de la viande. Il en va de même pour la chaîne plus courte de la pêche jusqu’au commerce de détail. L’IEV est surtout connu pour ses activités de dépistage de résidus (hormones, médicaments, métaux lourds). Il se charge de l’hygiène dans les établissements, vérifie la manière dont les procédures de sécurité sont suivies. C’est lui qui donne l’agrément aux établissements. Les 750 vétérinaires de l’IEV procèdent à des contrôles non annoncés. L’IEV dispose d’une équipe spéciale de dépistage d’hormones ainsi que, depuis peu, d’une cellule de fraude.

L’Institut Scientifique d’Hygiène Publique - Louis Pasteur (ISHP-LP)

Pour l’exercice de leur tâche, le législateur et l’exécutif s’appuient sur la recherche scientifique. En Belgique, l’Institut Scientifique d’Hygiène publique - Louis Pasteur mène des activités de recherche dans ce but.
Cet institut scientifique dispose d’un laboratoire et gère différentes banques de données ayant trait à la santé publique. Aussi bien les produits alimentaires que les médicaments et les vaccins, les manipulations génétiques, la radioactivité, le contrôle de laboratoire, les données épidémiologiques, les moisissures, les virus et les bactéries, etc. font partie du terrain d’étude de l’Institut Scientifique d’Hygiène Publique.

Le Conseil Supérieur d’Hygiène

Le Conseil Supérieur d’Hygiène, fondé il y a 150 ans, est un organe d’avis qui conseille le gouvernement dans toutes les questions ayant trait à la santé publique. Ce conseil scientifique se compose de membres issus du monde universitaire et de l’administration fédérale.

Nubel

L’asbl NUBEL gère une banque de données relative à la valeur nutritionnelle de 650 produits alimentaires présents sur le marché belge. Elle a édité une table de composition belge des denrées alimentaires. NUBEL a également élaboré un logiciel simple, dénommé le NUBEL planning alimentaire. Celui-ci est un outil de travail simple qui permet à tout utilisateur de gérer son alimentation. Il comprend, outre une table automatisée de composition des denrées alimentaires, un journal personnel et un livre de recettes.

3.2.3. Le Ministère Fédéral des Affaires économiques

L’Administration de l’Inspection Economique (AIE)

L’Administration de l’Inspection Economique assure une fonction aussi bien d’information que de contrôle. Elle assure une information téléphonique et écrite sur les droits et devoirs des consommateurs et des commerçants. Elle contrôle l’application de la loi sur les pratiques du commerce. Ce contrôle s’exerce au niveau des pratiques commerciales, de la publicité et des techniques de vente, de l’étiquetage, de la dénomination et de la composition des produits, de l’indication du prix et du respect des quantités annoncées. L’AEI peut détecter, constater et poursuivre toute infraction à cette loi.

L’administration centrale de l’Inspection Economique est située à Bruxelles. Un service d’inspection est également organisé par région.

L’Administration de la Politique commerciale, protection des droits des consommateurs

La Cellule Info Consommateurs informe et conseille sur les droits des consommateurs. Elle donne des avis juridiques, soit par téléphone, soit par courrier. Le cas échéant, elle oriente le consommateur vers des services plus spécialisés.

3.3. INFORMATION ALIMENTAIRE

Une politique alimentaire qui ne fournit aucune information au citoyen n’est pas une politique cohérente. En Belgique, différents centres d’information développent des initiatives pour aider le consommateur à consommer une alimentation saine. En Flandre, ils sont rassemblés au sein d’une
organisation de concertation, le VIG (Vlaamse Instituut voor Gezondheidspromotie), service “Voeding en Gezondheid.

En Wallonie, l’ICAN (Institut Communautaire de l’Alimentation et de la Nutrition) est actif sur le plan de l’information nutritionnelle.

4. Les risques des aliments contaminés

Les micro-organismes sont indispensables à la vie, il y en a partout. La plupart sont inoffensifs et même utiles. Cependant, certains peuvent être dangereux. Qu’en est-il de leur présence dans les aliments? Quels sont les risques? Est-il dangereux de manger des produits alimentaires dont la date de durabilité est dépassée?

4.1. La qualité microbiologique des denrées alimentaires

Les micro-organismes sont de minuscules organismes vivants. Les principaux micro-organismes que l’on retrouve dans les aliments sont les bactéries, les levures et les moisissures. La qualité microbiologique d’un produit alimentaire est déterminée par le type et le nombre de micro-organismes contenus dans l’aliment. A côté des micro-organismes utiles, comme par exemple, ceux qui assurent la fermentation de la bière ou la transformation du lait en fromage et en yoghourt, il en existe d’autres - plus à risque et donc plus indésirables - qui déterminent la qualité microbiologique des aliments. Certains de ces germes non désirés sont relativement anodins, mais ils peuvent néanmoins provoquer de la pourriture. Leur développement produit certaines substances non toxiques, qui peuvent cependant altérer les sucres, les matières grasses, les protéines et d’autres composants, rendant les denrées alimentaires impropres à la consommation. Pensons seulement à l’aspect peu attrayant de fruits pourris ou au mauvais goût de lait tourné ou de beurre ranci. L’avantage de ces germes est que leurs effets sont détectables à l’œil nu ou au goût, ce qui donne un avertissement aux consommateurs. D’autres micro-organismes sont par contre susceptibles de rendre malades. Leur présence peut avoir différentes causes :

- a mauvaise qualité des matières premières;
- le non respect des règles d’hygiène lors de la préparation;
- de mauvaises conditions de conservation.

Le problème avec ces micro-organismes dits pathogènes est qu’ils ne sont pas repérables par le consommateur. Une denrée alimentaire peut en effet paraître saine et même avoir un goût agréable, alors qu’elle contient pourtant des bactéries qui sont dangereuses pour la santé. Pour ce qui est du délai de conservation et de la sécurité des denrées alimentaires, il convient de distinguer entre les produits microbiologiquement stables et instables.

Les produits microbiologiquement stables sont, par exemple, les conserves, les aliments secs et déshydratés, les produits à teneur élevée en sucre ou les aliments très acides qui peuvent être conservés à température ambiante. Au cours de la production de ces aliments, les micro-organismes présents sont supprimés ou maîtrisés pour empêcher leur développement. En général, ces aliments sont encore sûrs et aptes à la consommation, même quelque temps après le dépassement de la date de durabilité.

Les produits microbiologiquement instables, en revanche, sont des aliments non préparés, crus, qui n’ont en général été soumis à aucun traitement de conservation “dur” (stérilisation, ...) et qui sont plus périssables. Il s’agit essentiellement de produits frais qui doivent être conservés à basse température.
4.2. Micro-organismes pathogènes pouvant contaminer les aliments

Parmi les bactéries pathogènes, on peut faire la distinction entre des bactéries responsables d’infections alimentaires et celles responsables d’intoxications.

4.2.1. Bactéries responsables d’infections alimentaires

En cas d’infection alimentaire, les germes encore vivants ont été ingérés avec des aliments. Une partie de ces germes est détruite par les acides dans l’estomac, mais une autre partie s’installe dans l’intestin, où ils se développent. Quand ils sont assez nombreux, ils infectent la paroi intestinale. Après une période d’incubation variant d’une demi-journée à quelques semaines, les symptômes de l’infection alimentaire commencent à se manifester. Il s’agit notamment de fièvre, nausées, éventuellement, avec vomissements, et parfois d’une diarrhée sanglante avec présence de glaires. Cette situation peut parfois mener à une gastro-entérite. Les principaux germes pathogènes qui peuvent contaminer les produits alimentaires et infecter directement le système digestif sont les germes Salmonella et Listeria et les colibacilles. Au cours des dernières années, de nouveaux germes pathogènes ont fait leur apparition dans l’alimentation humaine, notamment le Campylobacter et le Yersinia.

Les salmonelles provoquent pratiquement la moitié des infections alimentaires. Elles se trouvent principalement dans des produits d’origine animale comme le poulet, le hachis de porc et surtout les œufs. Néanmoins, d’autres aliments peuvent en contenir, par exemple, la viande, les crevettes, les produits laitiers tels que le fromage ou le lait cru, les épices et les herbes aromatiques. Les salmonelles survivent bien dans le réfrigérateur, mais ne s’y développent pas. En revanche, elles se multiplient très rapidement à température ambiante. Elles ne sont détruites qu’à une température supérieure à 65°C.

Escherichia coli est une bactérie qui réside dans les intestins des hommes et des animaux, et qui dans la plupart des cas est anodine. Il y a cependant certains types qui peuvent occasionner de graves infections intestinales. La présence de cette bactérie est un indicateur d’hygiène. Elle se trouve plus souvent sur des aliments crus, mais peut aussi se trouver dans les plats réchauffés. Etant donné que ces germes se retrouvent normalement dans les intestins, leur présence dans les aliments indique une contamination par des matières fécales.

Tandis que la Salmonella et les colibaciles sont des bactéries typiquement intestinales (résidant dans les intestins des hommes et des animaux), la Listeria est par contre assez répandue dans la nature. On retrouve aussi régulièrement ces bactéries dans la cuisine (dans les poubelles, les torchons, les réfrigérateurs, …). Elles peuvent être présentes dans toutes sortes d’aliments crus (la viande, la volaille, les légumes, le poisson, etc.), mais aussi dans les fromages à pâte molle fabriqués à base de lait cru. Les
Listeria sont très résistantes. Elles résistent au sel et se maintiennent dans un environnement aussi bien riche que pauvre en oxygène. Le germe Listeria peut même survivre dans des denrées acides et sèches, mais il ne peut pas s’y multiplier. A l’opposé d’autres germes pathogènes, comme la Salmonella, la Listeria peut survivre et continuer à se développer dans le réfrigérateur. Seul le chauffage à une température de plus de 70°C peut la tuer.

4.2.2. Micro-organismes responsables d’intoxications alimentaires

Lors d’une intoxication alimentaire, ce n’est pas la bactérie elle-même, mais une substance toxique appelée toxine, produite par la bactérie, qui est l’origine de la maladie. Les cas les plus fréquents d’intoxication alimentaire sont également accompagnés d’une gastro-entérite. Dès que la toxine entre dans le tractus digestif, elle peut commencer à se conteminer. C’est pourquoi la période d’incubation d’une intoxication est plus courte que celle d’une infection : les premiers symptômes peuvent déjà se manifester dans les six heures qui font suite au repas. Il n’y a généralement pas de fièvre, mais plutôt des crampes, des nausées, des vomissements et/ou de la diarrhée.

Les principales bactéries pouvant produire des toxines sont :

- Le Clostridium botulinum qui est responsable du botulisme. Cette contamination, très rare, se fait via des salaisons ou des conserves de viande ou de poisson. Les toxines touchent le système nerveux central, ce qui peut provoquer des paralysies fatales.

- Les staphylocoques sont des bactéries à la fois humaines et animales. Elles peuvent contaminer un aliment par l’air, par des éternuements ou par un contact avec les mains. Contrairement à la majorité des germes pathogènes, les staphylocoques sont très résistants à des teneurs élevées en sel, et peuvent donc persister (et encore se développer) dans des aliments fortement salés. Les toxines produites par le Staphylococcus aureus, sont résistantes à la chaleur. D’où l’importance de bien conserver les denrées alimentaires au frais avant la cuisson, car le Staphylococcus aureus ne peut pas se multiplier, et ne peut donc pas produire des toxines, à des températures inférieures à 10°C.

Certaines moisissures peuvent également produire des toxines, par exemple l’Aspergillus flavus. Cette moisissure produit l’aflatoxine, une toxine qui à long terme peut provoquer des cancers. Ces moisissures se trouvent surtout sur certaines noix, herbes aromatiques et épicées ainsi que sur certaines graines oléagineuses et céréales. Elles se développent et produisent la toxine lorsque les aliments sont mal séchés ou conservés dans une atmosphère trop chaude et trop humide.

4.3 Les CAUSES DES INFECTIONS ET INTOXICATIONS ALIMENTAIRES

La contamination des aliments peut donc se produire à tous les niveaux de la chaîne, du producteur au consommateur en passant par le transport, le stockage et la distribution. Dans la plupart des cas, l’infection ou l’intoxication alimentaire ne se produira qu’au moment où des germes pathogènes sont présents en quantité. C’est donc le rôle de chaque maillon de la chaîne de veiller à l’hygiène des denrées alimentaires, en évitant le plus possible la contamination par des germes pathogènes ou en évitant qu’ils se multiplient.

Il y a un nombre d’éléments qui favorisent la multiplication des bactéries. La température est l’élément le plus important. Des températures comprises entre 30 et 40 °C sont idéales pour la plupart des bactéries. Si des denrées alimentaires se retrouvent à de telles températures, les bactéries y prolifèrent et se
multiplient très rapidement. A ces températures, certaines bactéries doublent leur nombre toutes les 20 minutes. C'est aussi la raison pour laquelle il y a plus d'infections et d'intoxications alimentaires pendant l'été. Pensons aux barbecues, où les salades et la viande restent longtemps non-réfrigérées sur la table, et à la 'tirista' ou diarrhée de voyage qui touche tant de touristes dans les pays chauds. Il faut donc absolument éviter de garder des aliments à des températures supérieures à + 7°C. Outre la température, le taux d'humidité joue également un rôle dans la multiplication des bactéries. Toutes les bactéries, ainsi que les levures et les moisissures, ont besoin d'eau pour se multiplier. Dans les aliments secs (par exemple les épices, le riz, la farine, les biscottes), l'eau est présente en très petite quantité, ce qui empêche la multiplication des germes présents. Lorsque ces aliments sont conservés dans des conditions trop humides ou si l'emballage n'est pas imperméable, les produits peuvent absorber de l'eau que les germes utilisent pour se développer.

4.4. Les consommateurs sont-ils égaux face aux risques ?

Manger un aliment contaminé ne provoque pas automatiquement une intoxication ou une infection alimentaire. En plus de la nature et du nombre de germes pathogènes présents dans l'aliment, la résistance du consommateur joue également un rôle capital. Les enfants de moins de quatre ans et les personnes âgées sont particulièrement sensibles aux infections et aux intoxications alimentaires. Les personnes pourvues d'un système immunitaire déficient (pendant et juste après un traitement aux antibiotiques, après une transplantation, en cas de SIDA, de chimiothérapie ou d'irradiation, en cas de toxicomanie, ...) courent également plus de risques que les adultes en bonne santé. Un autre groupe à risque est constitué par les femmes enceintes. La bactérie Listeria est particulièrement dangereuse pour ces femmes ainsi que pour le foetus.

4.5. Est-il dangereux de manger des produits alimentaires dont la date de durabilité est dépassée ?

Pour les denrées alimentaires très périssables

Les denrées alimentaires préemballées très périssables sont reconnaissables par l'indication d'une date limite de consommation (avec la mention "A consommer jusqu'au ..."). Le fabricant garantit la sécurité du produit jusqu'à cette date, à condition que celui-ci soit conservé selon les indications figurant sur l'étiquetage et correctement préparé. Par exemple, le poisson, la viande et les plats préparés doivent être conservés à une température ne dépassant pas 4 °C. La qualité microbiologique de ces aliments peut se dégrader; ils peuvent s’altérer et présenter un risque d’intoxication alimentaire. Une fois cette date dépassée, les produits alimentaires doivent être retirés du commerce. Lorsque le consommateur achète des denrées alimentaires très périssables (et c’est certainement le cas pour tous les produits qui sont vendus au rayon frais et qui doivent être conservés dans le réfrigérateur), il doit impérativement tenir compte de la date limite de consommation. Quand cette date limite est dépassée, il vaut mieux jeter le produit. Il est de plus recommandé de consommer le produit le plus tôt possible avant la date limite indiquée.

Pour les denrées alimentaires qui se conservent plus longtemps

Les produits alimentaires portant une date de durabilité minimale (avec la mention "A consommer de préférence avant le ...") ont subi un traitement ou sont composés de telle manière que les germes putréfiants ou pathogènes ne peuvent plus se développer ou sont freinés dans leur développement. En principe, le consommateur ne coure aucun risque s'il le consomme peu de temps après la date de durabilité minimale. Une fois la date dépassée, la valeur nutritive (vitamines) et/ou l’aspect sensoriel (goût, odeur, vue) sont modifiés. Bien que le goût soit altéré, cela ne présente aucun risque pour la santé. Les
produits dont la date de durabilité minimale est dépassée peuvent encore légalement être vendus, mais cela se fait alors sous la responsabilité du vendeur, et non plus sous celle du fabricant. La vente de produits dans des emballages endommagés, est dans tous les cas interdite, même si la date limite de conservation n’est pas encore dépassée.

Remarque

Dès qu’un emballage a été ouvert, la date de durabilité minimale qui est indiquée, perd son utilité. Les conditions idéales de conservation sont de toutes façons rompues, et il y a un risque réel d’une nouvelle contamination (par la manipulation, par des couverts malpropres, par l’air, etc.). C’est certainement le cas pour les aliments très périsposables, sur lesquels il est indiqué “à consommer jusqu’au...”, mais aussi pour certains aliments portant la mention “à consommer de préférence avant le ...”. Exemples : la mayonnaise est mise en vente en dehors du réfrigérateur et porte la mention “à consommer de préférence avant le...”, mais l’étiquette indiquera dans la plupart des cas que le produit doit être conservé au frais après l’ouverture. Les jus de fruits en briques portent aussi de plus en plus souvent l’indication “Peut encore se conserver trois jours après l’ouverture de l’emballage”, bien que le délai de conservation pour le produit en emballage non ouvert puisse facilement atteindre un an. Par contre les aliments secs avec indication d’une date “à consommer de préférence avant fin”, comme le café, le riz, la farine, etc., restent stables. Ils peuvent sans problème être consommés jusqu’à la date indiquée, même si l’emballage a été ouvert.

4.6. Que faut-il faire en cas d’intoxication alimentaire ?

Heureusement, les problèmes se manifestent après la consommation d’un produit alimentaire contaminé chez une personne adulte et saine se limitent le plus souvent à une forme bénigne de gastro-entérite. Certaines bactéries peuvent cependant provoquer de sérieuses diarrhées pouvant entraîner un état de déshydratation. Le traitement des infections alimentaires varie donc en fonction de la bactérie à l’origine de la contamination mais aussi selon la personne infectée. En particulier pour les enfants, les personnes âgées, les femmes enceintes et toutes personnes dont le système immunitaire est affaibli, les infections et intoxications alimentaires ne sont pas du tout anodines et dans ces cas, il faut toujours faire appel à une aide médicale. Pour la plupart de infections et de intoxications, il est important d’éviter la déshydratation. Parfois des antibiotiques et des anti-diarrhéiques sont nécessaires. Dans d’autres cas, toute médication est superflue et les symptômes disparaissent d’eux-mêmes. C’est pourquoi, en cas de réaction inhabituelle, il est préférable de consulter le médecin traitant. Celui-ci doit faire part de tout soupçon à l’Inspection d’Hygiène de sa province et remplir un formulaire de déclaration. Si le consommateur a des doutes quant à la qualité et surtout la sécurité d’un produit alimentaire, il peut s’adresser à l’Inspection Générale des Denrées Alimentaires auprès du Ministère des Affaires sociales, de la Santé publique et de l’Environnement.

5. La responsabilité des producteurs et de la distribution

Le secteur de la production alimentaire a subi, au cours des dernières décennies, de profondes modifications. La production primaire dans le secteur de l’agriculture et de l’élevage est gouvernée suivant des principes modernes de gestion, la distribution s’est également modernisée. La majorité des denrées alimentaires arrive dans les rayons des magasins après un détour par l’industrie agro-alimentaire où elles ont subi l’un ou l’autre traitement de transformation ou de conservation. Les techniques d’emballage et de conservation permettent de limiter l’altération des aliments. A côté des techniques traditionnelles telles que la pasteurisation, la stérilisation, la réfrigération ou la congélation, on dispose depuis quelques années de
techniques issues de nouvelles technologies comme la cuisson et/ou l’emballage sous vide, l’ionisation, l’emballage sous atmosphère modifiée. Ces dernières permettent aux producteurs de proposer des produits qui correspondent mieux au mode de vie actuel. Plats cuisinés, légumes et fruits prédécoupés, salades prêtes à mettre dans le plat sont appréciés de nombreux consommateurs. Tout le secteur de la production, jusqu’aux distributeurs, travaille en se référant à des législations nationales, européennes, voire même internationales.

5.1. Le principe général

Les producteurs ne peuvent commercialiser que des produits alimentaires sains et sûrs. Afin d’assurer la qualité des denrées alimentaires, le secteur de la production alimentaire doit appliquer depuis quelques années des règles d’hygiène particulières et mettre en place des procédures de sécurité. D’autre part, tous les intervenants de la chaîne alimentaire doivent maintenant obtenir une autorisation d’exploitation délivrée par l’Inspection Générale des Denrées Alimentaires après contrôle des installations. L’objectif de la législation sur l’hygiène est de garantir la sécurité des produits alimentaires à tous les stades de la chaîne en prévenant tout risque de contamination. La loi s’applique à tous les produits et à tous les secteurs qui suivent la production agricole. Toutes les entreprises qui ont un rapport avec les denrées alimentaires, de la sortie de l’exploitation agricole jusqu’au commerçant, restaurateur ou distributeur automatique, sont concernées par cette réglementation.

La législation sur l’hygiène :

− comporte des exigences essentielles en matière d’hygiène;
− impose le principe des procédures de sécurité;
− offre la possibilité aux fédérations ou aux organismes professionnelles de rédiger des “guides des bonnes pratiques d’hygiène” pour leur secteur. On parle également dans le cas présent de codes d’hygiène.

Contrôle obligatoire de la qualité, mais sur parole

Le secteur agro-alimentaire doit mettre en place des procédures de sécurité. A cet effet, on se réfère au nouveau concept du HACCP. L’objectif du HACCP est la mise en place par chaque entreprise d’un programme de surveillance permettant de démontrer qu’elle connaît bien ses processus de production et tous leurs risques, et en outre qu’elle les contrôle. Pour tout problème éventuel (risque de contamination par des bactéries), le fabricant doit pouvoir prouver qu’il peut directement intervenir pour adapter ou rétablir le processus. Toutes les données relatives aux ingrédients, aux stades du processus et aux contrôles des produits doivent être systématiquement et soigneusement tenues à jour. Le fabricant doit vérifier régulièrement si son programme de surveillance fonctionne correctement. On parle d’autocontrôle. Le principe suivant lequel le “fabricant” est lui-même responsable de sa gestion des risques constitue une nouveauté dans la législation alimentaire. Les autorités contrôleront si le fabricant suit son programme de surveillance et s’il met tout en œuvre pour analyser et maîtriser les risques.

5.2. La qualité commence à la source : l’agriculture

La qualité des denrées alimentaires trouve son origine dans les secteurs de l’agriculture et de l’élevage. On y travaille par définition dans des conditions microbiologiques à risques. Le sol, le bétail, l’engrais sont en effet des produits qui, par nature, contiennent des bactéries nuisibles. C’est
privancièrement pour le lait, les œufs et l’élevage que les agriculteurs sont soumis à des procédures particulières de sécurité.

5.3. **La responsabilité du fabricant**

C’est le fabricant ou le conditionneur qui, selon le produit, fixe la date limite de consommation ou date de durabilité minimale. Jusqu’à cette date, il est responsable de la sécurité, de la valeur nutritive et de l’aspect du produit pour autant que les conditions de conservation aient été respectées. Il est en effet le mieux placé pour connaître la qualité des matières premières et les transformations qui leur sont appliquées, ainsi que les méthodes de conservation et d’emballage utilisées.

*Les méthodes de conservation ralentissent l’altération des aliments*

La majorité des micro-organismes qui peuvent altérer les aliments se multiplient très rapidement à une température de 30 à 37 °C, en présence d’eau et d’oxygène. Au-delà ou en deçà de cette température, le processus de multiplication est plus lent. Un chauffage au-delà de 80 °C (pasteurisation et stérilisation), durant un laps de temps suffisant tue les micro-organismes. Un abaissement de la température en deçà de 4°C ralentit (conservation au frigo) ou en deçà de -18 °C stoppe (surgélation) leur multiplication mais ne les tue pas. D’autres techniques influencent les autres paramètres pour ralentir la multiplication des micro-organismes, par exemple en diminuant la teneur en eau par déshydratation (séchage ou lyophilisation), en modifiant la teneur en oxygène (le sous-vide ou sous atmosphère modifiée), ou l’acidité du produit (choucroute, conserves au vinaigre). Pour que les denrées alimentaires se conservent plus longtemps, les fabricants peuvent également utiliser des additifs. Leur usage est réglementé. Des listes établies au niveau européen reprennent les additifs autorisés en spécifiant dans quels produits et en quelles quantités ils le sont. Ces additifs reçoivent un numéro de code européen commençant par E. Ils doivent être mentionnés dans la liste des ingrédients. Les conservateurs sont des substances qui prolongent la durée de vie des denrées alimentaires en les protégeant des altérations dues aux micro-organismes. Ce sont les additifs portant les numéros E200 à E252.

La durée de vie de produits à conserver au frais dépend directement de la température à laquelle ils sont conservés. Plus la température est basse, plus le développement des bactéries sera lent et plus le temps de conservation sera long. Le producteur fixe cette date en recourant à des tests de simulation qui reproduisent le mieux possible la réalité quotidienne. Le moment où soit l’aspect, l’odeur, la couleur ou le goût, soit les propriétés microbiologiques subissent une modification détermine le délai de conservation. Pour arriver à la date de durabilité minimale ou date limite de consommation, une marge de sécurité est calculée. Ce calcul peut être effectué de deux façons :

- Soit le producteur réduit le délai de conservation fixé expérimen tally (par exemple d’un tiers);
- Soit il réalise le test de stimulation dans des conditions de conservation moins favorables et il prend ce délai comme date de durabilité (par exemple : température supérieure à 10 °C pour des produits devant être conservés à moins de 7 °C).

L’information fournie au consommateur comprend donc selon les produits, une date limite de consommation ou une date de durabilité minimale ainsi que les conditions de conservations recommandées pour le produit. Cette date est valable tant que l’emballage est fermé. Une fois l’emballage ouvert, la durée de vie de l’aliment dépend des conditions de température dans lesquelles il est conservé.
5.4. **La responsabilité du transporteur et du distributeur**

Les secteurs du transport et de la distribution font le lien entre le producteur et les consommateurs. Il s’agit d’une longue chaîne, très diversifiée, qui comprend le stockage, le transport et la **vente** des produits. Une caractéristique de la distribution de masse est la diversité des produits proposés dans un seul point de vente et/ou transportés en commun.

Comme le producteur, le transporteur et le distributeur doivent respecter à tous les stades de l’approvisionnement (du stockage, à la vente en détail en passant par le transport) des procédures de sécurité qui garantissent au consommateur qu’il ne recevra que des produits sûrs, que tous les risques pour la santé sont limités au minimum. Ils sont d’ailleurs également soumis à la réglementation en matière d’hygiène. Le distributeur doit aussi s’assurer que toutes les mentions obligatoires sont reprises sur les emballages, que l’emballage n’a pas été endommagé pendant le transport, etc. Il est en effet responsable de ce qu’il fournit au consommateur.

**Froid - plus froid - on ne peut plus froid ...**

Chaque intervenant est un maillon important de la chaîne du froid. Tous doivent prévenir tout dépassement des températures prescrites par le producteur ou le législateur. La chaîne ne peut, en effet, à aucun moment être interrompue entre la fabrication des aliments et leur vente au consommateur.

**La bonne gestion du stock**

Comme déjà mentionné, le stockage dans le magasin (lieu de vente) est une affaire délicate. Les comptoirs doivent répondre à certaines spécificités en fonction des produits qu’ils contiennent. Les produits surgelés doivent se trouver dans un congelateur dont la température est contrôlée, les produits réfrigérés doivent être stockés dans un comptoir frigo, et les aliments secs peuvent être stockés à la température ambiante, ... Le système de rotation est basé sur le principe de “first in, first out”: ce qui a été stocké le premier, doit partir le premier. Les réassortiments dans les rayons sont toujours mis dans le fond. C’est également pour des raisons d’hygiène que le “self service” des produits en vrac, non-préemballés, est soumis à des règles.

**La commercialisation de produits nuisibles est dans tous les cas interdite.** Dans sa définition d’un produit nuisible, le législateur comprend aussi bien les aliments infectés de germes que les conserves endommagées.

**Que deviennent les produits dits “périmés”**?

Les produits dont la date de durabilité minimale est dépassée ou presque atteinte, devraient être retirés des rayons pour ne pas porter préjudice à la confiance des consommateurs. Par contre, pour les aliments très périssables, une fois la date limite de consommation atteinte, le produit doit obligatoirement être retiré du commerce et dans certains cas même détruit.

Quand ils sont proches de la date limite de consommation, il arrive souvent que des aliments périssables soient vendus à des prix démarqués, ce qu’on appelle “la vente rapide” dans le jargon des vendeurs. Ces produits passent aussi souvent au circuit de l’aide humanitaire, par exemple à travers les banques alimentaires, les institutions caritatives, etc. Ce circuit doit cependant lui aussi respecter les prescriptions légales. D’autres produits frais qui ont atteint la date limite de conservation, sont rassemblés dans un point central, où des firmes spécialisées les collectent pour en faire de la nourriture pour animaux.
5.5. **Le client est roi**

La loi sur les pratiques du commerce et sur l’information et la protection du consommateur définit les droits fondamentaux du consommateur. Ces principes de base sont explicités dans diverses lois. Afin de pouvoir bien choisir en tant que consommateur, nous avons besoin de certaines informations, et notamment de savoir qui peut nous aider en cas de problème. Nous ne nous attendons pas à ce que quelqu’un nous fournisse un produit alimentaire qui est nocif. Si le cas se présente, adressez-vous d’abord au vendeur ou au fabricant. Si les questions persistent, faites appel aux autorités publiques ou aux différentes organisations de consommateurs.

6. **La responsabilité des consommateurs**

La manipulation imprudente de denrées alimentaires risque de les contaminer. Au mieux, le consommateur devra simplement jeter le produit, ce qui représente un gaspillage d’argent et d’énergie. Dans le pire des cas, il risque une infection ou un intoxication alimentaire.

Le consommateur oublie trop facilement que les denrées alimentaires ne se conservent pas éternellement. Il ne fait pas toujours attention à la date de durabilité minimale. Il ne dit jamais non à des démarques intéressantes en raison d’un dépassement de la date de durabilité minimale. Il suppose que le fabricant ne prendra aucun risque, et qu’il aura tenu compte d’une large marge de sécurité lors de la fixation de la date limite de consommation.

Plus, il fait chaud dans l’endroit de stockage, plus rapide sera la multiplication des bactéries. Et même au réfrigérateur, il y aura des bactéries qui parviendront à proliférer. Cela ne signifie pas pour autant que la cuisine doive être aussi stérile qu’une chambre d’hôpital, et que le consommateur doit tout manipuler muni de gants en plastique. Le consommateur doit tout simplement rester vigilant, conserver et manipuler les denrées alimentaires de façon correcte, pour éviter que les bactéries se développent à volonté.

**La sécurité des denrées alimentaires. Comment y faire face?**

Le texte de la brochure du CRIOC comporte toute une série de conseils à destination du consommateur qui concernent notamment les précautions qu’il est invité à prendre :

- lors de ses achats d’aliments;
- lors de leur transport;
- lors de leur conservation;
- lors de leur préparation;
- lors de leur consommation.

7. **Les règles de l’étiquetage**

L’étiquette devient de plus en plus importante. Les consommateurs ont besoin de certaines informations qu’ils trouvent sur l’étiquette pour pouvoir faire un choix responsable. Se nourrir de façon équilibrée n’est déjà pas facile, et ce n’est pas toujours l’étiquette qui va simplifier les choses, car il n’est pas toujours aisé de s’y retrouver.
Il importe de savoir que le législateur européen a fixé le droit du consommateur à l’information sur les aliments préemballés dans une directive transposée dans la législation belge dans les années 80. Depuis, il y a eu divers amendements.

**Que dit l’étiquette ?**

- Certaines mentions doivent obligatoirement apparaître sur l’étiquette.
- La dénomination de vente: le consommateur doit savoir de quel produit il s’agit.
- La liste des ingrédients, dans l’ordre décroissant du poids qu’ils représentent, et prochainement avec mention de leur quantité.
- La date de durabilité minimale (ou la date limite de consommation).
- Eventuellement, les conditions particulières de conservation et d’utilisation.
- Un mode d’emploi, si le produit ne peut être utilisé convenablement sans celui-ci.
- Le lieu d’origine si l’omission de cette information peut induire le consommateur en erreur.
- Le poids net, c’est-à-dire, la quantité de produit sans emballage.
- Le pourcentage d’alcool pour les boissons alcoolisées de plus de 1,2 pour cent de volume.
- Le numéro du lot, c’est-à-dire une indication de la partie de production à laquelle appartient l’aliment, sauf si la date limite de conservation comprend au moins aussi le jour et le mois.

**En outre l’étiquetage doit répondre à des règles très strictes.**

Toutes les données doivent être apposées sur l’étiquette à un endroit visible sur le produit, et de façon lisible et indélébile.

En Belgique, la législation sur les pratiques du commerce impose que les mentions obligatoires sur l’étiquette doivent s’y trouver au moins dans la langue de la région où ils sont mis sur le marché. D’autre part, une législation détermine ce qui est permis et ce qui ne l’est pas en matière de publicité pour les denrées alimentaires.

Le prix ne doit pas nécessairement être indiqué sur le produit. Mais le consommateur doit pouvoir facilement calculer ou trouver la quantité de marchandise qu’il reçoit pour le prix qu’il paie. C’est pour cette raison que la réglementation sur l’indication du prix est tellement volumineuse. Pour certains produits, le prix doit être indiqué par unité de vente (selon le poids).

**On peut toujours poser des questions...**

Toutes les denrées alimentaires préemballées doivent porter une étiquette qui informe le consommateur le plus correctement possible.

Le consommateur a vraiment intérêt à bien lire cette étiquette, car elle lui donne beaucoup d’informations sur le produit et lui permet de faire des achats plus responsables. En outre, beaucoup de ces informations sont importantes pour éviter des problèmes. Tant le consommateur, que les autres parties concernées de la chaîne alimentaire, doivent respecter les consignes qui sont reprises sur l’étiquette.
Outre les mentions obligatoires, on retrouve encore d’autres informations indiquées sur les produits. Certaines données, comme la valeur nutritionnelle, ne sont pas obligatoires. Mais, si cette dernière est mentionnée, elle doit l’être selon les règles prévues à cet effet.

L’indication volontaire de la valeur nutritionnelle donne des informations particulièrement sur les denrées alimentaires : la valeur énergétique, les protéines, les glucides, les matières grasses, les vitamines, les minéraux et les oligo-éléments, etc. Elles permettent au consommateur de choisir son alimentation en toute connaissance de cause.

Beaucoup de discussions tournent autour des demandes du consommateur en matière d’information et sur la manière dont cette information doit lui être communiquée.

Certains producteurs mettent en place un numéro vert, d’autres distribuent des brochures, d’autres encore passent à Internet, ...

Tout produit doit au moins porter le nom et l’adresse du fabricant.
1. Introduction

Food safety has received increasing coverage in the popular press in recent times, particularly as food safety related incidents appear to have attracted consumer attention. Recalls of various products including ground meat, sausages and cheese products have been quite widely reported.

As well consumers and their associations tend to associate or at least consider emerging technologies, such as biotechnologies, as food safety issues.

More and more, food safety is seen to be a responsibility that should be managed across all steps of the food chain from the farm through to the consumers plate. Government agencies at the federal, provincial and municipal levels must all work with industry and consumer groups to increase public awareness of food safety issues.

1.1. Government policy

Government approach to food safety and regulation in Canada has undergone quite a major revision in recent years. The responsibility for food safety policy, standard setting, risk assessment, analytical testing research and audit rests with Health Canada. The Government of Canada has consolidated all federally-mandated food inspection and quarantine services into a single food inspection agency. The Canadian Food Inspection (CFIA) began operations in April 1997 and reports to Parliament through the Minister of Agriculture. The consolidation into a single agency enhances food safety systems by integrating the delivery of inspection and quarantine services previously provided by four departments, Agriculture and Agri-Food Canada, Health Canada, Industry Canada and the Department of Fisheries and Oceans Canada. All inspection services related to food safety, trade-related requirements and animal and plant health programs are provided by CFIA.

1.2 The Mandate for the CFIA

“To enhance the effectiveness and efficiency of federal inspection and related services for food and animal and plant health”.

1.3 The mission of the CFIA:

“Safe food, market access, consumer protection”.
1.4. The Objectives of the CFIA

- To contribute to a safe food supply and accurate product information.
- To contribute to the continuing health of animals and plants for protection of the resource base.
- To facilitate trade in food, animals, plants and their products.

The 1999 federal budget announced the investment of $65 million over three years to strengthen the national system of scientific support for food safety and nutrition and develop new food and nutrition policies and initiatives in consultation with Canadians. Looking forward to the next century, Health Canada is committed to strengthening its food and nutrition programs so that they may:

- effectively link with provincial activities in food safety;
- provide appropriate regulatory control of novel food products, including genetically engineered foods, through pre-market review and expanded pursuit of international harmonisation in this area;
- maintain the health and safety of Canadians;
- ensure that decisions are based on the best available scientific evidence;
- provide accurate information to Canadians and be fully accountable to them;
- use resources cost-effectively to make sure Canada remains a world leader in food safety.

Key areas of Health Canada’s commitment are:

- science programs;
- surveillance; and
- regulatory and related responsibilities.

Within the Science programs, Health Canada is committed to developing policies and setting standards that are founded on scientific evidence of the highest quality by:

- strengthening analysis and the scientific base of food programs;
- improving the evaluation of the Government’s programs, as well as the effectiveness of the Canadian Food Inspection Agency.

Surveillance systems ensure that the government is informed of emerging issues, public hazards and data relating to the everyday application of its programs. Government works closely with industry, voluntary organisations and consumer groups to address issues as they arise. Capacity will be further increased by:

- enhancing public health surveillance systems to provide real-time information on outbreaks of food borne illnesses;
- strengthening communication between regions, provinces and communities so that timely, complete and accurate information is available for decision making; and
– furthering the application of statistical information to assess demographic and other trends, such as eating habits and food-borne illness outbreaks.

Health Canada’s role includes food safety education, the provision of nutrition and healthy eating information and the implementation of guidelines, standards and food regulations to safeguard the health of Canadians. Health Canada will take further steps to implement its responsibilities by:

– opening up the decision making process by consulting Canadians more regularly through, for example, public hearings and the Internet;
– increasing scientific analysis in order to ensure food safety;
– ensuring communication between governments, industry, consumer interest groups, the public and other stakeholders to give Canadians a well balanced perspective on food issues; and
– promoting healthy eating practices and supporting safe food and nutrition programs for Canadians.

2. Regulations

On April 22, 1999, the Minister of Agriculture and Agri-Food Canada introduced in the House of Commons a Bill entitled Canada Food Safety and Inspection Act.

The CFIA and Health Canada in consultation with consumers, industry, provinces and other government partners, had identified the need for a review of the federal food and agricultural inputs legislation. This review has resulted in a Bill that provides an efficient and modern legislative framework to meet current and future food safety needs.

The new Bill, which is implemented jointly by CFIA and Health Canada, represents a consolidation and modernisation of existing food and agricultural inputs statutes currently administered and/or enforced by the CFIA. The Bill retains the division of responsibilities currently in place with the Minister of Health responsible for health, safety and nutritional standards for food and the Minister of Agriculture and Agri-food Canada responsible for agricultural inputs, plant and animal health and food related inspection.

The existing statutes currently administered and/or enforced by the CFIA are:

– Canada Agricultural Products Act
– Meat Inspection Act
– Fish Inspection Act
– Seeds Act
– Feeds Act
– Fertilizers Act

and all the food-related provisions of the Food and Drug Act and the Consumer Packaging and Labelling Act. Industry Canada has transferred the responsibility for administering the food related provisions of the Consumer Packaging and Labelling Act to the CFIA.

As part of this proposed legislation, inspector powers found in the Agency’s existing legislation will be consolidated into the Canadian Food Inspection Act. In addition, amendments to the Health of
Animals Act, Plant Protection Act, Agriculture and Agri-food Monetary Penalties Act, and the Canadian Food Inspection Agency Act will be made to achieve consistency with the proposed new legislation. The Plant Breeders’ Rights Act will also be updated.

A cornerstone of the Canadian approach to addressing the issues related to food safety and inspection has been the Food Safety Enhancement Program (FSEP) of the Canadian Food Inspection Agency. This is a Hazard Analysis Critical Control Points (HACCP) based program. HACCP represents a new way of approaching the management of chemical, physical and biological hazards which affect food production. It shifts the focus from end product testing to more rigorous and scientific management of food processing activities. Critical points in the production of a food product are identified and monitored. These HACCP systems are unique for each establishment and specific food product. FSEP Implementation Manual has been prepared as an aid for the CFIA implementation teams, inspectors, and industry’s management and employees. Curriculum Guidelines have been prepared to assist providers who are delivering or intend to deliver HACCP/FSEP courses to the industry. As well a series of HACCP Generic Models have been developed as guides for the design of specific HACCP systems for food processing establishments. These models, which are available in the CFIA Databank, cover a range of topics in Meat and Poultry Products, Eggs and Processed Eggs, Dairy Products as well as low acid canned food, frozen vegetables, aseptic high acid product, honey and maple products.

3 Forms of co-operation

Food safety activities in Canada have a variety of formal and relatively informal co-operative arrangements. Research and Development is undertaken at a range of federal, provincial and university facilities across the country and there are frequent interactions between the different players. An example of the co-operation between agencies is to be found at Guelph in Ontario. At this location scientific expertise and research facilities of the Provincial and Federal governments (Health Canada and Agriculture and Agri-Food Canada labs) as well as those from the University of Guelph cooperate in carrying out research on the topic. While the mandate for delivery of food safety R&D at the federal level rests with Health Canada, research conducted under the food research programs of AAFC will frequently have an impact on the delivery of safe foods and processes and in some cases be directed toward the support of regulatory activities. Examples of collaboration between the Research Branch of AAFC and CFIA include work being conducted on control of microbial pathogens in alfalfa sprouts and investigations on processes to control E.coli in fresh pressed apple juice. Similarly in the meat industry, work conducted by AAFC scientists has been used in the development of suitable HACCP programs.

Several fora exist where information is shared amongst the various stakeholders. The Canadian Agri-Food Research Council (CARC) maintains a database of R&D conducted in Canada in Agri-Food, including food safety and food research. The Inventory of Canadian Agri-Food Research (ICAR) can be accessed on the Internet through the CARC homepage (www.carc-crac.ca). A committee of CARC, the Canada Committee on Food provides a forum for members from industry, government and academia to discuss items of mutual interest related to essentially all aspects of food R&D. The area of food safety receives particular emphasis through the Expert Committee on Food Safety. These committees make recommendations related to their areas of expertise and identify priority issues and potential gaps in the knowledge base. At the federal level the Interagency Working Group on Food Safety and Nutrition Research provides a place for discussions amongst scientists from AAFC, CFIA and Health Canada to share program information and examine areas for potential collaboration. Annually this group arranges an Interagency Workshop on Food Safety which brings together up to 200 scientists and program specialists to present the results of their research and develop a strong network of people with common goals in food safety research.
4. Summary and conclusions

Canada takes the approach that food safety is a shared responsibility and endeavours to involve all participants of the agri-food sector in the assurance of a safe food supply. Policies for food safety are mandated to Health Canada while the Canadian Food Inspection Agency (part of the Agriculture & Agri-Food Canada portfolio), provides a single regulatory source. Research is a primary responsibility of Health Canada, however food and food safety research at a range of universities, provincial and federal (AAFC) laboratories provides excellent knowledge on the topic. HACCP programs are helping the industry to deliver a safe food supply in light of increasing consumer awareness and activism. Informational programs through Health Canada and other organisations endeavour to draw the consumer into the picture and play their part in the delivery of safe food. Cupertino/collaboration between the diverse players provides an opportunity to share knowledge and increase the efficiency of delivering sound, wide ranging food safety R&D programs.
CZECH REPUBLIC

1. Introduction

This section employs current information regarding transfers in agriculture (AKS) that concentrate on problems related to food safety. Its objective is to describe the present state of services available at the time the original study on which this section is based was prepared.

The Czech Republic has become an OECD member only recently and thus the extension service in agriculture has not been organised as an integrated system as it is in other OECD countries. Nevertheless, hygien and food safety have been guaranteed at various levels for many years.

The definition of elements of the system of extension service in agriculture -- namely education (ie. university education of the relevant branch), research and extension -- has been adopted from an OECD document. To assess the activities of universities and research institutes working in the field of food safety, questionnaires were mailed to the relevant institutions. Over 50 per cent of these questionnaires were returned and data was acquired from all the decisive organisations.

Critical problems

Agriculture in the Czech Republic has passed profound changes in the last eight years: the proprietal relations have changed because of privatisation and restitution, private subjects farm 99 per cent of land, demand and supply have levelled. Approximately 50 per cent workers left the agrarian sector, subsidies into agriculture dropped to 1/6 of the original amount and labour productivity increased substantially. The key objective is sustainable agriculture.

Significant changes occurred also in the food processing industry, many enterprises perished due to privatisation. However, on the other hand series of producers appeared, most of them are small to medium ones. Foreign supranational trade chains entered the national food market. The consumers´ requirements changed to some extent, too, the interest in food for certain categories of inhabitants increased, like food with low energy content, food enriched with vitamins and minerals, food with low fat content, products for seniors, for diabetics and the like. However, the main objective in this sector remains to guarantee competitiveness of the home processing industry using home raw materials while preserving the high level of food safety.

2. Definition of governmental policy in relation to food safety and of current legislation including prospects

The key document in this area is the Food and Tobacco Act no. 110/97 Coll. from 1997 that has been drafted in such a way that it has shifted food safety in a new, appropriate position, both by construction of individual provisions and by its legal force and relevant sanctions. The Act in line with the UN Resolution no. 39/248 and the relevant EU Directives has arranged the system for food control. On the one hand it involves the control provided by a producer or an importer which ensues from their
responsibilities for the food to conform the conditions set by legal regulations. It guarantees the state supervision on food also in such a way that all marketed food would meet strict and versatile criteria in view of food safety in particular.

Its value lies in protection of economic and health interest of consumers against harmful, false, incorrectly labelled or inferior products including imported products. It has increased the responsibilities of producers in this field by improving consumers’ protection. This way a better position on the developed European food market has been created for producers on the other hand. Taking into account the Act compatibility with the EU legislation (particularly by shifting food safety and other requirements in a new position), it has contributed to preparations of the Czech republic to join the European Union. A component part of the Act are amendments to six relevant acts particularly treating adjusted competencies of supervisory bodies. The Act has been amended with implementation regulations that treat food commodities, with regulations on methods and extent of assessing food conformity and on methods to find critical points in production technology. The regulations have been issued under gestion of the Ministry of Agriculture while the Ministry of Health has prepared and issued regulations treating hygienic and chemical requirements on food materials and food products. The regulation on methods how to calculate and present nutritional values and on marking information of possible negative impact on health was among them.

The food safety is guaranteed well in the legislative way at present, based on the law the state supervision is provided by veterinary administration bodies and by the Czech Agriculture and Food Inspection that are under control of the Ministry of Agriculture and by hygienic service bodies under control of the Ministry of Health. The division of competencies among supervisory bodies is set by law. This way the supervision protects the complete chain -- all stages of production, import, storage and trade. The depth and extent of realised inspections are however limited to some extent by lack of funds so that only the operative (specific) inspection can be realised that is based either on consumers’ impulses and impulses of inspection bodies or on ongoing assessment of extraneous substances monitoring.

The Act does not apply to the primary production of food raw materials and on public catering. Each of this fields is covered by separate acts and regulations. The primary production is treated for example in the Veterinary Care Act and in the Phytosanitary Care Act, in the Act on Fertilisers. These Acts guarantee inter alia that the raw materials for the production of food shall meet the food safety conditions. Public catering is treated for example in the Public Health Act that also sets rules for hygienic supervision.

After first experience with new food legislature, it is evident that many amendments and adaptations are necessary to achieve an even higher level of compatibility with the EU legislation and possibly simplification of some regulations. The works on an amendment to the Public Health Act are also under way so it would correspond to the European standard. The current enactment does not suit current requirements in many aspects.

3. Responsibility structure within AKS

The responsibility for three functions of the AKS lies with the government of the Czech Republic that through the relevant ministries organises the activities of universities and of research institutes the orientations of which fall in the agriculture and health sectors. Through specific funding, its policy for example in research impacts the thematic orientation of projects the solution of which will be supported, even by private (independent of the ministries) subjects.

Universities of the relevant branches (and at a lower level vocational schools for food processing), research institutes and institutions involved in inspections (Czech Agriculture and Food
Inspection, State Veterinary Inspection, Hygienic Stations) take part in providing basic information on food safety.

Results of systematic inspections and of monitoring extraneous substances in food chains are another important source of information. Extraneous substances monitoring in components of agrarian ecosystems and in the resultant products of agricultural and food production in fodder, raw materials and in food has two basic objectives: Firstly, it is control given by law the objective of which is that no harmful products could pass to a consumer. The other objective is to adopt measures of the preventive character based on risk assessment ensuing from the monitoring results. This vast amount of data is acquired in cooperation of all inspection and testing organisations and of selected research institutes of the agricultural sector and it has been published under gestion of the Ministry of Agriculture each year since 1993.

Agricultural research including problems related to food production is controlled by the Ministry of Agriculture. Part of it is realised in universities (food processing particularly in the Faculty of Food Processing and Biochemistry Technologies of the Institute of Chemical Technology) that are within competency of the Ministry of School, Youth and Sports. The research in the field of food hygiene and food safety is partly controlled by the Ministry of Agriculture and partly by the Ministry of Health. Part of the research institutes formerly directly controlled by the Ministry of Agriculture was privatised and they are commercial subjects to a large extent independent of the Ministry at present.

**Features of AKS**

To define the AKS, the scope of the system, its structure and interrelations should be characterised at first. These are drawn in the scheme.

**Relations within AKS**

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<th>MoA</th>
<th>Ministry of Agriculture</th>
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<td>MoH</td>
<td>Ministry of Health</td>
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<tr>
<td>MoE</td>
<td>Ministry of Education, Youth and Sports</td>
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<table>
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<tr>
<th>_________</th>
<th>responsibility (including mutual transfer of information)</th>
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<tbody>
<tr>
<td>----------</td>
<td>transfer of information only</td>
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1. Following are the number of employees contributing to the AKS operation:

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number</th>
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<tbody>
<tr>
<td>Czech Academy of Agricultural Science</td>
<td>1</td>
</tr>
<tr>
<td>Research institutes</td>
<td>23</td>
</tr>
<tr>
<td>Universities</td>
<td>6</td>
</tr>
<tr>
<td>Advisors</td>
<td>&gt;150</td>
</tr>
</tbody>
</table>

Informal relations exist among universities and research institutes and these are usually realised in shared participation in projects solutions and by mutual exchange of information. Integration of research
in both these groups has been realised in a small extent because there are independent programs of research projects of both the ministries.

**AKS functions features and their objectives**

**Universities**

Universities are controlled by the Ministry of School, Youth and Sports and they concentrate on teaching, research makes a minor part of their total activities, there are certain differences between the schools due to their orientation.

Based on data from the questionnaires, the shares of teaching, of research and of other activities are 65 per cent, 30 per cent and 5 per cent of the total sum, respectively. According to estimates, the food safety share is about 14 per cent of the total sum of activities.

In the field of agriculture, there operate: the Czech Agricultural University in Praha, Mendel Agriculture and Forestry University in Brno and the University of South Bohemia, in the field of food processing the Institute of Chemical Technology in Praha - the Faculty of Food Processing and Biochemistry Technologies and some faculties or institutes of the above universities with agricultural orientation. In the field of hygiene and food safety, there are the Veterinary and Pharmaceutical University in Brno and partly the Medical Faculty of Charles University.

Based on authorisation of the Ministry of Agriculture, the Faculty of Food Processing and Biochemistry Technologies is active in the field of HACCP. It guarantees preparation of background documents and training of workers of food processing plants that have displayed interest in it. The Veterinary and Pharmaceutical University in Brno has the same certificate.

**Research Institutes**

Agricultural research including food processing is under control of the Ministry of Agriculture, hygiene and food safety are controlled also by the Ministry of Health. A portion of research institutes formerly controlled directly by the Ministry was privatised within the transformation process.

The relevant institute for food is the Research Institute of Food Industry Praha, the only institute directly controlled by the Ministry of Agriculture. 60 per cent of its activities deal research, the remaining part cares for other activities including production as the institute had to win some 50 per cent of funds to cover all the institute activities outside the Ministry in recent years. The institute contributes to food safety by developing new analytic methods to determine minor nutrients and various contaminants. New methods of food processing including aseptic processes are also under development. A joint project of the Research Institute of Food Industry Praha and TNO Food and Nutrition Research Institute (the Netherlands) entitled Q-Food was founded with support of the Ministry. The project objective is to fix the quality systems in the Czech food processing industry.

The Institute of Agricultural and Food Information that owns the most voluminous central libraries for agriculture, forestry and food processing in the Czech Republic has the central position in the sector of informatics. The institute is directly connected to the most important world databases and provides extensive information retrieval, publication and service activities. This institute of the service type is directly controlled and funded by the Ministry of Agriculture.
While the organisation and activities of subjects in competence of the Ministry of Education did not change significantly after 1990, the organisation of research institutes in the sphere of agriculture changed considerably. Formerly there was a relevant research institute in each branch of the food processing industry. After the integrated organisation of food processing industries (in the form of General Directorates) was dissolved, most of these specialised research institutes perished soon because of privatisation of the food processing industry. Besides the Research Institute of Food Industry Praha that is controlled directly by the Ministry as its contributitional organisation, there are only three specialised research institutes, two of them in the form of independent joint stock companies (VUC, Praha a.s. -- Sugar Research Institute, and Pivovary a sladovny, Výzkum a slu by, a.s. -- Breweries and Malt Houses, Research and Service) and one as a part of a joint stock company (Milcom a.s. - Milk Research Institute).

**Extension**

A state network of extension centres existed till the 1989 end, but after political changes they closed their activities or were privatised and they operate as private advisory service nowadays. The system does not depend on the Ministry of Agriculture at present.

The total number of advisors and of advisory organisations is not known at present, neither in the agriculture nor in the food processing industry.

Some fraction of the advisory activity is realised by Potravinářské sdružení (Association for Food Processing, it forms an umbrella for the whole food processing industry) and branch associations that concentrate their activities exclusively in the relevant production branches. All these associations are based on voluntary membership of the production subjects.

The total support for extension is generally low and the institution of state that would provide systematic extension service has not been established yet. The Ministry of Agriculture supports extension in this field by the mentioned creation of training centres by the Institute of Chemical Technology in Praha and by the Veterinary and Pharmaceutical University in Brno to introduce the HACCP system in food processing and by issuing periodical guidebooks - model systems of critical points for production of actual kinds of food.

Most research institutes are involved in extension but they realise it for a consideration within their economic activities. For example, the Milk Research Institute implements introduction of the HACCP system including training workers in dairies actively.

After the Food and Tobacco Act entered into force the producers displayed increased interest in information in this field as the hygiene of production, quality and food safety are main criteria at marketing food products.

**3.1. Category of knowledge that producers and public use at present**

The Ministry of Agriculture funds monitoring of extraneous substances and several organisations within the Ministry and outside it take part in it. The bulk of the results is published and this way available to public. Food producers employ the research results through workshops, information materials published by the Institute of Agricultural and Food Information and above all by direct contacts with relevant facilities of the research institutes and of universities, either through consultations or by commissioning orders. Even in these cases these activities concentrate on small and medium producers whose economic position does not allow to place more extensive research orders.
3.2. **Description of Discussion Forum to Identify Demand for Knowledge**

There is no forum for discussion where the public could directly influence demand for research and extension service in the Czech Republic. Professional associations (Professional Group for Food and Agriculture Chemistry in Czech Association for Chemistry, Czech Quality Association and Czech Food Association that operate within the former Association for Science and Technology, Association for Alimentation) supply this activity to some extent.

These associations transfer knowledge into the expert and lay public by organising lectures, conferences and workshops, the Association for Alimentation publishes a journal.

Such an activity is mediated within the Czech Academy of Agricultural Science that is organised on a voluntary base and associates leading experts of universities with agriculture and food orientation, of the relevant research institutes and from the practice. As for its organisation, it is divided in departments the activities of which treat all fields of agricultural basic industries and processing. Close cohesion both of professionals with the same orientation and between the departments is achieved this way. Representatives of the Ministry of Agriculture, of the Agrarian Chamber of the Czech Republic and of the Czech Food Association participate in the negotiations, too. The statutory position of the Czech Academy of Agricultural Science is defined as an advisory body of the minister of agriculture.

An important problem of the present situation is a high level of fragmentation of interest groups and of producers’ association so not even the Agrarian Chamber of the Czech Republic where most of them are represented is a representative partner for the state authorities neither in the field of legislature influencing nor in the field of providing subjects for research problems, etc.

4. **AKS approach to solve problems**

The most important body for creation of research priorities is the Czech Academy of Agricultural Science that has prepared a profile priorities draft based on needs and objectives of the agricultural sector. These profile priorities are used by the National Agency for Agriculture Research which is part of the Institute of Agricultural and Food Information and this way is subjected directly to the Ministry of Agriculture.

Within these priorities, competitions have been declared each year and the professional subjects (workers in universities, in research institutes and in private companies) can suggest research projects to be solved in the next years. The projects matching the declared conditions (including so called preferences) and selected in challenging evaluation process by committees of experts are then supported partly or fully from the Ministry of Agriculture funds.

The expert committees members -- members of program councils -- are experts in the relevant fields from universities, from research institutes and from private organisations. Most of them are members of the Czech Academy of Agricultural Science, but this is not a precondition. They are appointed by the Ministry of Agriculture into the program councils.

4.1. **Problems identification**

The topics that the AKS representatives perceive as important are discussed in expert meetings in actions of the Academy. The overview of priorities particularly for research projects funded through the National Agency for Agriculture Research has been created this way. The priorities formulation indicates however that these are not factual and actual problems but rather spheres or topics that should be
considered at approving research projects. Therefore the research projects do not concentrate on solution of actual or expected problems systematically. The expected output of research is not usually described within the mentioned system of priorities identification.

Another mechanism of research priorities identification is based on communication of workers in research institutes and in universities with the Ministry of Agriculture. The experts suggest tasks to be solved to the employees of the Ministry and a share of these problems is accepted in a discussion and supported. This is not the most efficient mechanism, particularly in the long term. The main factor that keeps this mechanism dominant is lack of a thorough agricultural policy that would provide a long term vision for sponsors and a base to formulate long term projects. The agricultural policy is under preparation and therefore a trend to change this mechanism is to be expected.

Research Priorities as Identified by AZV

a) Innovation of technology and of methods to use land, geared at:
   − increasing economic effectiveness of agricultural production;
   − limiting negative impacts of agricultural technology on the environment;
   − evaluating non production functions, particularly in landscape enhancement and in water management;
   − contributing to conservation and sustainable use of non renewable resources of energy as inputs in agriculture
   − contributing to more efficient utilisation of natural and human resources;

b) Improving quality of agricultural and food products and providing food safety.

c) Providing a higher level of products and goods finishing.

d) Development and application of biotechnology in all production stages.

e) Development and introduction of technologies for non-food use of products in relation to development of processing technologies in the industrial sphere.

f) Provision of a scientific and technical base necessary for preparation, for use, for adoption of standards and harmonisation of EU regulations to the conditions of the Czech Republic.

g) Economic and control processes to develop the agrarian sector.

h) Structural development of the agrarian sector considering business conditions in the EU.

i) Support for and exploitation of new opportunities in the agrarian sector.

j) Innovation of the forest management system and provision of revitalisation of forest ecosystems affected by immission.

Some of the above priorities are closely related to food safety (items b, c and d) and others only marginally (such as i and j).

4.2. **Programs planning**

Planning of programs preparation to provide and increase the food safety has not been introduced systematically.

4.3. **Qualification level required to introduce a program**

The preconditions to provide the basic requirements on food safety had been fixed in an array of laws, regulations and inspections within the centralised conception of food production and sale. This sphere has been liberalised due to the new legislation given in the Food Act and a large portion of responsibility for a marketed product has been transferred upon the relevant producer of importer.

The producer has to meet his obligation to guarantee food safety in production by determining so called critical points and by setting limits for deviations of the monitored parameters including measures to maintain these parameters within limits. Adherence to the basic hygienic principles will do usually for simpler products produced by common and in long term established technological methods and no excessive risk to food safety will occur. However, a substantial portion of food production has become a highly sophisticated matter and therefore novel methods and components are introduced in traditional production. Therefore the good production practice principles must be obeyed in more complex production and the HACCP system must be implemented for each of those production methods.

However, for introduction of a functional system, the relevant production workers at all levels must be adequately trained. The approach started with a more general training (through regular courses organised by training facilities - by the Institute of Chemical Technology in Praha and by the Veterinary and Pharmaceutical University in Brno), personal accreditation (of qualified advisors) started and preparation of guidebooks of simplified (basic) methods respecting the basic hygienic principles in smaller and simpler production methods began, a new subsidy title of the Ministry of Agriculture is introduced for producers who intend to introduce the HACCP system in their production on initiative of their own (the law does not require it yet). It shall be necessary to train the workers of the inspection bodies and to establish an efficient inspection system that would base on prevention, not on treating the effects. All AKS components - research, extension and education - cooperate in the process.

4.4. **Strategies to address problems**

Strategies to address the problems have not been prepared for the long term and the problems are usually addressed case by case.

4.5 **Mechanisms to engage AKS in policy formulation and implementation**

As appeared in previous chapters, the formulation of the policy to improve food safety is in the domain of central organs with occasional participation of representatives of research institutes and universities. The food industry representatives realise their opinions either through comments in legislation preparation or in workshops and similar activities. No system for regular co-operation with expert teams has been established and the co-operation is realised based on personal contacts of the Ministry employees with experts who are called for consultations ad hoc or to prepare short time studies to enable the decision making process. The initiative comes form both sides. Far-sighted workers of the Ministry place short-time research tasks (less frequently) and research workers come with stuff to prepare policy tools or to do works that would facilitate their preparation. The system deficiency is that the research potential is fragmented in many facilities and some of them are under competency of the Ministry of Health.
5. **Description of co-operation methods between the three functions of AKS and co-operation with private sector**

Co-operation between the AKS functions ensues primarily from individual projects and, in particular, personal relations. Established networks, however, are not formalised and deliberate (that is, goal oriented). Relations among the AKS functions not supported significantly in the goal-oriented manner have developed only slowly. There are not many facilities involved in food safety and efficiently connected with other facilities and branches in the same field at present. The co-operation between universities and research institutes is quite uneven and depends heavily on extent of research activities in a university and particularly on the mentioned personal relations. In general, the regular co-operation among research institutes and between research institutes and universities is not satisfactory and only a small portion of workers is involved in it. The co-operation of universities and research with advisors is even less intensive and is based again on the personal contacts.

6. **Forms and sources to support programmes (including public and private)**

Due to the lack of a long term agrarian policy and long term research strategy, these cannot be assessed. Projects are funded in the short to medium term, and are not in general part of a long term programme.

Nine of 24 research institutes receive an institutional contribution of the state (through the Ministry). This contribution - besides one exception - does not cover total expenses of an organisation. Remaining funds come from grants that are subjected to competition rules (usually is the rate 1:1). Other research institutes are funded from state grants that get from competition and from service for farmers, agricultural suppliers and customers. Universities acquire most funds from the state (through the Ministry of Education), particularly to cover labour costs and most of operating costs. The rest of operating costs comes from state grants and commercial orders.

7. **Results evaluation**

There is a functional system to evaluate project proposals, to control their course and to assess their results within the process of inviting tenders for projects. Its weak spot is evaluation of results feasibility and their future fate. Up to now, the criteria to assess the projects results have been the quality of acquired knowledge and the scientific approach. The new system to place research projects and to control results shall introduce a change in projects evaluation the priority shall be relation to results application with a complementary report after three years since the project has finished.

The subsequent SWOT analysis is based on the assumption that the ASK consists of research, schools and extension and farmers and the Ministry are outside and therefore they are a seed of opportunities and threats. So that the analysis could be related to certain issue, the AKS ability to address problems in the field of food safety was selected as the starting point. The factors, that have been separated within the SWOT analysis come implicitly or explicitly from the above findings.
SWOT analysis
from the point of the AKS ability to address problems of food safety

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<tbody>
<tr>
<td>there are many experts able to address and above all to analyse problems</td>
<td>the new legislation is not satisfactory</td>
</tr>
<tr>
<td>a part of research is engaged in problems of food safety</td>
<td>lack of integration (a low level of co-operation)</td>
</tr>
<tr>
<td>extension is controlled directly by food producers’ demand</td>
<td>interdisciplinary projects lack</td>
</tr>
<tr>
<td>there is the tradition of high hygienic quality of food production</td>
<td>research results are not always applied consistently</td>
</tr>
<tr>
<td>the new legislation is compatible with that of the EU</td>
<td>there is lack of feedback with advisors and producers</td>
</tr>
<tr>
<td></td>
<td>the demand for research in this direction and for extension from food producers is low</td>
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<tr>
<td>Preparation and entry in the EU shall:</td>
<td>economic position of small and medium food producers</td>
</tr>
<tr>
<td>- require a state policy to improve food safety</td>
<td>delay in agricultural policy preparation</td>
</tr>
<tr>
<td>- force food producers to be able to be competitive (including quality)</td>
<td>lack of funds for projects</td>
</tr>
<tr>
<td></td>
<td>support for research and extension not enough deliberate</td>
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($S =$ strength, $W =$ weakness, $O =$ opportunities $T =$ threats)

The application of the SWOT analysis results means to make use of strong points, to shift weak points purposefully to the strong ones, to exploit identified opportunities and to implement the new system of the AKS development considering potential threats. Though being outside the AKS, the Ministry of Agriculture plays an important role here and significantly assists in improving the system. Some factors that belong in the $T$ group are under control of the relevant officers. The Ministry cannot realise transition of weak points in strong ones directly but it can implement such measures that could catalyse required changes.

8. Additional observations from questionnaire survey realised in research institutes and universities

The share of investigated branches (topical orientations), oriented or directly related to food safety amounts scant 10 per cent in research institutes, 25 per cent in universities. The most frequent customers for the results of activities oriented on food safety from research institutes are the Ministry of Agriculture or its institutes, input providers and agriculture basic industries. The results of universities are also taken by the agriculture basic industries, next there are processors and after them inputs providers and the Ministry of Agriculture.

The research institutes and universities differ significantly in technical forms for presentation of results of their activities. The dominant form in research institutes are studies and reports, then there are
conferences, journals and personal consultations far away. Conferences and professional press dominate in universities, then studies followed by the answer involving media like magazines, TV and radio.

The respondents replied quite colourfully what are the institution types that provided for them information. Research institutes occupy the first place (after quantity of replies), then universities, various conferences and workshops, processing and agricultural businesses.

When questioned about the problem knowledge level using the five-point scale (5= high knowledge), universities rated the current state better (rating 4.3) than research institutes (average rating 2.9).

**ENCLOSURE**

List of research institutes and universities operating in the sphere of agriculture, forestry and food industry.

Research Institute of Agrarian Economics, Institute of Agricultural and Food Information, Research Institute of Food Industry Praha, Research Institute of Forestry and Game, Research Institute of Soil and Water Management, Research Institute of Crop Production, Research Institute of Animal Production, Veterinary Research Institute, Research Institute of Agricultural Engineering, Research Institute of Animal Nourishment, spol s.r.o., Research Institute of Apiculture, Agritec spol s.r.o., Agricultural Research Institute Kromý, spol s.r.o., Research Institute of Forage Crops, Potato Research Institute Havlíkôv Brod, spol s.r.o., OSEVA PRO spol s.r.o., Grass Research Station Ro nov - Zubí, o.z., Oil Plants Research Institute Opava, spol s.r.o., Fruit Research and Breeding Institute, spol s.r.o., Institute of Hop, spol s.r.o., Beet Institute spol. s r.o., Cattle Breeding Research Institute spol s r.o., Milcom a.s., Milk Research Institute, VUC Praha, a.s., Breweries and Malt Houses, Research and Service a.s., Brewery and Malt Research Institute

Czech Agricultural University in Praha, Mendel Agriculture and Forestry University in Brno, University of South Bohemia, Veterinary and Pharmaceutical University Brno, Institute of Chemical Technology Praha.
DENMARK

1. & 2. Introduction and Government policy

In recent years, food safety has been the subject of much public debate in Denmark. Danish consumers are very conscious of food quality, safety and nutrition and their Government aims to secure high food safety standards.

The Ministry of Food, Agriculture and Fisheries (abbr: Ministry of Food) is actively seeking to curb the use of food additives, including the addition of growth promoters to animal feed. Government policy is that antibiotics should be reserved for the treatment of sick people and animals, so the Ministry of Food systematically examines all antibiotic growth promoters with a view to a possible ban on their use in feed. To reduce their consumption, a levy will be imposed on growth promoters.

Government interventions to fight Salmonella and other food pathogens, to reduce the use of medicines in animal husbandry, to prohibit the use of avoparcin for growth promotion in animal husbandry, and to implement a consolidated Food Act are all part of a comprehensive plan to secure and increase food safety.

In this context it has formulated the following objectives:

- to reduce the incidence of salmonella poisoning,
- to keep pathogenic bacteria at the current low levels,
- to ban antibiotic growth promoters throughout the European Union,
- to reduce the use of antibiotics and other medicines in animal husbandry,
- to ensure that food is free of pesticide residues and other chemical pollutants,
- to reduce the use of food additives, and
- to improve costs to the consumer.

3 & 4. Responsibility for the Agricultural Knowledge Systems and existing regulations

At Government level, responsibility for the Agricultural Knowledge Systems (abbr.: AKS) relating to food safety is held by the Ministry of Food. This Ministry must ensure that food products that are produced and sold to consumers are healthy and of high quality, and that a lot of information is maintained concerning these matters.

The Royal Veterinary and Agricultural University (abbr: RVAU) may be described as an independent governmental entity (university status) within the Danish AKS, with special responsibility for higher education relating to agricultural production and food science (see organisation scheme in Country Note on the AKS in Denmark). In 1992, RVAU and The Technical University of Denmark established The Centre for Advanced Food Studies (CAFS). This centre co-ordinates publicly financed food research and joint degree courses in food science and technology. Its primary research objective is to underpin the development of nutritionally correct and healthy foods of high quality.
Formerly, government responsibility for food safety and production was divided between the Ministry of Health and the Ministry of Agriculture and Fisheries. However, national as well as international developments in food production and processing called for a change in the structure. As of January 1 1997, Ministry of Health projects on matters relating to nutrition and food legislation were transferred to the Ministry of Agriculture and Fisheries, and the latter changed its name to the Ministry of Food, Agriculture and Fisheries. A principal aim of the re-structuring was to satisfy public demands for quality, safety and wholesomeness in foods more effectively. The Ministry of Food is now responsible for all governmental activities relating to foodstuffs, e.g. regulation, control, research and public information. A single authority is thus responsible for all inspections and food controls from stable to table.

Consequently, the Ministry of Food expects to achieve the following advances:

- simplified and transparent food legislature,
- uniform control standards,
- a coherent control system involving the whole food chain,
- improved consumer protection, and
- improved information to consumers and industry.

The Danish Veterinary and Food Administration

In March 1997 the Minister of Food, acting upon recommendations from a working group, decided to merge the Danish Veterinary Service and the National Food Agency, thus creating a new service as a directorate under the Ministry of Food, the Danish Veterinary and Food Administration. By amalgamating these two institutions, a unified system was created comprising all food products in the manufacturing, wholesale and retail links. With regard to animal products, its tasks have been unified from farm to the fork, i.e. from primary production to retail trade and consumption. By providing information, advice and inspection, the agency aims to ensure that livestock are healthy and well bred according to the animal welfare regulations and that consumers can enjoy safe food.

The overall aims of the Administration are thus:

- to protect consumers against health risks, secure the truthful labelling of products, and promote sound eating habits, and
- to safeguard the health and welfare of livestock and maintain Denmark’s high veterinary standards.

The specific objectives of this agency are:

- to ensure that food is healthy and uncontaminated,
- to provide consumers with information on food and nutrition,
- to ensure the consistent and effective control and inspection of all food at every stage in the production chain,
- to promote the development of high-quality food,
- to promote the development of sustainable food production,
- to promote Danish food exports,
- to create a sound scientific basis for all activities through research and testing,
- to guard against the influx of dangerous livestock diseases and maintain contingency capabilities,
- to ensure openness with regard to the activities of the Administration, and
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- to ensure uniform conditions for both producers and retailers.

The Administration produces an abundance of information material, and publishes reports, leaflets, etc., for consumers, companies and practising vets.

**SVS and SVIV**

Two Government Research Institutions are connected to the Danish Veterinary and Food Administration: The National Veterinary Laboratory (SVS) and the National Institute for Virus Research (SVIV). Both play a role in the veterinary emergency service.

SVS helps to prevent and combat livestock diseases and food-borne human diseases originating in primary livestock production (zoonoses). SVIV helps prevent and combat viral infections in mammals, including (exotic) viral infections originating outside Denmark. Both institutions work for the production of healthy livestock and food, to the benefit of producers and consumers alike.

The Administration is at present represented throughout Denmark by 12 regional veterinary offices, two meat inspection districts, nine border control points, a veterinary inspector in Greenland, and inspection staff at abattoirs and other meat-processing enterprises.

**Laboratories and research facilities connected to the Administration**

The Institute of Food Safety and Toxicology advises on safety in the context of food additives, nutrients, pollution, pesticide residues, natural plant toxins, pathogenic microorganisms, antibiotic resistance, starter cultures and novel foods. These consultation activities are backed up by the Institute’s own research into toxicology as well as safety in the fields of microbiology and genetic engineering. It is also involved in risk assessment projects carried out by the EU, OECD and FAO/WHO. The Institute furthermore undertakes investigations designed to study and break the links between diet and various diseases.

The Institute also advises the Danish Environmental Protection Agency on the health risks associated with various chemical substances and products, genetically engineered organisms and their products, and the general environmental pollution of soil, water and air.

The Institute of Food Research and Nutrition comprises three divisions and a technical secretariat. The Division of Nutrition documents the content of energy-providing nutrients, vitamins, other secondary substances and additives in food. It is also responsible for diet surveys and advises on nutritional matters and the running of industrial kitchens. The Division for Chemical Contaminants investigates the contamination of food with heavy metals, minerals, mycotoxins, dioxins, PCBs, nitrosamines, etc., from packaging and other sources. Finally, the Division for Food Analysis performs inspection surveys on a number of animal products, concerning their composition, residues of veterinary drugs, and microbiological quality. The Institute acts as reference laboratory for food inspection and is extensively involved in the development of new methodologies.

**Regulations on food safety**

In the spring 1997 the Minister of Food set up a Food Policy Council whose task is to advise on new regulations in Denmark and the EU. This Council will also give advice on control strategies and take
part in major debates on the subject of food policy. Its members are appointed on the recommendations of a number of business organisations and stakeholders.

At the end of 1997, The Minister of Food published a Government paper on food policy. This white paper, which was submitted to the Danish Parliament ("Folketinget") in early 1998, sets out the visions and aims of the Government for the food policy area as a whole over the next few years. It lays down three fundamental principles to be applied in food policy-making: Safety, Transparency and Credibility.

In June 1998, a consolidated Food Act was approved by Parliament which defines the basic terms for Danish food production and food processing. It will come into force in January 2000. The Food Act has thus taken a major stride away from the traditional sector-based approach to food legislation towards a regime of general rules applicable for all groups of food.

The Food Act of 1998 integrates the general law on processed foodstuffs with the individual laws governing the production of basic food products (e.g. meat, milk, eggs, and fish). Rules, regulations, and administrative instructions have been established over many years and cover very different aspects of food production. To reflect the unity of the new Food Act, a review and reorganisation of regulations and administrative instructions will be carried out to improve the impact and transparency of the legislation.

The Food Act forms the foundation for the establishment of one overall national food and veterinary inspection authority. Eleven district offices will carry out inspections, these offices being established on the basis of the existing local food inspection units and national supervisory authorities.

As a member of the EU, Denmark plays an active role in the harmonisation processes associated with the establishment of the Single Market. For this reason, Danish regulations on food safety and foodstuffs are closely linked to European legislation. As a consequence, autonomous national legislation on food production and food processing is restricted in scope.

5. How AKS is addressing the topic

Most public research in the area of food science and human nutrition is undertaken by Government Research Institutes, under the auspices of the Ministry of Food, and by RVAU. Research relating to food safety is also financed by the Ministry of Research as well as the Ministry of Environment and Energy. In addition, research in food science is undertaken by The Technical University of Denmark (DTU) and other universities (see organisation scheme in Country Note on the AKS in Denmark).

At RVAU, the Department of Dairy and Food Science carries out research and provides education within the area of food. This department is part of the Centre for Advanced Food Studies (see below), the Research Department of Human Nutrition (RVAU) and sections of DTU. Furthermore, RVAU and DTU have a joint degree programme in Food Science. This programme is an innovation in the Danish university system, combining RVAU’s biologically oriented expertise with the more technological experience of DTU.

6. Forms of co-operation

The Centre for Advanced Food Studies (CAFS) was established in 1992 by RVAU and DTU in collaboration with the Ministry of Education. It serves a dual purpose: to co-ordinate food research financed by public funds, and to co-ordinate joint degree courses in food science and technology.
CAFS also acts as a bridge between university research and industry, primarily by establishing collaborative projects involving companies and research institutions, and further as an intermediary for activities in the fields of research and education.

The objective of CAFS research is to form a base for the development of nutritionally correct and healthy foods of high quality. Through its research programme for 1995-1997, the centre attained its position as the natural base for Danish food science. The programme of CAFS research for the 1998-2000 period concentrates on three main areas:

- Chemistry, physics, and technology,
- Nutrition,
- Microbiology.

In addition, CAFS co-ordinates courses in food science and technology for the Degrees of B.Sc. and M.Tech., respectively. By combining the research-based learning and practical experience of professional production methods, students are guaranteed a high level of scientific and technical competence and an insight into the biological, technical, and legal conditions associated with food production and consumption. Education takes place at RVAU and DTU. The students thus acquire an all-round education, including all aspects of food science and food manufacturing. Through these courses industry and the authorities are assured highly qualified staff in the areas of food science and food technology.

CAFS is primarily funded by the Ministry of Education, the Ministry of Research and Information Technology and the Ministry of Food. Moreover, some CAFS projects are funded through collaboration agreements with industry, and via other research programmes.

7. **Forms of programme funding and sources of funding.**

The main channels for funding research in food safety and health are:

- Core funded R&D activities at Government Research Institutes of the Ministry of Food and the Ministry of Environment and Energy.
- Core funded academic research and education at RVAU, DTU and other universities.
- Publicly and privately funded R&D programmes partly funded by the Ministry of Food, the Ministry of Research, the Ministry of Environment and Energy, the Danish Basic Research Fund and other public funds.

In addition, the meat and dairy industry funds R&D in the fields of food technology, quality management, and the improvement of production systems.

8 & 9. **Assessment of results and conclusion**

The creation of the Ministry of Food at the beginning of 1997 opened the way for an overall food policy which can benefit food quality, safety and nutrition at every link in the chain from the farmer and gardener, via the processing industry, wholesale and retail sectors, to the consumer.

The Government will continue its efforts in its policy on food safety, including the fight against salmonella and other pathogenic bacteria in food, the fight against pesticide residues and other chemical
pollutants in food, the banning of antibiotic growth promoters, the reduced use of antibiotics and other medicine in animal husbandry, and the general curbing of the use of food additives.
FINLAND

The Finnish salmonella control programmes for live animals, eggs, and meat

1. Introduction

Animal disease in Finland has been well controlled for decades, and salmonella in animals, and in products of animal origin, has been particularly low.

Before Finland became a member of the European Union, the spread of salmonella was restricted through domestic policy — by controlling salmonella at all stages of the food production line and by setting conditions for the importation of live animals, animal-originating foods, and feedstuffs. EU membership changed this, however. Without any special allowances, membership would have meant that live animals and foods of animal origin could have been imported into Finland from Member States according to the principal of free movement of goods inside the Union. At the time of the membership negotiations, the salmonella situation in feedingstuff, live animals, food of animal origin and humans was better in Finland than in the other Union countries. That is why an increase in salmonella infections in live animals and humans was considered to be very likely if live animals, fresh meat and eggs were to be imported into Finland from the other Member States without any special measures being taken. It was also likely that importation without extra control would cause the number of salmonella infections to increase, not only in humans, but also in the animals used in food production. Finland, however, was keen on maintaining its good salmonella record, even as a member of the Union, and during the membership negotiations was determined to find a way of achieving this goal.

In support of this, Finland drew up a salmonella control programme of its own; the EU approved the programme in 1994. As a result of the membership negotiations, additional guarantees concerning salmonella were given to Finland (and Sweden) in the Act of Accession of Austria, Finland, and Sweden 95/1/EC. The Act of Accession amended the Council Directives 64/433/EEC and 71/118/EEC in order to provide these salmonella guarantees. The precondition for these guarantees was that Finland would have a national salmonella control programme concerning salmonella in live animals, meat and eggs, and therefore provide for equivalent guarantees concerning live animals, meat and eggs delivered from other Member States and live animals, meat and eggs produced in Finland.

When establishing this new policy during the membership negotiations, the Ministry of Agriculture and Forestry had wide and thorough discussions with, among others, representatives of trade, food industry, producers and consumers. To estimate the current salmonella situation in Finland, and to set goals for the programme, representatives of medicine, veterinary medicine, and of related research were consulted. Methods, sampling, and other measures included in the programme were discussed with the representatives. All parties were informed of events and goals at all stages of the negotiation and programme preparation, and the Ministry released relevant reports to the media. After the commission had approved the salmonella control programme and related terms, all interested parties and the public at large were informed.
The national salmonella control programme has faced no significant technical or communication problems because information has been disseminated thoroughly and efficiently from the start. All sections of society have approved of the aims and contents of the programme.

2 Description of the National Salmonella Control Programme

The aim of the Finnish national salmonella control programme is to maintain Finland’s favourable salmonella record in livestock, fresh meat, and eggs, and to provide the Finnish consumer with safe and wholesome foods of animal origin. The programme is aimed at helping maintain the level of salmonella in beef, pork, poultry, meat, and living food animals below 1 per cent.

Authorities

The authority responsible for enforcing any legislation surrounding the salmonella control programme is the Ministry of Agriculture and Forestry. The Ministry issues legislation and recommendations concerning the control of live animals and domestic food production.

The National Veterinary and Food Research Institute (EELA) directs and controls the enforcement of the legislation of foodstuffs of animal origin subordinate to the Ministry of Agriculture and Forestry. EELA is also responsible for meat inspection and supervision in slaughterhouses and related establishments. The state veterinary officers of these establishments are employed by EELA.

The municipal food control authorities are responsible for control and inspection of food at the retail level in the municipalities. The officials responsible for the inspection and supervision in low-capacity slaughterhouses, stand-alone cutting plants and meat cold stores are municipal veterinary officers.

Laboratories and methods

EELA is the national reference laboratory for the diagnosis of salmonella, but EELA is also in charge of the approval and surveillance of other laboratories performing salmonella diagnoses. The

**Sampling**

*Cattle and swine*

**Control programme in herds**

The salmonella control programme in cattle and swine herds is based on testing of random samples collected at slaughtering and on examination of all suspected cases at the farm. When salmonella is detected in a lymph node sample at the slaughterhouse, the herd of origin is traced and sampled for the presence of salmonella. Whenever clinical symptoms suggest a possibility of salmonellosis, individual samples of the diseased animal must be taken and examined bacteriologically for salmonellosis. Municipal veterinary officers are responsible for the salmonella control at the herd level.

All swine pedigree breeding units, and those breeding holdings that belong to the national swine health control scheme, are inspected regularly by the official veterinarian and tested for salmonella from faecal samples at least once a year. All boars and bulls sent to semen collection centres have to be examined for salmonella during a 30-day isolation period before being allowed to enter the centre. Finnish legislation prohibits keeping fur animals on the same farms as livestock.

**Slaughterhouses**

Slaughterhouses in which approximately 99 per cent of all cattle and pigs are slaughtered are controlled as separate units. In each of these slaughterhouses, the number of carcasses sampled is sufficient to detect a level of salmonella of 5 per cent with a confidence level of 95 per cent. Low-capacity slaughterhouses in which less than 1 per cent of cattle and pigs are slaughtered are treated as one slaughterhouse. 3000 samples per animal species is sufficient to detect a level of salmonella of 0.1 per cent at the population level. The confidence level is 95 per cent.

In each slaughterhouse at least 59 lymph node samples and 59 swab-surface samples are randomly taken annually from the carcasses of cattle, pigs, and sows. EELA determines the number of samples for each slaughterhouse each year.

**Cutting plants**

Salmonella control in cutting plants is based on examination of the production hygienics. The number of samples is large enough to cover the prevalence of 0.1 per cent at the population level. At the establishment level, the prevalence is 5 per cent and the confidence level is 95 per cent.

Samples can be taken from crushed meat or from trimmings. Each cutting line is sampled separately and at random; the number of samples being based on the production rate of the cutting plant.

**Measures taken if salmonella is isolated**

Any serotype of salmonella is notifiable in Finland. Any isolate of Salmonella from a production animal, from a pet or a wild animal or from a lymph node sample at slaughter, is confirmed at EELA. The
farm of origin of the production animal is identified, and after a positive finding has been confirmed, the following measures are taken at the farm:

Restrictions at the farm

Restrictions at the farm are imposed by the official veterinarian after any indication of salmonella infection in the herd. Officially, the restrictions are imposed after the result is confirmed at EELA. The restrictions include:

- Restrictions on animal movements, selling or transfer of all animals is banned except for sanitary slaughter.
- Evaluation of the level of salmonella contamination by sampling and bacteriological testing of all animals and animal feedstuffs. The measures may also cover people taking care of the animals. Epidemiological inquiry is made to detect the source of salmonella contamination.
- Isolation of diseased animals.
- Only people directly involved in taking care of the animals may enter the animal sheds.
- Informing authorities: municipal health authorities, local inseminators, dairys and slaughterhouses.
- Cleaning and disinfecting the animal sheds and pastures where infected animals have been kept under the control of the official veterinarian.
- After transporting animals from infected herds, vehicles must be thoroughly cleaned and disinfected under the supervision of the official veterinarian.
- Handling of manure only according to the instructions of the official veterinarian.

Clinically diseased animals, and those animals in which the presence of salmonella has been bacteriologically confirmed, are isolated at the farm.

The restrictive measures are lifted when all animals have been tested twice for the presence of salmonella with negative results.

Measures in slaughterhouses and cutting plants

Clinically diseased animals are condemned from slaughter in ante mortem inspection. Clinically healthy but bacteriologically positive animals are sanitary slaughtered, and measures must be taken to avoid cross-contamination during slaughter. In addition, the spreading of salmonella contamination is minimised with careful working hygiene and effective cleaning and disinfection.

If any type of salmonella is found in meat samples from a cutting plant, steps are taken to trace back the contaminated carcasses. Effective cleaning and disinfection of premises and equipment must be carried out in the plant at once, even on suspicion of salmonella contamination. The results are confirmed at EELA and an increased sampling is carried out.
Poultry, poultry meat and eggs

The salmonella control programme of poultry meat and eggs is mainly based on control of the production farms and prevention of salmonella infections at the farm and it covers the whole chain from breeding flocks and hatcheries to production flocks.

All broiler and turkey flocks are tested for salmonella 1–2 weeks before slaughter by faecal sampling, and the results must be sent to the veterinary officer in the poultry slaughterhouse before sending the flock to slaughter.

The salmonella control in cutting plants is based on examination of the production hygienics. The method is similar to the one used in beef and pork cutting plants.

Breeding flocks and hatcheries

The salmonella control program in breeding flocks and hatcheries includes hens and turkeys. Sampling of breeding flocks is carried out according to the Council Directive 92/117/EEC. In addition, faecal sampling on the holding is carried out every two months in those breeding establishments where the directive requires the sampling to be carried out through hatcheries (hatcheries with a capacity more than 1000 eggs).

Sampling in hatcheries is carried out by sampling of one day old chicks and by environmental sampling. Once a year the samples have to be taken by the municipal veterinary officer.

Breeding flocks are sampled by fecal sampling three times during the rearing period: immediately after arrival to the rearing unit, as four weeks old and two weeks before the birds are moved to a laying unit. During the production phase the breeding flocks are sampled by fecal sampling every eight week. Every second sample has to be taken by the municipal veterinary officer.

Commercial egg laying flocks

Sampling of egg laying flocks is carried out by fecal sampling. Sampling is carried out once during the rearing period, 1–2 weeks before moving to a laying unit — and the examination results must be known before moving the birds. During the laying phase, egg laying flocks are sampled three times and the result of the last sampling should be sent to the official veterinarian before sending the flock to slaughter. Once a year the samples have to be taken by the municipal veterinary officer.

Poultry meat

All broiler and turkey flocks are tested for salmonella 1–2 weeks before slaughter by faecal sampling, and the results must be sent to the official veterinarian in the poultry slaughterhouse before slaughtering.

Salmonella control of poultry meat establishments covers fresh poultry meat as defined in the Council Directive 71/118/EEC.

The salmonella control programme in poultry meat establishments is based on regular sampling during the production process and on examination of production hygiene. The programme is carried out in all establishments and the sampling is focused on cutting plants. The poultry establishments in Finland are
approved by the competent authority. Statistically the system in sampling is the same throughout the whole programme: The number of samples is large enough to cover the prevalence of 0.1 per cent at the population level. At the establishment level the prevalence is 5 per cent and the confidence level is 95 per cent. Control in the cutting plant includes hens, broilers, turkeys, guinea fowl, ducks and geese.

Measures if salmonella is isolated

When an approved laboratory detects any serotype of salmonella, it has to immediately notify the municipal veterinary officer. He/she immediately imposes official restrictions, which include a prohibition of moving any bird to or from the holding, except for sanitary slaughter. No eggs may be transported from the holding, except table eggs used for pasteurised products in the case of non-invasive serotypes. The municipal veterinary officer immediately takes a second sample from the suspected flock for tracing back of the source of infection.

The restrictions are lifted from the holding when all the birds have been slaughtered, the premises thoroughly cleaned and disinfected under the supervision of the municipal veterinary officer and environmental samples from the farm have been examined with negative results.

Control of imported foodstuffs of animal origin

Salmonella control of lot of pork, beef, poultry meat and eggs imported to Finland must be performed in the country of origin. This requirement does not apply to lots of pork and beef intended for heat treated products.

Food of animal origin delivered to Finland from other Member States are controlled at the place of destination. The companies that receive foodstuffs of animal origin from other Member States have to notify the relevant authority before they begin to receive those products. In addition, the companies have to inform the relevant authority of every arriving consignment so that the authority is able to check the consignment if necessary. The companies have to check that the consignments and documents, including salmonella certificates, comply with all the requirements carry out salmonella inspections according to their own-check systems. In addition to this, authorities supervising the place of destination perform random spot checks on the lots. The authorities concerned are the official veterinarians in the slaughterhouses and related establishments, and the municipal supervisory authorities in other locations. The official spot-checks have to be regular, non-discriminatory, and based on random sampling.

Food of animal origin imported to Finland from a third country has to undergo a veterinary border inspection. Random spot checks are performed at the lots according to an annual sampling plan issued by the Ministry of Agriculture and Forestry.

3. Description of topic related Government policy

The Finnish Ministry of Agriculture and Forestry has for decades aimed at maintaining a favourable animal disease situation in Finland. This has been shown in legislation as well as in developing research and education. It has been considered especially important to prohibit any dangerous livestock diseases, which are very rare in Finland. In addition, attention has been paid to zoonoses, and in particular to those infections that are transmitted via food from animals to humans. In short, the goal of the government has been to maintain the good level of livestock health and the high hygiene quality of animal-originating foods.
Closely related to these aims is the desire to keep the level of salmonella low in animals used in food production, as well as in foods derived from them. As Finland began to negotiate joining the EU, a special workgroup was formed in the Ministry of Agriculture and Forestry to deal with those EU membership problems that involved veterinary medicine. The workgroup included representatives from the following fields of government and organisations:

- Ministry of Agriculture and Forestry
- Ministry of Trade and Industry
- Ministry of Foreign Affairs
- National Board of Customs
- National Veterinary and Food Research Institute (EELA)
- Finnish Food and Drink Industries' Federation
- The Association of Finnish Local and Regional Authorities
- Central Union of Agricultural Producers and Forest Owners
- The Finnish Consumers' Association
- Finnish Veterinary Association

This workgroup concluded that Finland had to be able to maintain its good salmonella record in the new EU environment, and possibly even to improve it. To achieve this target, a national salmonella control programme had to be drawn up and implemented. The propositions of the workgroup were promoted as Finland's official goal and as advice for the Finnish EU negotiators.

An important aspect of all this was that the official standpoint of the government was based on wide ranging co-operation, open discussion, and broad dissemination of information.

4. Description of existing regulations

The Finnish national salmonella control programme is the reason why the European Union gave additional guarantees to Finland concerning salmonella. The EU legislation developed from this is significant because the additional guarantees also affect the other Member States. The implementation of the programme in Finland requires related domestic legislation, so the full legislation has two levels. The EU legislation includes stipulations concerning all Member States and Finnish legislation includes stipulations concerning domestic implementation.

European Union legislation

Additional guarantees concerning salmonella were given to Finland in the Act of Accession of Austria, Finland, and Sweden 95/1/EC. The Act of Accession amended Council Directives 64/433/EEC and 71/118/EEC in order to provide these salmonella guarantees. The Finnish salmonella control programme was approved by Commission Decision 94/968/EC.

**Finnish legislation**

National legislation concerning the control programme came into force in Finland in 1995. Stipulations concerning the programme have been given through regulations of the Ministry of Agriculture and Forestry. In all, there are five regulations. Separate regulations have been given for the control of cattle and pigs, broilers and turkeys, breeding flocks, egg-laying flocks, and for salmonella control in slaughterhouses and cutting plants. The regulations mentioned above give orders for sampling on supervised production farms and production plants, and for actions that shall be taken if salmonella is suspected, or has been proved to occur, on a farm or at a plant. In addition, EELA has provided instructions for sampling and studying the samples.

In addition to the national salmonella control programme, salmonella is also covered in the legislation by other decisions.

5. **Informing and communication**

**Informing**

The Finnish people are widely interested in the safety and hygienic quality of their food. The public wants to have information about the related legislation and its preparation, as well as about the methods used when examining the safety of food. The public interest becomes especially great when a foodstuff is suspected of causing illness, or when legislation or international treaties are expected to decrease the hygienic quality of food. The administrative officers, producers, and the food industry are aware of public expectations, and aim to act accordingly. When planning the national salmonella control programme, a decision was made to involve all parties in preparing the programme, to ensure early on that all those interested in salmonella control were informed about the progress of the programme at every stage. The Veterinary and Food Department of the Ministry of Agriculture and Forestry also drew up bulletins for the media, and the issue was discussed with representatives of the food industry.

As planned, the press has taken care of informing the public, and no criticism on lack of information has arisen. Information about programme-related topics has also been given in consumer and producer publications.

The details of this programme can be read from a written description drawn up by the Ministry of Agriculture and Forestry. The description includes exact information about sampling, examining the samples, and actions that should be taken after the results. This extensive description of the programme provides authorities, companies, and producers involved in implementation of the programme with all the information they need.

An annual salmonella report from the results of the Salmonella Control Program is published by National Veterinary and Food Research Institute (EELA) and the Veterinary and Food Department of the Ministry of Agriculture and Forestry (MMMEEO). This publication is distributed to all interested parties in Finland and abroad (the tables are in English). The results of the program are also published in the general annual report of EELA as well as in the report of animal diseases published by MMMEEO and EELA. They are also dealt in articles concerning animal diseases and food safety matters in various domestic and international forums. Furthermore, a summary of all the results in feed, animals, food and humans in 1995-1997 derived from various sources will be published in the “Zoonoses in Finland 1995-1997” –report both in Finnish and in English (in print).
In the beginning of the program, MMMEEO and EELA arranged education for local veterinarians in different parts of Finland. After the new refined decisions of MMMEEO and instructions of EELA will be published this year, and education tour will be arranged again.

The close co-operation with authorities, producers and industry is important in implementing this programme. This has been and still is working very well by regular meetings and follow up of the situation.

**Discussion forums**

The Ministry of Agriculture and Forestry has used all existing possibilities to supply information systematically and openly. Thereby, it has formed a picture of the need for information and concentrated its dissemination towards those who need it most.

The control programme has been introduced and discussed, for example, in the Advisory Committee of Foodstuffs, which is an official committee of the Ministry of Trade and Industry. The following ministries, central administrative boards, and organisations are represented on this committee:

- Ministry of Trade and Industry
- Ministry of Agriculture and Forestry
- Ministry of Social Affairs and Health
- National Food Administration
- Finnish Customs Laboratory
- Finnish Consumers’ Association
- Central Union of Agricultural Producers and Forest Owners
- Finnish Food and Drink Industries’ Federation
- Finnish Food Marketing Association
- The Finnish Food Workers’ Union

Handling the topic in existing organisations in which various parts of society are widely represented has provided an opportunity to inform and evaluate the need for information.

In addition to the bulletins of the Ministry of Agriculture and Forestry, the programme has been discussed in publications by the National Food Administration, the National Veterinary and Food Research Institute (EELA), and the Finnish Veterinary Association, as well as at training events organised by these groups.

6. **Problems, Qualifications, Control, and Development**

No specially designed or approved method related to agricultural information systems was applied to the preparation of the Finnish salmonella control programme, or its related training or informing. The control programme was prepared at the Veterinary and Food Department of the Ministry of Agriculture and Forestry in co-operation with the National Veterinary and Food Research Institute (EELA). Before the completion of the programme, the Ministry negotiated its contents with EU commission officials who gave their opinions on the programme requirements. These opinions were extremely important, because it was the commission that gave final approval for the programme and the terms relating to its implementation. In addition, the Ministry negotiated with Swedish authorities who were simultaneously preparing a similar control programme for Sweden.
Problems

There have not been any significant problems implementing the control programme, which would have influenced the reliability of the results or hampered sampling and examination of the samples. The level of salmonella in animals and foodstuffs of animal origin has been studied in Finland for several decades, where there is also a long history of combating salmonella. As far as training and research are concerned, special attention has been paid to the facts that relate to the implementation of the salmonella control programme. These factors facilitated the implementation of the wider control programme and diminished any related risks.

However, some minor problems have arisen when carrying out the programme in practice. A lot of samples for the laboratory tests are taken, so it is essential that the accompanying letters include enough and correct information about the type and origin of the sample. There have been some inaccuracies in these letters that have caused some difficulties in collecting of the numbers of samples studied. However this hasn’t resulted in problems concerning the actions taken after salmonella isolations.

It has been possible to carry out the programme itself with almost no problems at all. The methods used, however, have engendered discussion and criticism. Criticism has come from domestic meat importing companies as well as companies of the other Member States who would like to export meat to Finland. With approved methods, the examination takes 3-4 days. This naturally impedes delivering meat to the Finnish companies. The parties concerned have suggested that alternative methods (e.g. rapid methods and test kits) could also be used for testing. This way, the tests would take 1-2 days less. However, the EU commission has not approved of these methods and so they cannot be used for tests included in the salmonella programme.

Qualifications

The basic requirement for the programme is that, on the basis of its results, the level of salmonella in meat, eggs, and the animals producing them can reliably be evaluated annually. Based on the results, actions will be taken to eliminate the detected infections. This is why the results have to be reported quickly and correctly; they have to be reliable and comparable. This is the reason for the special quality requirements for the laboratories that shall be restricted in the very near future; the reliability of the results depending on how the sampling is done and how the samples are treated. This is why the procedure has to follow detailed instructions. The laboratories are only allowed to use methods approved by the EU commission for testing the samples that are part of this programme.

Control of programme

The laboratories shall pass on their test results monthly to EELA, who will summarise them for the Ministry of Agriculture and Forestry. On the basis of this summary, the sampling and results can be monitored continuously, and the results and their quality can be evaluated.

The role of EELA is to supervise sampling, collect the results, approve the laboratories and confirm the salmonella isolations made at the local level. As the national reference laboratory, it also advises municipal and industrial laboratories on methodological problems and quality control, and co-ordinates proficiency tests.
Development

The implementation of the control programme does not require further development. Instead, the functionality of the programme is being improved and the laboratories are to be supervised more efficiently. The Ministry of Agriculture and Forestry has issued a new regulation concerning laboratory requirements and is refining the decisions concerning the salmonella control program, especially the reporting system. EELA is preparing more detailed instructions for sampling and reporting of the results.

7. Description of forms of co-operation

The official network for co-operation consists of the authorities responsible for the implementation of the control programme. They are listed in chapter 2 of this report. The supreme authority is the Veterinary and Food Department of the Ministry of Agriculture and Forestry. The National Veterinary and Food Research Institute (EELA) is in charge of implementing the programme, of the operations of the laboratories approved by the institute, and of collecting the test results. The Provincial State Officers supervise actions in the provinces, and the local authorities are the Municipal Veterinary Officers as well as State Veterinary Officers.

In addition to the official implementation organisation, meat industry companies, livestock producing farms, and companies that are approved as first sites of arrival take part in the programme. The programme is also supported by the Association for Animal Disease Control. 95 per cent of dairies, slaughterhouses, and egg packing plants are members of this association, which also involves rural advisory organisations and industrial feed companies. The goal of the association is to maintain and promote the health of production animals and ensure the safety of foods derived from domestic animals, and it gives instructions for the importation of animals and animal feed to control the risks of animal diseases.

There is also co-operation educationally, especially with the Faculty of Veterinary Medicine at Helsinki University. The Faculty gives information of the programme in addition to general bacteriology and epidemiology, and the topic is also handled during specialist veterinary training. The Association for Animal Disease Control informs the producers about the programme and can assist technically when needed.

The diagram below shows the parties in co-operation.
8. **Forms of programme funding**

The main part of the expenses caused by implementing the salmonella control programme is paid for by producers and industry. Slaughterhouses pay for taking the faecal samples in the slaughterhouse as well as lymph node samples, carcass surface swabs, and their testing. Cutting plants pay for their own sampling and also the testing of such samples in laboratories.

The owner of the animals is principally responsible for the expenses of sampling on farms and testing those samples in laboratories.

The State and municipalities will contribute to the expenditure only by means of their officers controlling and advising as part of their job.

The salmonella infection causes costs like cleaning and disinfection and killing of animals etc. to the producer. Principally, the producers pay them by themselves. However, 80-90 per cent of the producers have insurances for salmonella.

9. **Assessment of results**

In 1996, Finland prepared the Report on the Experience Gained on Control of Salmonella in Poultry in Finland and in 1998, Finland published the Report on the Experience Gained on the Control of Salmonella in Finland in Beef, Pork, and Poultry Meat and the Implementation of the Salmonella Guarantees in Trade for the EU. In these reports, Finland states that the national salmonella control programme has worked well. Only minor problems have arisen and the aim has been to solve them as quickly as possible. The prevalence of salmonella has been kept at a low level in meat, and therefore the goal of salmonella control has been achieved. Salmonella has remained under 1 per cent in cattle, fattening pigs, and sows. In poultry, salmonella has been kept under 5 per cent in cutting plant samples, and under 3.2 per cent in samples taken from live poultry before slaughter.

In spite of some problems encountered in the implementation of salmonella guarantees, these are also functioning well at the moment.

The testing of meat and live animals for salmonella is only a tool, not the goal, for the control programme: i.e. restrictive measures to be taken when salmonella contaminated meat or animals are found. The basis for the favourable salmonella situation in Finland is good husbandry practice of livestock and poultry, and good manufacturing practices of the industries.

To evaluate the costs and the benefits of the salmonella control programme, Finland has made cost-benefit analyses for poultry and of meat production. These reports have been sent to EU. Furthermore, the cost-benefit for egg production has been reported in Finland.

The cost-benefit analysis estimates the expenses for the producers, the industry, and the State caused by the implementation of the control programme. Estimates have also been made of how the costs to human health care and the markets would be influenced if there were no control programme. On the basis of the cost-benefit analysis, it can be estimated that one FIM (Finnish mark) invested on meat salmonella control will benefit society 5.40 FIM, if market disturbances are excluded from the calculation. If market disturbances are included, the benefit-cost ratio is increased to 258 FIM. According to another analysis, the benefit-cost ratio of egg production is 19.80 FIM if market disturbances are excluded from the calculation. Even though elements of uncertainty are always included in cost-benefit analysis, the analyses show that society has benefitted from the salmonella control programme.
10. Summary and conclusions

*Salmonella* infections are important zoonoses in Finland, even though their prevalence in this country is low compared to most other countries. An agreement was reached with the EU commission at the end of 1994 for a National salmonella control programme, and the programme was started in May 1995. The aim of the programme was to maintain the low prevalence of *Salmonella* infections in food animals and to prevent transmission to humans. The programme also allows Finland to monitor certain imported food for salmonella.

The control programme concerns cattle, pigs, and poultry as well as beef, pork, poultry meat and eggs. In slaughterhouses, samples are taken randomly from carcasses (surface samples), lymph nodes, and cut meat according to the annual schedules given by the National Veterinary and Food Research Institute (EELA). Faecal samples are taken from all categories of poultry and hatcheries at given intervals. There are no annual schedules for sampling cattle herds or pigs. Faecal samples are taken from animals showing

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**SWOT analysis**

**Strength**
- society approval and support
- government support
- supports the national health goals
  - scientific basis
  - economically justified
  - functional administrative and implementation organisation
  - readiness to change

**Weakness**
- communication between some of the test laboratories and the reference laboratory

**Opportunity**
- the low salmonella level can be maintained in meat and eggs as well as in the animals producing them
- the programme makes it possible to prevent the spread of infections when importing live animals and meat
- the programme creates opportunities to cut down expenses on resisting and treating diseases
- the progress of the salmonella situation can be monitored with the programme

**Threat**
- the opinions of the other Member States turn negative
- the conditions imposed on importation, based on the national salmonella control programme, are considered to restrict the free moving of goods
clinical signs, from herds sending animals to semen collection centres, or from swine herds belonging to the national swine health control programme.

The goals set for the control programme have been well reached. The salmonella level has remained below 1 per cent nationally in beef, pork, and poultry meat, as well as in live production animals. The level of salmonella in meat industry plants has also been kept below 5 per cent. The salmonella situation has partially improved during the implementation of the programme.

Even the technical implementation of the programme has worked well, despite some very minor problems. The functionality of the programme shall continuously be improved with efficient supervision, new instructions, and new legislation.

The costs and benefits of the national salmonella control programme have been evaluated; on the basis of a cost-benefit analysis, it can be stated that it is economically justified to resist the spread of salmonella with the aid of the control programme described above.
Dans les années 1970, le consommateur français recherchait une alimentation au meilleur prix ; dans les années 1980, une alimentation plus rapide. Dans les années 1990, il privilégiait la quête de l'équilibre à travers son régime alimentaire. Aujourd'hui, après la crise de la vache folle et celle du poulet à la dioxine, le consommateur traverse une crise de confiance et s'interroge sur l'origine et la sécurité des aliments. L'apparition de nouvelles technologies et l'allongement de la chaîne alimentaire, lié à l'éloignement du monde rural, se sont ajoutés à ces facteurs. Alors que la technique avait jusqu'alors fait continuellement progresser l'industrie agro-alimentaire et la qualité sanitaire des produits -- pasteurisation, amélioration de la chaîne du froid, -- elle induit, désormais, des doutes sur la qualité sanitaire des produits issus de l'agriculture et de l'élevage modernes. La nouveauté provoque également des interrogations et l'arrivée, sur le marché, d'aliments contenant des produits animaux ou végétaux transgéniques fait surgir de nouvelles questions. De plus, le consommateur français accorde une valeur particulière à son alimentation et, s'il souhaite des produits répondant parfaitement aux normes en matière de sécurité des aliments, il aspire néanmoins à préserver ses spécificités, comme peuvent en témoigner les produits représentatifs d'un terroir ou d'un savoir-faire particulier.

Par ailleurs, le consommateur estime, quelquefois, ne pas disposer de toutes les informations relatives à la composition ou à la provenance des produits alimentaires. Aujourd'hui, les avantages des organismes génétiquement modifiés (OGM) végétaux peuvent être nombreux : des rendements améliorés, des résistances accrues aux herbicides, des plantes protégées contre certains virus ... Pour ce qui concerne le secteur animal, l'apparition des OGM aurait pour principaux objectifs d'augmenter les performances et d'améliorer la résistance des animaux aux maladies. Cependant, la connaissance dont dispose le consommateur à l'égard de produits pouvant contenir des OGM est encore insuffisante pour ne pas soulever d'interrogations. De plus, les risques de dissémination de gènes, d'introduction de gènes de résistance aux antibiotiques, de flux de gènes par croisement avec différentes autres espèces, ... peuvent exister et sont difficiles à apprécier. Toutefois, en France, avant de délivrer l'autorisation de commercialisation, des mesures spécifiques prises par le Ministère de l'agriculture et de la pêche (consultation du Comité technique permanent de la sélection des plantes cultivées (CTPS) qui vérifie notamment la stabilité de la plante, et de la Commission du génie biomoléculaire (CGB), qui étudie l'impact de l'OGM concerné sur l'homme et l'environnement, voire de la Commission de génie génétique (CGG)), sont indispensables. Des précautions sont prises telles que l'étiquetage des produits suivant la directive "novel food", pour tout produit contenant des OGM, ou encore l'obligation de disposer d'une autorisation de mise sur le marché délivrée par la Commission Européenne, si une plante transgénique entre dans la composition du produit.

Le consommateur n'a pas toujours bénéficié d'une éducation approfondie en matière de sécurité sanitaire des aliments et peut, ainsi, se trouver à l'origine de toxi-infections alimentaires familiales, suite à des manipulations erronées des produits. Parallèlement, le seuil d'acceptabilité, par le consommateur, du niveau de risque sanitaire lié à l'alimentation est de plus en plus faible, bien que les Toxi-Infections Alimentaires Collectives (TIAC), dues majoritairement à des Salmonelles, posent relativement peu de

1. The English version of this report can be found in the Annex of this paper.
problèmes majeurs de santé publique. Pour répondre à ces attentes et sur la base du principe de précaution, l'affinements des techniques d'analyse microbiologique permet aux responsables de santé publique d'exiger des taux de contamination de plus en plus bas. Par conséquent, un souci de meilleure information, de transparence sur tous les processus de fabrication ou de distribution et de traçabilité des produits doit guider l'action des pouvoirs publics.

Pour ce qui le concerne, le secteur agricole a toujours eu pour mission centrale de contribuer à mieux nourrir les hommes en quantité, en qualité, à un coût acceptable et avec un souci, de plus en plus de ce qu'il est, de préservation de la sécurité et de la santé du consommateur, ainsi que de l'environnement. Les agriculteurs se sont engagés à satisfaire les attentes des consommateurs, par une adaptation des pratiques agricoles (agriculture raisonnée, plus durable), par la mise en place de systèmes de traçabilité de plus en plus performants, par la négociation avec les industriels, dans le cadre d'une production intégrée, de cahiers des charges toujours plus précis, et par l'exercice d'une surveillance sanitaire sur leurs produits.

Toutefois, les nombreuses interrogations relatives au rôle de l'élevage dans la sécurité des productions - l'impact du facteur "alimentation" dans l'induction des Encéphalopathies Subaiguës Spongiformes Transmissibles (ESST), les effets des promoteurs de croissance sur la viande et le lait, et notamment leurs conséquences sur la santé publique, la santé et le bien-être des animaux -, mais aussi celles liées à la production de végétaux - la possible présence de résidus de pesticides, d'engrais, ... dans les produits, l'impact sur le milieu naturel avec la contamination de nappes phréatiques, l'application à ces produits de procédés de transformation toujours plus performants -- ont soulevé des inquiétudes parmi les agriculteurs.

Si les industriels sont soumis à des interrogations de nature différente, il n'en demeure pas moins que leur intérêt même réside dans le fait que le consommateur aie confiance dans les produits proposés. A cet égard, la sécurité de l'aliment représente un des critères de choix, au même titre que le prix du produit. La mise en place et l'utilisation de systèmes "qualité" pour garantir la sécurité des aliments (analyse des dangers, détermination des points critiques et maîtrise de ceux-ci) a représenté, et est toujours, une démarche fondamentale permettant une meilleure maîtrise de la sécurité sanitaire. Cependant, la perception de la sécurité des aliments par le consommateur est souvent fort différente de celle du producteur, de l'industriel ... ou simplement de la réalité.

1. Sécurité des aliments : de la définition aux actions de contrôle

Si on définit la sécurité des aliments comme étant l'état selon lequel le produit doit présenter un seuil de risque accepté (et détectable ...) le plus bas possible, il reste à préciser ce que sont ces risques alimentaires susceptibles de nuire à cette sécurité. La sécurité et l'hygiène des aliments peuvent être entravés par plusieurs facteurs : la présence d'agents pathogènes (bactéries, virus prions notamment) voire de leurs métabolites (toxines, ...), d'agents antibiorésistants, de substances indésirables (métaux lourds, pesticides, radionucléides, produits de nettoyage, ...) ou bien encore la mise en œuvre des nouvelles technologies et de comportements alimentaires "erronés" (mauvaise conservation des aliments, interactions produit/emballage,...).

En conséquence, il convient de définir des niveaux de risques socialement acceptables, sans occulter que l'évaluation quantitative de ces risques par le scientifique est particulièrement difficile. Il est également nécessaire de hiérarchiser ces risques pour aider à la décision publique - voire industrielle -, tout en privilégiant une démarche visant à la prévention des contaminations plutôt qu'à la mise en place de traitements, à posteriori, de contaminations avérées. Cette première étape représente l'évaluation des risques. Une seconde étape est constituée par la gestion des risques, dévole aux pouvoirs publics. Il s'agit de déterminer les mesures à prendre pour maîtriser les risques et d'assurer le contrôle de celles-ci, en
respectant, autant que nécessaire, le principe de précaution. Ces deux étapes nécessitent un appui fort du système de connaissances agricole pour apporter des éléments de réponses aux différentes problématiques abordées, permettant ainsi au citoyen d'avoir pleinement confiance dans l'aliment qu'il consomme.

La mission de contrôle est conduite, en France, par trois administrations en étroite concertation : la Direction Générale de l'Alimentation (DGAL) du Ministère de l'agriculture et de la pêche, les services de la Direction Générale de la Concurrence, de la Consommation et de la Répression des Fraudes (DGCCRF) du Ministère de l'économie, des finances et de l'industrie et ceux de la Direction Générale de la Santé (DGS) du Secrétariat d'État à la santé. S'inscrivant dans un contexte réglementaire européen type "nouvelle approche" (directive hygiène 93/43 CEE) mais aussi international avec les règles édictées par l'Organisation Mondiale du Commerce (OMC) et le rôle joué par le Codex Alimentarius, les missions de la DGAL consistent, notamment, en l'élaboration des règles relatives à la sécurité et à la qualité des produits agricoles et alimentaires, en la prise en considération de bonnes pratiques agricoles visant à la préservation de l'environnement (mission relative à la protection des végétaux), en veillant à la promotion de la qualité sous toutes ses formes. Placées sous l'autorité du Directeur Départemental de l'Agriculture et de la Forêt, la mise en œuvre effective des contrôles, et notamment la réalisation des plans de surveillance (métaux lourds, pesticides, radioactivité), ainsi que la centralisation des informations à l'échelle du département, est assurée par les Directions des Services Vétérinaires (DSV). En leur sein, des personnels techniques y exercent ces missions : des vétérinaires inspecteurs et des techniciens des services vétérinaires.

2. L’apport de la formation aux acteurs intervenant dans le domaine de la sécurité des aliments

Le nouveau cursus des études vétérinaires, désormais organisé en trois cycles, a permis la création de formations spécialisées, permettant aux élèves de diversifier leurs débouchés. Ainsi, le Conseil National de la Spécialisation Vétérinaire, instance tripartite (administration, enseignantschercheurs et professionnels) prévue par le décret du 7 décembre 1992 relatif à la spécialisation, s'est prononcé pour la création de spécialités en relation avec la sécurité des aliments : "santé publique vétérinaire", "hygiène et technologie alimentaires" mais aussi : "gestion de la santé et de la qualité en production laitière", "gestion de la santé et de la qualité en production porcine", "gestion de la santé et de la qualité en productions avicole et cunicole". Pour ces spécialités, a été organisée la première année de formation, sanctionnée par un Certificat d'Études Approfondies Vétérinaires (CEAV). Les vétérinaires inspecteurs appelés à exercer une mission de santé publique suivent une formation dont la majeure partie se déroule à l'Ecole Nationale des Services Vétérinaires (ENSV) à Lyon, soit de deux années, après un recrutement interne (lors de leur avant dernière année d'ENV), soit d'une année après un recrutement externe, faisant suite à une expérience professionnelle. Dans ce cadre, ces élèves fonctionnaires suivent le CEAV de santé publique vétérinaire, leur permettant d'acquérir, outre les connaissances scientifiques de base, les compétences propres requises dans l'exercice de leurs missions de service public : une vue synthétique des filières agricoles et alimentaires des élevages au consommateur, une bonne compréhension des motifs et justifications de la réglementation ainsi que de l'organisation générale tant nationale qu'internationale conduisant à sa définition, et une connaissance optimale de leurs droits et devoirs au sein du dispositif.

Les techniciens des services vétérinaires, après réussite à un concours de niveau baccalauréat, intègrent l'Institut de Formation du Ministère de l'Agriculture (INFOMA) sur le site de Lyon et bénéficient, durant deux années, d'enseignements théoriques et pratiques, ainsi que d'un stage pratique, leur permettant, sous l'autorité des vétérinaires inspecteurs, d'assurer des tâches techniques et de participer aux missions de contrôle et de surveillance, qui incombent aux services vétérinaires, tout particulièrement en matière d'inspection sanitaire ou qualitative des animaux vivants et des denrées animales ou d'origine animale.
De plus, des Ecoles d'ingénieurs, et tout particulièrement l'Ecole Nationale Supérieure des Industries Agricoles et Alimentaires (ENSIA) et l'Ecole Nationale d'Ingénieurs des Techniques des Industries Agricoles et Alimentaires (ENITIAA), concourent à la formation de près de 250 diplômés par an, occupant, à terme, des places de cadres dans le secteur de la sécurité des aliments, exerçant de façon privilégiée dans le domaine industriel et dans celui de la qualité (assurance-qualité) et de la recherche. La récente campagne d'évaluation et de reconnaissance des formations dispensées en troisième année d'écoles d'ingénieurs a permis de labelliser près de dix formations intégrant les principes relatifs à la sécurité des aliments.

3. Une politique gouvernementale offensive

Ces inflexions conduites par les pouvoirs publics et d’optimiser la qualité des produits, dans le cadre des actions de formation, ont été intégrées dans les débats menés ces dernières années relatifs à la pédagogie, à la recherche ou aux structures.

La priorité donnée à la qualité, l’hygiène et la sécurité des aliments a encore été affirmée dans le projet inscrit dans le contrat initié en 1993 et venant à son terme en 1999, passé avec la région Ile-de-France, en vue de regrouper sur un même site, les travaux concernant cette thématique, assurés par les organismes suivants : l'Ecole Nationale Vétérinaire d'Alfort (ENVA), le Centre National d'Études Vétérinaires et Alimentaires (CNEVA), le Centre Technique de la Salaison, de la Charcuterie et des Conserves de Viandes (CTSCCV) et le Centre Régional de Recherche, Innovation et de Transfert de Technologies pour les industries agro-alimentaires de la région Ile-de-France (CRITT-IAA-IDF).

De la création de l'Afssa ...

A l'amont, il est indispensable que l'évaluation des risques permette d'enrichir en continu les réflexions conduites par les pouvoirs publics et d'optimiser la qualité de l'expertise collective française en matière de sécurité sanitaire des aliments. A cet égard, l'Etat français a décidé, par la loi n°98-535 du 1er juillet 1998 relative au renforcement de la veille sanitaire et du contrôle de la sécurité sanitaire des produits destinés à l'homme, une modification du dispositif national de veille sanitaire.

Quatre organes ont été créés par cette loi :

- l'Institut de Veille Sanitaire (IVS), qui enregistre morbidité et mortalité humaine dans le cadre d'une veille sanitaire globale. Cet IVS dispose d'une mission d'alerte des pouvoirs publics,

- l'Agence Française de Sécurité Sanitaire des Produits de Santé (AFSSPS), qui correspond à l'actuelle Agence du Médicament et qui voit son champ de compétences élargi aux implants, aux prothèses, aux produits sanguins et aux cosmétiques,

- l'Agence Française de Sécurité Sanitaire des Aliments (AFSSA), chargée de la veille, de l'alerte et de l'évaluation des risques que présentent les aliments,
le Comité National de Sécurité Sanitaire, chargé d'assurer la liaison entre toutes les composantes du système de sécurité sanitaire français.

Par décret n° 99-242 du 26 mars 1999, ont été précisés l'organisation et le fonctionnement de l'AFSSA, après la mise en place de l'IVS et de l'AFSSPS. L'AFSSA, établissement public placé sous la tutelle de trois ministères respectivement en charge de la santé, de l'agriculture et de la consommation, constituera l'outil national de l'évaluation des risques sanitaires et nutritionnels des aliments. En outre, avec l'intégration en son sein du Centre National d'Etudes Vétérinaires et Alimentaires (CNEVA), l'AFSSA assurera, auprès du Ministère de l'agriculture et de la pêche et des autres ministères intéressés, l'appui scientifique et technique nécessaire à l'élaboration, l'application et l'évaluation des mesures prises dans les domaines de la santé animale, du médicament vétérinaire, du bien-être des animaux et de leurs conséquences sur l'hygiène et la sécurité des aliments destinés à l'homme ou à l'animal. Cette agence pourra proposer toute mesure qu'elle juge opportune pour préserver la santé publique et rendre public ses avis et recommandations, y compris suite à une saisine réalisée par une association de consommateurs. Dans le domaine alimentaire, la fixation du niveau de risque étant particulièrement délicate, celle-ci sera effectuée par l'Etat sur la base des éléments chiffrés transmis par l'AFSSA.

L'AFSSA sera obligatoirement consultée sur les projets de dispositions législatives ou réglementaires portant sur ses domaines de compétence, ainsi que sur les programmes de contrôle et de surveillance mis en œuvre par les services de l'Etat. A cet égard, elle pourra proposer des priorités, formuler des recommandations, demander des contrôles ou des investigations spécifiques. Elle mènera des programmes de recherche scientifique et technique, de manière autonome ou avec le concours d'organismes publics ou privés de recherche, de développement et d'enseignement, notamment dans les domaines de la santé animale, du bien-être des animaux et de leurs conséquences sur l'hygiène publique, ainsi que de la sécurité sanitaire des aliments. Elle délivrera les autorisations de mise sur le marché des médicaments vétérinaires dans le cadre de l'Agence Nationale du Médicament Vétérinaire (ANMV), qui lui est intégrée. Enfin, l'AFSSA aura un rôle consultatif sur les questions relevant de son domaine de compétences de par la création en son sein de comités d'experts spécialisés résultats de l'intégration de plusieurs commissions (Observatoire des consommations alimentaires, Centre National d'Etudes et de Recommandations sur la Nutrition et l'Alimentation, ...).

La structuration interne de l'AFSSA est en mise en œuvre. Toutefois, les travaux de recherche et d'appui scientifique et technique aux pouvoirs publics, conduits antérieurement par le CNEVA, et plus spécialement ceux relevant du département "Hygiène, qualité et sécurité des aliments", s'inscrivaient dans une double perspective de prévention des contaminations, et de recherche et d'identification des contaminants (essentiellement suite à des TIAC), en croisant les approches "filières" (avicole et porcine, lait, poisson, et viande) et "produits finis" (viandes de volailles et de porcs, lait et produits laitiers, produits de la pêche, restauration collective et plats cuisinés). Les méthodes modernes de diagnostic sont développées : biologie moléculaire, méthodes immunologiques et méthodes physico-chimiques pour l'évaluation de la qualité ou la détection des contaminant de l'environnement éventuellement présents dans l'alimentation humaine (toxines microbiennes, radionucléides, pesticides, métaux lourds). L'action du CNEVA était focalisée sur les produits d'origine animale ; le champ de compétences de l'AFSSA a été élargi à l'ensemble des produits alimentaires.

Si l'objectif premier de la création de l'AFSSA est d'appuyer l'activité d'évaluation des risques sur les compétences du CNEVA, l'appel à d'autres organismes exerçant des missions de recherche comme l'Institut National de la Recherche Agronomique (INRA) demeure nécessaire. Outre la création de l'AFSSA, au cours des quinze dernières années, les pouvoirs publics ont également fortement encouragé la recherche dans le secteur des industries agro-alimentaires. Cet effort s'est traduit par la mise en place de programmes incitatifs, menés conjointement par les ministères en charge de la recherche et de l'agriculture, par un appui de l'Agence Nationale de Valorisation de la Recherche (ANVAR) à des efforts d'innovation.
menés par les entreprises et par une clarification du paysage institutionnel de la recherche publique française.

... à la mise en œuvre de programmes de recherche interministériels


En 1996, un programme de recherche interministériel (ministères en charge de la recherche, de l’agriculture et de la santé) et inter-organismes (AFSSA, CEA, CNRS, INRA, INSERM) plus spécifique, ciblé sur les ESST, a été lancé. Il comporte un axe spécifique de recherche sur les aspects liés à la sécurité des aliments, dont l'objectif est d'apporter des réponses concrètes aux problèmes rencontrés (par exemple : comment assurer une traçabilité maximale de certains organes prélevés sur les animaux, comment extraire la moëlle épineuse des bovins et des ovins dans des conditions optimales de sécurité pour l’ouvrier et le consommateur, ...), en coordination avec les industriels et les partenaires du développement.

4. Un apport incontesté de la recherche publique

Les travaux soutenus par ces programmes interministériels représentent un atout important pour le dispositif français, contribuant ainsi à la consolidation du dispositif de recherche et de développement des entreprises et des relations entre celles-ci et la recherche publique. Les objectifs et les lignes de force des organismes publics exerçant des missions de recherche sont définis par les organismes eux-mêmes au sein de leur instances (conseils scientifique et d'administration) en étroite concertation avec leurs tutelles ministérielles. Par ailleurs, la tenue de Comités Interministériels pour la Recherche Scientifique et Technique (CIRST), sous la présidence du Premier ministre, permet de valider et d'harmoniser les champs d'intervention de chacun de ces organismes. Il est important de souligner que, s'inscrivant dans une démarche encore plus forte de rapprochement entre l'enseignement supérieur et la recherche, de nombreuses unités mixtes de recherche (UMR) ont été créées, faisant suite aux unités de recherche.
associées, concrétisant la volonté commune des établissements d'enseignement supérieur et des organismes de travailler ensemble sur des thématiques communes.

Pour ce qui concerne la sécurité des aliments au sein de l'INRA, dès 1989, les travaux menés dans le domaine de la nutrition humaine au sein du département de "Nutrition, alimentation, sécurité alimentaire" furent renforcés. En 1997, la création d'une nouvelle direction scientifique "Nutrition humaine, sécurité alimentaire" répond à deux impératifs : renforcer les actions de l'organisme dans ces domaines scientifiques et apporter des réponses aux attentes des citoyens, et par voie de conséquence, aux préoccupations des autorités administratives et politiques. Dans ce cadre, sont conduites des recherches pour mieux maîtriser les mécanismes de toxicité, la genèse, la biodisponibilité et le métabolisme des toxiques potentiels, ainsi que les risques chimiques. Une approche positive de la sécurité des aliments représente aussi un des axes de recherche, permettant de considérer l'alimentation comme susceptible d'apporter à l'organisme une protection à l'égard des composés potentiellement toxiques, par la présence de composés "non nutritionnels".

En partenariat avec les établissements d'enseignement supérieur, des recherches sont, par exemple, conduites sur l'évaluation des risques associés à la présence des xénobiotiques dans les aliments (le Cadmium dans la chaîne alimentaire, en partenariat avec l'Ecole Nationale Vétérinaire d'Alfort - ENVA) ou bien sur l'optimisation des technologies de stabilisation des ovoproduits pour une plus grande maîtrise de la sécurité alimentaire (en partenariat avec l'Ecole Nationale Supérieure Agronomique de Rennes - ENSAR).

Le Centre national du machinisme agricole, du génie rural, des eaux et des forêts (Cemagref) affiche également des priorités en matière de recherche dans le domaine de la sécurité des aliments, en relation avec la maîtrise des procédés frigorifiques et de la chaîne du froid alimentaire. Les travaux portent sur la mise au point de nouvelles technologies de réfrigération et de congélation, et sur la maîtrise des températures par l'adaptation d'équipements, tout en permettant la protection de l'environnement. D'autres études s'inscrivent dans une démarche d'analyse des risques, modélisation et mise au point d'outils d'aide à la décision pour la sécurité des filières de production, par exemple, dans le cadre des prions.

Pour ce qui le concerne, l'Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) intervient dans le domaine de l'alimentaire, comme secteur prioritaire, en hygiène et sécurité, sur les méthodes de détection et contamination des coquillages par les micro-organismes pathogènes (virus et bactéries), les contaminations chimiques et les toxines des algues, mais aussi sur les risques potentiels pour le consommateur et le rôle épurateur joué par les bivalves. Dans ce cadre, des collaborations sont formalisées avec l'Ecole Nationale d'Ingénieurs des Techniques des Industries Agricoles et Alimentaires (ENITIAA) en sciences des aliments et portant, plus particulièrement, sur les interactions microbiennes dans les produits de la pêche.

4. La contribution du développement en matière de sécurité des aliments

Si la mise en œuvre de travaux scientifiques plus fondamentaux est primordiale pour l'évaluation optimisée des risques, l'intérêt des recherches appliquées et de leur développement est indiscutable pour une appropriation et une bonne diffusion et valorisation des résultats obtenus. Le rôle et la mission même des Instituts et Centres Techniques Agricoles (ICTA), à orientation "filière", fédérés au sein de l'Association de Coordination Technique Agricole (ACTA) et ceux des Instituts et Centres Techniques de l'Industrie Agro-alimentaire (ICTIA) à compétence thématique, regroupés au sein de l'Association de Coordination de l'Industrie Agro-Alimentaire (ACTIA), relèvent de cette dynamique.
L'ACTA, dans le cadre de son Plan d'Orientatio Scientifique et Technique (POST) quadriennal (1997-2000), a particulièrement insisté sur la nécessité de conduire des recherches sur l'adaptation des produits agricoles à la demande de la société. Cette thématique, intégrant tout particulièrement les notions de qualité des produits, d'innocuité et de sécurité des aliments, a permis le cofinancement de plusieurs actions avec les ICTA, sur des crédits provenant du Budget Civil de la Recherche et du Développement technologique (BCRD). On peut souligner l'intérêt des travaux portant sur les origines et les moyens de maîtrise à la production de la contamination du lait de vache par les salmonelles, ou bien sur les méthodes et démarches pour la maîtrise de la qualité sanitaire des fromages fermiers au lait cru, dans le nouveau contexte réglementaire. Les réflexions, qui ont présidé à la rédaction du quatrième POST, se sont menées en partenariat avec les membres du Comité d'Orientatio Scientifique et Technique (COST) de l'ACTA : professionnels, acteurs du développement, scientifiques relevant des organismes exerçant des missions de recherche et administration. Les réflexions préliminaires à la rédaction du cinquième POST (2001-2004) conduisent à considérer ce thème comme toujours prioritaire.

Pour ce qui concerne l'ACTIA, de nombreuses actions sont relatives à la sécurité des aliments : de l'étude de la congélation et de la décongélation sur les différentes matrices alimentaires, à la sécurité des produits végétaux commercialisés par l'industrie agro-alimentaire, par le développement d'un outil permettant l'étude du comportement des flores pathogènes et l'étude de l'incidence de choix technologiques. Dans le secteur agro-alimentaire, les ICTIA, en contact direct avec leurs partenaires industriels, ont ainsi la faculté d'identifier très rapidement les problèmes cruciaux auxquels il convient d'apporter des solutions.

Dans ce cadre, la concertation entre l'ACTA et l'ACTIA est grandement favorisée et débouche sur la mise en oeuvre de projets, financés par le BCRD, sur des thèmes d'intérêt commun "de l'étable à la table". Ces projets font l'objet d'une analyse concertée entre les COST des deux associations et induisent également des synergies avec les acteurs de la recherche d'amont et ceux du terrain. Cette concertation ACTA - ACTIA a aussi permis la rédaction et la co-édition d'un guide pratique pour l'agriculture et l'agro-alimentaire sur la traçabilité, servant notamment, de base de travail à un groupe de réflexion mis en place en 1999, par l'Association Francaise de Normalisation (AFNOR).

De la création des réseaux ...

D'autres types de fédération des compétences, telle que la création de réseaux, qu'ils soient formels ou informels, ont souvent présidé aux avancées dans ces domaines permettant des synergies d'actions et une démultiplication des résultats. Au sein de l'ACTIA, il existe de tels réseaux, soit constitués, soit en voie de constitution, par exemple sur l'évaluation sensorielle, les équipements et procédés, la nutrition, la traçabilité ou bien encore la sécurité des aliments. De nouveaux réseaux institutionalisés sont actuellement en cours de formalisation, tout particulièrement dans le secteur de la microbiologie prévisionnelle afin de donner une ameure différente aux travaux, eu égard aux besoins existants dans ces secteurs. Ce réseau permettrait de fédérer autour de l'ACTIA et certains de ses centres, des entreprises ainsi que des laboratoires de recherche publics. Un co-financement de cette action serait assuré tant par le Ministère de l'agriculture et de la pêche que par le Ministère de l'éducation nationale, de la recherche et de la technologie.

Cette fédération de partenaires existait déjà sous la forme des Groupements d'Intérêt Scientifique (GIS). Ces regroupements actés sous forme conventionnelle, ayant pour objet de contribuer à la définition ou/et à la résolution de problématiques scientifiques, permettent sous une forme administrative assez souple de rapprocher des compétences dans certains secteurs. On peut citer, à titre d'exemple, le GIS dit "d'Alfort", en qualité, sécurité et hygiène des aliments ou encore le GIS RIA dans le secteur de la recherche en agro-alimentaire.
Créé en 1993 avec le soutien des ministères en charge de l'agriculture et de la recherche, le Groupement d'Intérêt Scientifique "GIS-RIA", résultant du rapprochement de 11 partenaires (5 organismes exerçant des missions de recherche et 6 écoles d'ingénieurs dépendant des deux ministères cités précédemment), vise à assurer une meilleure concertation de la politique de recherche relative aux besoins de l'industrie agro-alimentaire. Le GIS organise une concertation entre ses membres sur la stratégie, la définition des programmes et leur mise en œuvre et peut également favoriser la mobilisation d'autres institutions en rapprochant les industries françaises, les organismes de recherche publique et les établissements d'enseignement supérieur.

... à l'identification des priorités thématiques

Lors d'une première étude, le GIS-RIA identifia deux points cruciaux : la nécessité de réduire les dangers, et celle d'optimiser l'évaluation et la gestion des risques. La réduction des dangers nécessite de maîtriser les aspects relatifs à la microbiologie prédictive, à l'écologie microbienne ainsi que de préciser les bases scientifiques de la construction et du fonctionnement d'un équipement ou d'une usine ultra-propre. L'optimisation de l'évaluation et la gestion des risques passe par la détermination des seuils de nocivité des xénobiotiques dans les aliments et des boissons, le développement de méthodes assurant la traçabilité des produits et la mise au point de méthodes d'analyses rapides des micro-organismes, des contaminants et de l'origine des matières premières utilisées (par exemple, pour l'identification des produits transgéniques).

Le bilan d'une convention organisée entre le GIS RIA, l'ACTIA et l'Association Nationale des Industries Agro-alimentaires (ANIA), se fondant sur l'expertise des recherches conduites au plan national, a permis de définir, de manière plus approfondie, quelques points clés pour lesquels il était nécessaire que des travaux scientifiques soient menés pour garantir la sécurité des aliments. En toxicologie, la biotransformation et la biodisponibilité des substances, l'évaluation des risques à long terme, notamment des risques nouveaux (matières premières, process, packaging,...), et les allergies (doses seuils, détection) sont les priorités à suivre. Les méthodes analytiques, permettant l'analyse d'éléments à l'état de traces et la recherche de multi-résidus par des techniques de screening, doivent être développées pour une meilleure performance de l'identification et du respect des seuils de risque. En matière d'hygiène, les priorités demeurent la physiologie et l'écologie microbienne étudiées selon une double approche complexe (les effets liés à l'hôte par rapport à la dose liée à la matrice), la microbiologie prévisionnelle et l'équivalence des technologies en matière de sécurité.

Pour ce qui concerne plus particulièrement l'amont agricole, la nécessité de disposer d'une sécurité sanitaire des matières premières agricoles nécessite, d'une part, un bon usage de la traçabilité. De plus, des recherches sur les résidus phytosanitaires, les métaux lourds (boues, engrais, géochimie), les oestrogènes mimétiques et les mycotoxines (écologie, physiologie, pathogénicité liée à l'hôte) sont à mener, pour disposer d'éléments permettant d'apprécier et d'aider à la fixation de seuils de risque mais aussi donner des indications permettant d'optimiser les conduites de culture et d'élevage.

L'identification des priorités scientifiques et techniques par les acteurs de la recherche est une étape totalement indispensable pour permettre l'orientation des travaux à conduire, notamment dans le cadre d'appels d'offres ministériels ou dans celui de l'exercice de la tutelle des organismes, par les pouvoirs publics. En regard, un fléchage des crédits, en adéquation avec les axes validés, peut s'opérer. Toutefois, il ne faut pas négliger que les interrogations des consommateurs à l'égard de leur alimentation et les questions soulevées par la société, doivent faire l'objet d'une appropriation par les scientifiques puis nécessitent des réponses. A cet égard, il est nécessaire de mieux appréhender les attentes et les pratiques des consommateurs, notamment pour identifier les celles à risque, analyser le phénomène "agriculture biologique", réhabiliter l'image de la sécurité de l'alimentation dans l'esprit des consommateurs ou encore gérer le décalage entre la filière de production (processus industriels, risques,...) et l'image idéalisée que
les consommateurs ont des produits. Ceci légitime totalement le champ de recherche en sciences humaines et sociales sur l'alimentation et le développement de ponts méthodologiques entre celles-ci et les approches technologiques, neurophysiologiques et biologiques (santé-sécurité). Pour illustrer cette démarche d' appropriation des questions de société, a été organisée, en juin 1998, une "conférence citoyen" ; ce débat public, réunissant experts et profanes, avait pour objectif de mieux identifier les nombreuses questions qui se posent relatives à l'utilisation des OGM en agriculture et en alimentation.

L'indispensable circulation des informations entre producteurs, distributeurs et consommateurs nécessitera l'intervention de professionnels de la communication, disposant de compétences techniques suffisantes des produits, et capables d'assurer la vulgarisation des connaissances scientifiques et techniques, nécessaires à l'information du consommateur sur les produits issus de l'agriculture. En effet, après l'évaluation des risques et leur gestion, il convient d'assurer la communication sur ces risques, ceci, prioritairement, par l'intermédiaire de l'AFSSA dont c'est la mission, dans de nombreux cas. A cette fin, il sera utile de faire preuve de transparence tout en veillant à éviter la création de mouvements de panique, souvent sans commune mesure avec les risques potentiellement encourus. Dans ce cadre, le rôle de l'éthique est primordial et doit permettre une gestion optimisée des risques.

Les différents éléments qui viennent d'être présentés, concourent tous à démontrer que l'ensemble du système de connaissances agricole apporte sa contribution à un objectif de sécurité optimale des aliments, représentant une des priorités nationales. Ceci est d'ailleurs réaffirmé par le projet de loi d'orientation agricole, qui précise les objectifs de la politique agricole : "la production de biens agricoles, alimentaires et non alimentaires de qualité et diversifiés, répondant aux besoins des marchés nationaux, communautaires et internationaux, satisfaisant aux conditions de sécurité sanitaire ainsi qu'aux besoins des industries et des activités agro-alimentaires et aux exigences des consommateurs et contribuant à la sécurité alimentaire mondiale".
1. **Introduction**

At the initiative of ICN, the WHO issued a Guideline (WHO/FNU/FOS) to assist governmental organisations in establishing their own National Food Safety Programs. The WHO suggests and facilitates to establish a Food Safety Committee in every country consisting of government officials and selected professionals who are responsible for food safety. In Hungary - already prior to the cognition of the contents included in the WHO document -- at the joint initiative of the Ministry of Public Welfare (today: Ministry of Public Health) as well as of the Ministry of Agriculture (today, Ministry of Agriculture and Rural Development) a Food Safety Advisory Board was set up in autumn 1997. Ministries, organisations with nation-wide authority, scientific institutions and lobby forums are equally represented among the members of the Board.

Primary and most important task of the Board is to co-operate in the elaboration of the National Food Safety Program in order to ensure preventive health protection for the consumers against food-borne diseases and other harms. In this respect the first task is to assess the domestic food safety situation. The Board will hand over the completed study to the decision makers hoping that on this basis the National Food Safety Program will be established and implemented. In the following the present situation of the food safety education and research is reviewed according to the first draft version of the assessment study, while the situation of providing consultancy services has been summarised relying upon other information resources.

2. **Education and training**

As a part of the general situation assessment a historic retrospection should be mentioned here: education of public health and food hygiene has always been performed in the human and veterinary higher education at an international level.

As regards medical universities food, environment and work hygiene as well as epidemiological and social medical disciplines are equally provided within the framework of the general scope of public hygiene. Relying upon the basic education of general medical public health and epidemiological specialists are continuously trained. In this context the special nutrition health training is pursued as further education. Specialised physicians are also obliged to sit for a state medical health officer examination. They can learn the up-to-date food hygienic knowledge during the preparation course.

The public health and epidemiological inspectors obtain their diplomas at the 4 years’ Sanitary College, Public Health and Epidemiological Inspectors’ Faculty.

At the University of Veterinary Sciences, under the auspices of the independent Department for Food Hygiene since 1949, the education has been approximated to the existing international level. As of 1973, there have been three special food hygienic veterinary training. Altogether, 162 people obtained a special veterinary diploma. A fourth special veterinary training is underway.
The manual “Food Hygiene”, written in 1993 for the purposes of veterinary food hygienic training, is now used in the entire agrarian higher education, including veterinary and medical authorities, as well as by national food controlling institutions.

At the Microbiological Department of the University of Horticulture and Food Industry food hygiene is taught; as a part of the microbiologist-engineer education, a wide-ranging hygienic training is also performed.

At the University of Agricultural Sciences -- with the active co-operation of the Central Food Research Institute (KÉKI) -- intensive training is given in the areas of food safety, food quality and food regulation for both undergraduate and postgraduate students.

At the Biochemical and Food Technological Department of the Technical University in Budapest the discipline “Food safety and Quality Assurance in the food industry” was developed with PHARE assistance. Up-to-date lecture notes are available for the education.

At the College for Business, Catering and Tourism there are microbiological and hygienic knowledge, but it is not enough for the demands and requirements emerging at the above fields.

Minimal courses on public health and food hygienic basic elements are organised for the food industrial employees as specified in the Hungarian Food Act¹ and its Enacting Clause².

Professional subjects for the minimal courses are included in Annex No. 7 of the Enacting Clause. The training material is based on the delivery of public health, food hygienic, Quality Assurance and environmental protection knowledge. The FAO/WHO Codex Alimentarius document on Hazard Analysis and Critical Control Points (HACCP) is also included in the education program of food hygienic materials.

Regarding the development of education on food hygiene, safety and quality, the following systematic approach is always considered in Hungary:

3. Statutory regulation

Food safety like training and further education are provided for by the following statutes:

– The Hungarian Food Act No. XC/1995 (ÉT) 5. §
– Nr. 41/1997. (V.28.) Veterinary Rules issued with FM decree, Appendix Nr. 5. – professional requirements for food hygienic inspection and assistant workers employed in meat investigations.

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- Nr. 17/1999. FVM-EuM Joint Decree about hygienic regulations of food production and circulation.(EuM: Ministry of Health)
- Nr. 8200-2/1953 EuM precept on the nutritional health regulations for workers of public catering
- Nr. 130/1995 (X.26.) Government Decree about the issue of the National Curriculum

Fundamentally, the above-mentioned regulations properly control the education of workers and assistant workers of food supply and those who work in controlling, but this regulation is fragmented, sometimes controversial or incomplete. It lacks statutory obligation for further education referring to middle and upper management and originally skilled people working in food production. There is need for a new statute for the education of those working in public catering.

4. Research

Tasks concerning research and development in connection with food safety are dealt with by food research institutes. Among the budgetary themes for 1997-1998 of the Central Food Research Institute, the examination of factors influencing food hygiene and safety, and the research & development tasks in relation with food safety were present. On the basis of the EU 92/46 Directive, the Hungarian Dairy Research Institute Ltd. carried out the national survey of the hygienic and microbiological characteristics of dairy products as a task promoting public interest. In 1997 KPKI, Canning Research and Development Co. Ltd. measured the lead and cadmium content of domestic vegetables. The Hungarian Meat Research Institute Ltd. dealt with the conditions of safe heat treatment, the development of methods of investigation, with the application of HACCP in meat industry and the possibilities of ensuring the safety of microbiological methods.

The strategic research program called “The quality dimensions of agriculture” or “Agro-Qualitat 21”, which was launched in 1996 and completed in 1999, under the auspices of the Hungarian Academy of Sciences, unanimously stated that in the following years there is a need for a turn to quality in the Hungarian agriculture. Concentrating on quality, competitiveness can be improved and the development of agriculture can be promoted and maintained. All the above promotes our access to the European Union as well as meeting of the expectations of OECD. Each step of the development is in accordance with the regeneration of the environmental resources, meanwhile serving the careful treatment and maintainability of the environment. The pace of the realisation of the shift to quality depends on how the Quality Assurance Systems relating products and activities spread (GAP, GMP, HACCP, ISO, TQM).

On the basis of the research program of the Hungarian Academy of Sciences, the fact that the HACCP system, as the most effective means of the promotion of food safety in stock breeding, plant cultivation and in primary production, should be regarded as accepted.

In the Hungarian research and development practice the introduction of the HACCP system is urged by state means as well. In 1998 the Ministry of Agriculture conducted an independent competition for the development and introduction of the HACCP system. Food processors, stock breeding and plant cultivating entrepreneurs had the possibility to receive the support. In 1999 the support of the topic on the research-development level is on the agenda again.
5. Priorities and future research-development tasks of public purposes and public interest

At the determination of tasks it is fundamental that the societal and economic policy regarding human health as a value should be consolidated in Hungary, including food supply and dietary policy, with special respect to ensuring food safety and quality.

The introduction of modern risk analysis should be treated as priority in order to establish reasonable regulations serving for the prevention and the protection of the consumer’s interests. Part of it is risk assessment, which - as an interdisciplinary theme – is a co-ordinated task of different disciplines.

It is practical to finance agricultural and food industrial research and development topics of public purposes and public interest at departmental (Ministry) level, with cabinet level co-ordination. It is necessary to work out a research strategy and a research framework plan to establish the topics.

6. Proposed draft

Food industry research and development topics of public purposes and public interest

- Further editing and development of Food Legislation (e.g. Hungarian Food Code), professional help in the application and practical implementation of new rules and regulations.
- Elaboration and issue of guidelines to promote the complex realisation of Good Hygienic Practice (GHP), the Good Manufacturing Practice (GMP), HACCP and ISO 9000.
- Establishment and operation of industrial self-control in every sector to verify that HACCP systems are satisfactory.
- Work out and propagate programs to prevent contamination with extraneous materials in every sector among food raw material producers and suppliers.
- Constant development of sampling systems and examination processes, introduction of quick examination methods.
- Development of methods for proving the originality of foodstuffs, detecting falsification, proving the concealment of inferior quality.
- Defining the technical conditions belonging to food safety, the examination of the technological conditions of freedom from microbiological hazard, with special respect to pathogens.
- Support of the development of HACCP systems, according to the respects of modernisation of the technology.
- Work out of new technologies for food conservation to inactivate micro-organisms (such as addition of bacteriolytic enzymes, polypeptides, antimicrobial substances of vegetable origin, ionising radiation, great hydrostatic pressure, application of great tension-gradients, and so on.)
- Development of combinations of additives influencing food safety (for example the application of organic acids and their combination in the meat industry.)
- Continuous discussion of the conditions of packing technologies of food safety, the examination of the interaction of packing materials and foodstuffs, the development of biologically discomposing packing materials.
Research and development tasks in connection to health hazards and food safety

- Continuous research and survey of the interrelations between healthy nutriment and food safety in order to satisfy consumers’ health protection.
- Monitoring the carry over of unwanted, mostly toxic substances through the dietary chain.
- Development of new processes to reduce the anti-nutritive components of foodstuffs (for example tripsin inhibitors, lectins.)
- Establishment of an information system, the Hungarian Food Intolerance Information Data Bank in order to secure hypoallergenic nourishment.
- Continuous clarifying the utilisation without anxiety of foodstuffs produced by biotechnological means.
- Examination of food albumins being utilised within the dietary chain with special respect to the regulation of immune activity.
- Determination and declaration of antigen/allergen characteristics of food products, development of new processes to reduce the allergen nature.
- Elaboration of new allergy diagnostic kits, based on IgE bond, in accordance with the standpoint of WHO.

Present research fields necessary to the better establishment of food safety and serving for the purpose of effective prevention of danger:

- Research for the scientific informational background of HACCP and risk analysis.
- Mathematical modelling of the proliferation, survival and death of microbes.
- Development of new, more effective and economical methods to detect pathogens, toxins and harmful residues of substances which can be transferred by foodstuffs.
- Surveys with properly selected product groups to determine the levels of occurrence of micotoxin and heavy metal contamination.
- Further development of cleaning-disinfecting methods, study of formation of microbial biofilms and its consequences.
- Scientific foundation of new, modern decontamination techniques of foodstuffs of higher risk in terms of microbiological safety.
- Economic analysis of the effect of food safety risk made on national economy. It is necessary to carry out the relevant, comprehensive cost-profit analyses, to demonstrate the profitability of prevention objectively.

It must be aimed at that a growing number of Hungarian enterprises and research-development firms join the international co-operation formed under the auspices of the 5th Framework Program for Research and Technology Development of the European Union. The first key project (Food, nutrition, health), which is the first topic of the program (Management of life quality and living resources), offers particularly numerous possibilities to join research consortiums aiming at EU priorities in relation with food safety.
7. Consulting

Campden and Chorleywood Food Industry Development Institute (before 1999, the Development and Quality Institute of Frozen Food Industry) plays an important role in the implementation of the HACCP System in Hungary as well as in consulting.

Related to the above-mentioned subject several associates of the Institute are enrolled in the Consultants’ List. Based on registration at the Labour Centre in Budapest the Institute holds special courses as well.

As regards higher educational institutions and research institutes, requirements needed to ensure food safety are getting more and more stressed in their consulting activities.

Supply of the quality consulting offices has recently been completed also with the implementation of HACCP System.

8. Summary

Attention has been called in due course to the importance of the implementation of the HACCP System in Hungary in various scientific publications and workshops. In line with the inclusion of the implementation obligation of the HACCP System in a EU Directive also real efforts were made in Hungary (Codex Alimentarius Hungaricus, Chapter 1-2-18/1993: Guidelines for the application of the Hazard Analysis Critical Control Points (HACCP) System. This guideline is equivalent in technical content to the FAO/WHO Codex Alimentarius CAC/GL 18/1993).
Food safety in Iceland is, in general, satisfactory. There is a ban on the use of growth promoting substances and prophylactic use of antibiotics. Use of pesticides and herbicides is minimal. The level of heavy metals is very low and there is no problem with radioactivity. Salmonella is under control and food poisoning is rare. The public is generally satisfied with food safety and often prefers local foods to imported foodstuffs.

Iceland has lost over half of its vegetative cover and nearly all its woodlands since the first settlements over 1100 years ago, and which is of great concern to the public. Two services address this problem: the Soil Conservation Service and the Forestry Service. The Agricultural Research Institute has responsibility for research on soil conservation and the Forestry Service operates its own laboratory. The Agricultural College, the Horticultural College and the Extension Service also address this problem.
IRELAND

1. Introduction

Food production is vital to the Irish economy with Agri-Food products accounting for over one-third of net foreign exchange earnings. The raw materials for Ireland's food come chiefly from extensive grassland farming systems. The greater proportion of production is exported so the industry is export oriented. A growing consumer demand for safe food, as well as exacting export market requirements, are the driving forces for high standards in food safety. Quality and safety of products are most important. Most food processing companies are small and do not have the scale to carry out any in-house research and development. However, most now have HACCP, ISO or similar Food Safety assurance strategies in operation.

National Objectives

− to ensure that the highest standards of quality, safety and nutrition are consistently achieved in food products
− To provide the necessary scientific and technological enabling-capacity in food products and ingredients.

2. Government policy

The Government's Action Programme for the Millennium\(^1\) recognises that customer confidence in Irish Food products, both at home and abroad, is of paramount importance. It stresses that Ireland must be in a position to offer uncompromised and independent verifiable assurances as to the quality and purity of its food products.

The Statement of Strategy of the Department of Agriculture and Food\(^2\) has Food Safety as one of its major goals. That goal is to continue to pursue the highest possible standards of food safety for those parts of the production chain for which it is responsible. To achieve that, the Department's monitoring, surveillance and inspection services are delivered on farms and in processing and storage plants throughout the country. As a backup to these services, it operates several laboratories where samples of product are tested for quality and safety. It also avails of the services of other laboratories, notably the State Laboratory, where necessary. This goal is pursued in co-operation with the Food Safety Authority of Ireland (FSAI).

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\(^1\) An Action Programme for the Millennium, detailed basis for the Policies to be implemented by the new Government and agreed by the Parties to Government, 1997.

\(^2\) A New Millennium - Setting the Challenges, Developing the Strategies, Statement of Strategy, Department of Agriculture and Food, 1998 - 2000
The strategy to achieve the goal is:

- Provide Food Safety monitoring, surveillance, and inspection programmes at farm level
- Control feedingstuffs, veterinary medicines, plant protection products and other agricultural inputs with appropriate programmes to detect unacceptable practices, residues and other risks
- Develop quality assurance schemes with effective animal identification and trace back system
- Provide an efficient operation of the inspection services and the dairy, meat control and veterinary diagnostic and pesticide laboratories
- Support research into food safety

The Government recently established a new Food Safety Authority of Ireland (FSAI), with overall responsibility for the enforcement of legislation in relation to food safety and hygiene, and for the promotion of standards of good practice throughout all stages of production, distribution and sale. Previously, food safety controls were spread across a number of Government Departments, Health Boards and Local Authorities. The new Authority will operate ‘service contracts’ with these existing bodies to continue to carry out food safety controls.

The Authority has a 15 member Scientific Committee that will assist and advise the Board, thus ensuring that its decisions take account of the best scientific advice and information available.

The Government believes that this new structure will lead to a more uniform approach and ensure that public health and consumer interests take precedence.

Teagasc, the State Agriculture and Food Development Authority, has identified Food Safety as one of six major themes on which it will focus its activities. Its objective is to develop preventative measures to ensure the microbiological and chemical safety of Irish food. The strategy to achieve this involves allocation of increased resources to Research and related technology transfer services, with particular emphasis on food safety.

The Teagasc research programme will focus on:

- Development of more sensitive methods for detecting pathogens and residues in food products
- Developing advanced techniques for controlling spoilage organisms
- Modelling pathogen growth in food products
- Evaluating the effects of processing methods on food safety
- Assessing advances in development of traceability systems
- Completing the National Food Purity Database
- Delivering accredited training programmes on food safety
- Providing a programme to verify industry food safety systems

Food Safety will also be a priority in the range of courses provided by Teagasc for practising farmers to ensure that they have the knowledge and skills necessary to meet the standards required by national food safety and industry assurance schemes.
3. **Description of existing regulations**

Legislation in relation Food Safety is laid down in a number of Acts, Statutory Instruments and Regulations which govern the production, processing and handling of food all along the production chain. These combine National and EU legislation. *The Food Safety Authority of Ireland Act 1998*\(^1\) places responsibility for enforcement of legislation relating to food safety and Hygiene with the FSAI. The First Schedule to the Act contains a list of all the legislative provisions in force.

4. **Responsibility structure of the AKS**

There are a number of Institutes involved in the operation of the AKS for food safety in Ireland.

*The Department of Agriculture and Food* co-ordinates and implements the provision of public funding for research in food safety. In particular, it implements the Non-Commissioned Food Research Programme, which is operated under the Operational Programme for Industrial Development 1994-1999. It also implements a number of food safety measures in conjunction with the FSAI related to meat inspection, feedingstuffs, veterinary medicines, pesticides, biocide plant protection products, dairy products, poultry and eggs and National Quality Assurance Schemes.

*The Department of Health*, through the Health Boards operates various control measures at the wholesale and retail level of the food distribution chain.

*Teagasc, The Agriculture and Food Development Authority*, is the state body established to provide Research, Advice and Education in Agriculture, the Food Industry and Rural Communities. Research on Food Safety is done at its two Food Centres, *The National Food Centre* and *The National Dairy Products Centre*. Both of these centres provide technical support to the food industry.

*The Marine Institute* - State Institute for Marine Research and Development. It advises on and co-ordinates Government Policy relating to Marine Research and Development and promotes development and application of technical processes for exploitation of marine resources. It contracts research as part of its Sectoral Programme on Marine Food, disseminates information relating to marine matters and maintains the National Biotoxin Reference laboratory.

*Universities* - There are six Universities with programmes in various areas of food research, all of which have projects concerned with food safety.

*Education* - Food safety and hygiene are constituent elements of most Irish food science education programmes in the Universities, Institutes of Technology, and Second Level education programmes.

*The FSAI* has functions in relation to research, advice, co-ordination of services and certification of food. In conjunction with producers and industry, it may promote food safety assurance schemes.

\(^1\); Food Safety Authority of Ireland Act 1998, available from Government Publications, Postal Trade Section, 4 -5 Harcourt Road, Dublin 2
5. **How is the AKS addressing the topic**

*Problems*

In delivering safe food to the consumer, the problem for industry is to be able to detect and prevent foodborne pathogens and chemical contaminants in food. The challenge for the food safety AKS system is to provide rapid test and detection procedures for foodborne pathogens and for development and application of chemical and veterinary drug residue analysis techniques.

Consumers have concerns about the safety of Genetically Modified Foods in relation to the potential build up of antibiotic resistance and the spread of allergenicity. There is a need for continuing assessment of GM foods, clear labelling of products, and provision of information. The FSAI reviews each new food to ensure that it complies with specified safety criteria, and it supports the consumers right to know whether or not a food contains genetically modified ingredients.

*Programmes*

Programmes are in place to address these AKS problems. Both Teagasc and the Universities work very closely with the food industry in ensuring that Research, Advice, Education and Training Programmes address the specific needs of the sector.

Food Safety Assurance Systems are being introduced, such as the National Beef Assurance Scheme, in response to the demands of consumers and retailers.

The new *Teagasc 2000 Strategy for Services to Food and Agriculture*¹ has identified Food Safety and Quality, focusing on the production and manufacture of food products of assured safety, as one of five programmes to which priority will be given. The new strategy involves a substantial reorientation of Teagasc research, advisory, education and training services towards the critical areas of food safety. Many of the new initiatives will be operated as integrated programmes involving all of the services, thereby ensuring maximum benefit to farmers and food processors.

*Research* - Substantial additional resources are being allocated by Teagasc to food processing and related technology transfer services, with particular emphasis on food safety and support for SME’s.

*Advisory* - New directions have been identified for the advisory programme, and a substantial restructuring is being carried out to improve the focus and delivery of services. The *Food Safety and Quality Advisory Programme* of the *Teagasc 2000 Strategy* will provide information, advice and training for individual farmers and ensure that they have the knowledge and skills necessary to meet the standards required by national food safety and industrial quality assurance schemes.

New Specialist Advisers in Food Safety have been appointed by Teagasc to service the new programmes and to ensure professional backup to local advisers. These Specialist Advisers, will be an essential link between the research services and the advisory and training services, and they will also provide the technical leadership for the advisory and training programmes in each programme area.

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¹. Teagasc 2000, A Strategy for Teagasc Services to the Food and Agriculture Industry in Ireland, Teagasc, 19 Andymount Ave, Dublin 4
Training - Food safety will become a priority also in the Teagasc Training programme for practising farmers. Courses on Codes of Practice in relation to food safety will be provided at all local centres. Specialised advanced courses will also be provided for farmers who already have basic training.

Information

Information on Food Safety related topics is published in Scientific Publications, Teagasc Reports, Seminars, Open Days, Training Courses and the popular Press. Information on projects under the Non-Commissioned Food Research Programme is widely distributed to Industry. The FSAI can publish reports on any matter related to its functions and from time to time it publishes pamphlets and brochures for distribution to consumers and other interests. In particular, it must publish an annual report, which will be laid before each House of the Oireachtas (Parliament). These arrangements will ensure a much greater degree of transparency and information about food safety generally.

A National Food Purity database, detailing levels of veterinary drugs, antibiotics, pesticides and other residues in foodstuffs, is being compiled by the National Food Centre.

Consumer interests are articulated through Consumer Associations and public representation. The FSAI is in the process of establishing a Consultative Council representative of a wide spectrum of interests, including consumers, producers, retailers, distributors, caterers and manufacturers. The Teagasc Board is also drawn from a wide range of interested groups.

6. Description of forms of co-operation

There is co-operation and collaboration between Teagasc, the Universities and Industry in generating and disseminating research knowledge on Food Safety. This is mainly achieved through the Non Commissioned Food Research Programme, which funds a number of collaborative research projects. In particular, one project operated from the National University of Ireland, Cork, is dedicated to the rapid dissemination of research results from the Programme to a wide range of industry.

Through the EU Framework Programme and bilateral arrangements with other research organisations, especially in NZ and USA, there is an extensive network of contacts which ensures early access to developments in science and technology.

Through their research and technological expertise, Teagasc and the Universities assist the food industry in meeting the stringent food safety requirements demanded by the consumer. The Food Safety Consultancy Service provided through the National Food Centre helps food companies to achieve the highest standards in all aspects of food safety, particularly in relation to chemical residues and pathogens. The various research Institutes also contribute to the organisation of a national food safety system by working in co-operation with other national agencies including the Department of Agriculture, FSAI, and An Bord Bia (The Food Board).

Through its research, advisory and training services, Teagasc has direct linkages for the rapid transmission of research to end-users. The Research Centres, Colleges, and Advisory and Training Centres enable integrated programmes in the food area to be delivered.

Training Courses for Industry are provided by the Teagasc National Food Centre, National University of Ireland Cork, and the Dublin Institute of Technology.
Teagasc provides a comprehensive range of training courses for managers, supervisors and operatives aimed at strengthening in-company capabilities. The Teagasc Training Services are accredited to ISO 9000. Workshops and Symposia organised by Teagasc draw on international partners involved in its food research programme.

The Food Training Unit attached to the Food Science Department at National University of Ireland Cork, provides a number of training courses and workshops each year for industry, in areas such as microbiology, hygiene, safety in processing, quality management, HACCP, etc.

The Dublin Institute of Technology (DIT) provides Education and Training courses for the butchering and catering sectors.

7. **Forms of programme funding**

Support for the AKS on Food Safety comes chiefly from Public Funds. The main sources of funding are:

- State Grant in Aid to the Institutes involved, including the Teagasc Research, Advisory, Education and Training Programmes
- The Non Commissioned Food Research Programme 1994-1999 which is funded by National and EU Structural Funds.
- Participation in EU Programmes such as the Framework Programmes for Research and Development, and other bilateral collaborations
- Small amount of industry support for Research.
- Fees paid to the Universities and to Teagasc by industry and farmer clients for consultancy, advisory and training services.

8. **Assessment of results - strengths and weaknesses**

The chief strengths in the AKS system in Ireland are in the highly qualified researchers, advisers and education specialists with experience in food safety issues. The Universities and Institutes have strong links to the Irish food Industry, and there are good National and International contact with food centres and laboratories, such as in EU Framework, USA and NZ bilateral collaborations. Teagasc is able to adopt a co-ordinated approach through its research, advisory, education and training services.

Though the industry is comprised of a large number of small processors, they achieve high standards of food safety in order to meet the demands of retailers, consumers and export markets. Threats to the knowledge system can arise from uncertainty in regard to funding for research and technological innovation.

Performance indicators to be used in measuring progress are:

- Regular management reports and annual published reports on
  - progress on the implementation of the food safety programmes
  - analysis of results of monitoring, surveillance, and inspection programmes (to include the number and results of inspections/tests)
− Actions taken and outcomes
− Implementation of National Beef Assurance Scheme
− Number Research projects completed on schedule, and the number of scientific, technical and popular reports published
− Number of product/process innovations and the level of uptake by industry
− Number of training courses, workshops, symposia, discussion groups organised for industry and farmers
− Number of Farms accredited to the recognised Quality Assurance Schemes

9. Summary and conclusion

An efficient AKS system for Food Safety is vital to the Irish Economy. Exacting export market requirements as well as consumer demands for safe food at home are the driving forces behind advances in food safety.

The AKS system is delivered through Government Departments, State Agencies, Universities and Colleges. The recently established Food Safety Authority of Ireland has overall responsibility for enforcement of legislation and standards of good practice.

Teagasc, the Agriculture and Food Development Authority, has an integrated programme on Food Safety involving its Research, Farm Advisory and Education Services. There is good co-operation between Teagasc, the universities and industry and a good network of international contacts which provides early access to the latest scientific developments. Funding for the AKS system comes chiefly from public funds.
ITALY

1. Introduction

Safety and food security in Italy concern principally three main areas:

- interventions on production (for example, reduction of chemical inputs in farming, genetically modified organisms)
- preservation, processing and distribution of products (HACCP and other rules on food control and hygiene; the safeguard of typical products and the promotion of quality productions);
- consumption (consumer protection, food education, etc.)

Generally speaking, Italy is particularly interested in protecting consumers, improving commonly used products as well as promoting quality products. This is translated into practical actions that target the population (through food education) and producers (through training, research, extension), and through legislation that also aims at enforcing community rules.

Public bodies (Ministries, regional authorities and other peripheral bodies) and private organisations (enterprise, professional, farmer and producer associations) play an active role. Farmers, for example, identify quality mainly by the sensory characteristics of the product; those responsible for the processing of the product aim at ensuring compliance with quality standards; and consumers consider the commercial quality of the product, including any related services.

In the agro-food sector, quality indicates all the characteristics of the finished product: freshness, the absence of noxious substances and waste, and the integrity of physical, nutritional and sensory characteristics. Also important are factors related to the local system where the product originates, protection of the environment of natural resources, and culture.

2. National policies

For the period 1994-99, national intervention in the agricultural and food sector has sought to foster competitiveness through the general development of activities in rural areas. The European Agricultural Guidance and Guarantee (EAGGF) granted approximately 9 billion Ecus to Italy for this period, to which must be added more than 4 billion ecus derived from private participation to investments, for a total of approximately 13 billion ecus.

General planning orientations gave a limited importance to “immaterial” actions, especially those concerning services and promotion, and to the diversification of entrepreneurial activities (about 7 per cent of the total cost of the regional Operational Programmes). The highest investments have been envisaged for those provisions aimed at improving farm structures, such as varietal re-conversion, as well as those
seeking to improve production quality, entrepreneurial performances (reg. 950/97). Investment in processing and commercialisation companies has been significant (reg. 951/97).

National policies concerning food security are tightly linked to European policies, with particular attention given to those aspects concerning consumer protection and the promotion of commonly used products. Italy has at times taken some distance from Community guidelines on these matters; for example, those concerning the problem of genetically modified organisms or derogations to the enforcement of directives on food hygiene on commonly used products.

In the last few years, responsibilities relating to agriculture and health have undergone dramatic changes due to regional decentralisation. The Ministry of Agricultural Policies and Forestry acts more as a co-ordinator and representative in the Commission, while management and operational tasks are undertaken by regional authorities. Among agricultural interventions taken are those aimed at reducing the impact on the environment and the level of toxic waste in food products.

The Ministry of Health has been entrusted with matters relating to food safety thus controlling, through regional administrations, the enforcement of the recent legislative decree 155/97 on food product hygiene. Along with the Ministry for Public Education, both ministries work on food education with the aim of promoting a correct diet, preventing diseases related to diet and developing knowledge of local food traditions.

3. Existing legislation

The fundamental law governing hygiene and health in the food sector is Law n. 283 of 30 April 1962. In the 1990s, Community directives either replaced or completed existing Italian regulations. The year 1997 was particularly active in this respect, with the legislative Decree 155/97, the directives 93/94/EEC and 96/3/EC, all of which concerned the enforcement of food hygiene regulation. Decree 155/97 represents an enlargement of rules concerning every type of food production and introduced a system of self control in every sector that must be carried out according to the standards indicated in the Hazard Analysis and Critical Control Points (HACCP) system, as foreseen by the European Codex Alimentarius.

Those responsible for the food industry must ensure the adoption of procedures identifying and controlling critical phases of food safety, as well as identify, implement and update safety procedures. In order to facilitate the implementation of this system, industries should adapt manuals for correct hygiene procedures elaborated by food industry sectors and representatives of the competent authorities and consumer associations.

The most important aspect of Decree 155/97 is the introduction of the mandatory self control mechanism. In fact, although legislative provisions have always included some kind of control mechanism at the end of the food production chain, this was applied only to some foods (see Table 1). The new decree makes this mechanism mandatory for the entire food sector.

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1. The decree designates every area within the food industry carrying out one of the following activities: preparation, processing, packaging, storage, transportation, distribution, manipulation, selling or supply, including food product administration.
Table 1. Rules on self-control for products

<table>
<thead>
<tr>
<th>Product</th>
<th>Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk and dairy products</td>
<td>Dpr 14/1/197 n.54</td>
</tr>
<tr>
<td>Ground meat and meat preparations</td>
<td>Dir. 94/65/EC, 14/12/94</td>
</tr>
<tr>
<td>Fresh meat</td>
<td>Dl 18/4/94, n. 286</td>
</tr>
<tr>
<td>Egg products</td>
<td>Dl 4/2/93, n.65</td>
</tr>
<tr>
<td>Meat by-products</td>
<td>Dl 30/12/92, n. 537</td>
</tr>
<tr>
<td>Fishery products</td>
<td>Dl 30/12/92, n. 531</td>
</tr>
</tbody>
</table>

Moreover, Decree 156/97 also received directive 93/99/EEC concerning the official control of food products, in particular with respect to the personnel of such control structures, the requirements of laboratories, responsible bodies, and the requirements and modalities of the verification systems in laboratories.

Directives 94/54/EC and 96/21/EC were also re-enforced through modifications to the rules on labelling, presentation and advertising of consumer food products as well as through directive 96/77/EC concerning the specific requirements for the purity of food additives different from dyes and sweeteners.

The Ministry of Health issued a decree in 1998 that established stricter hygienic rules for the processing of fish on boats and new provisions on labelling of imported fresh and frozen fish products so as to be able to track their origin.
Table 2 – Main rules in the sector of food products hygiene

<table>
<thead>
<tr>
<th>Law</th>
<th>Date</th>
<th>Matter</th>
</tr>
</thead>
<tbody>
<tr>
<td>283</td>
<td>30/4/62</td>
<td>Hygienic regulation for the production and selling of food products and beverages</td>
</tr>
<tr>
<td>441</td>
<td>26/2/63</td>
<td>Modifying Law of 283</td>
</tr>
<tr>
<td>DPR 327</td>
<td>26/3/80</td>
<td>Execution regulation of 283</td>
</tr>
<tr>
<td>DPR 777</td>
<td>23/8/82</td>
<td>Receiving of EC directive 76/893 on materials in contact with food</td>
</tr>
<tr>
<td>DPR 236</td>
<td>24/5/88</td>
<td>Receiving of EC directive 80/778 on the quality of waters for human consumption</td>
</tr>
<tr>
<td>DPR 224</td>
<td>24/5/88</td>
<td>Receiving of EEC directive 85/374 on the legal responsibility of producers</td>
</tr>
<tr>
<td>D. leg. 109</td>
<td>27/1/92</td>
<td>Implementation of dir. 89/396 on labelling</td>
</tr>
<tr>
<td>L. 82</td>
<td>25/1/94</td>
<td>Regulation on cleaning and sanitation</td>
</tr>
<tr>
<td>Cir. 21</td>
<td>28/7/95</td>
<td></td>
</tr>
<tr>
<td>Min. Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPR 54</td>
<td>14/1/97</td>
<td>Receiving of directives 92/46 and 92/47 on the production of milk and its by-products and relating hygienic prescriptions</td>
</tr>
<tr>
<td>D. leg. 155</td>
<td>26/5/97</td>
<td>Directive eC/93/43 system of self control HACCP (two extensions for the implementation of penalties in July 99 for the companies with less than five employees in 4/2000)</td>
</tr>
<tr>
<td>D. leg. 123</td>
<td>1/3/93</td>
<td>Receiving of Community directive 89/397 on the official control of food products (modification of DPR 327 of 26/3/80)</td>
</tr>
<tr>
<td>Cir. 1 Min. Health</td>
<td></td>
<td>Guidelines for the redaction of manuals for correct hygienic practices (in application of 155/97)</td>
</tr>
<tr>
<td>L. 59</td>
<td>9/2/63</td>
<td>Direct selling in extension of 155</td>
</tr>
<tr>
<td>L. 730</td>
<td>5/12/85</td>
<td>Selling on the spot in extension of 155</td>
</tr>
<tr>
<td>L. 52</td>
<td>1996</td>
<td>Receiving of directive 93/99/EC on the supplementary rules on the official control on food products</td>
</tr>
</tbody>
</table>

Particular consideration must be given to the area of genetically modified organisms. European regulations guides national regulations, in particular the Decree of the President of the Republic 128/99 which incorporated community directives 96/5 and 98/36 on both food products for children and cereal-based products. This decree forbids the use of genetically modified ingredients for food destined to newborns and children, and reduces plant protection agents to a maximum of 0.01 milligrams for each kilo. When Italy attempted to place limits on these rules, the Commission reacted by indicating the need for Italy to revise this decree.

Control on the hygiene of food products is managed by the Ministry of Health through regional and Local Health Enterprises (ASL). In 1992, the implementation of national legislative decrees 502/92 and 517/93, as well as a series of regional bills implementing the national reform bill, brought changes to the national health system and to Local Health Units (USL), which were transformed into Local Health Enterprises (ASL) and given complete organisational, administrative, financial, accounting and technical autonomy. Decree 502/92 transfers real powers to the region and stipulates, among other requirements, that a Department of Prevention be created in each ASL to take on the tasks previously assigned to USL services, following art. 16, 20 and 21 of Bill n. 833 of 23 December 1978. Each such department must guarantee to provide at a minimum the following services:

a) public health and hygiene;
b) prevention and security in work places;
c) hygiene of food and nutrition;  
d) veterinary

This department must also guarantee co-ordination with the Regional Agencies for Environmental protection (ARPA), to whom bill 61/94 assigned the tasks of environmental protection previously assigned to ASL; where ARPAs are not yet operational, this department is responsible for environmental protection as indicated in decree 833/78. Prior to the 1992 reforms, each of these services was vertically managed (bill 833/78) without any type of co-ordination; after the reform, the services provided by ASL were grouped and managed in functional areas. There are two areas which concern the hygiene of food, nutrition and veterinary services:

- hygiene of food and drinks;  
- hygiene of nutrition

The first area (hygiene of food and beverages) has, among other things, the task of: verifying the production, preparation, packaging, storage, transportation, administration and trade of food products; of controlling food products and the structural and functional requirements of companies; verification of commercialisation procedures and the use of plant protection products; dissemination of information and implementation of educational activities on health and food hygiene; and, finally, elaborating proposals for the training and bringing up to date of personnel working in this area.

In the area of nutritional hygiene, the following tasks have been attributed: nutritional surveillance; wide-spread dissemination of proper nutrition targeted at specific population groups; control of collective catering; updating personnel on nutrition, and public and private catering structures; and, diet and nutritional consulting.
Table 3. Institutional bodies responsible for the control of hygiene in the agricultural and food sector and laboratories for the control

<table>
<thead>
<tr>
<th>Ministry of Health – Regions</th>
<th>Mipa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pmp multinational presidium for prevention (one for each province, responsible for the control of products of vegetal origin)</td>
<td>Inspectorate for fraud and repression</td>
</tr>
<tr>
<td>Zoo-prophylaxis and experimental Institute: ten in Italy, responsible for the control of animal products</td>
<td>Research and agricultural experimentation Institutes</td>
</tr>
<tr>
<td>Superior Health Institute (following community directive 93/99 and decree of 12/5/99) is the body responsible for the evaluation and recognition of laboratories carrying out analysis for the official control of food products for the National Sanitary Service</td>
<td>National Institute for Nutrition</td>
</tr>
</tbody>
</table>

Interventions on hygienic adaptation are also envisaged by the Multiregional Operational Programme for 1996-99, *Improvement of processing and marketing structures in the agroindustrial sector*. The general objective is to improve the processing and commercialisation of agricultural products which have an impact on the environment through a set of interventions at the multiregional level. Specific objectives foresee the modernisation of hygienic and sanitary structures, cost reductions through the introduction of new technologies, and the enhancement of environmental resources through biological production.

This intervention envisages a total expenditure of 115.385 million ecu, about half of which will be financed by Community and national funds, while the remaining half will be paid by participants to the various projects.

In so far as the improvement of commonly used products and quality promotion is concerned, there is a specific regulation that envisages the participation of regions in identifying the products and geographical areas to be involved.

Italian regulations refers to those of the Community and distinguishes two typologies in the agricultural and food sector: labels of origin (Denomination of Protected Origin, Protected Geographical Indication and Certificate of Specificity) and quality labels (issued by bodies or associations with a statute and a regulation establishing the product requirements acting as a guaranty for consumers). Among the tools used in this sector is the Community initiative LEADER which offers many Local Action Groups the opportunity to initiate actions promoting territorial products through more complex interventions.

4. **Organisation of Agricultural Knowledge System**

In Italy, circulation, training and research fall under the aegis of different public institutions. Advisory services, which offer primarily technical and financial assistance to farms and rural areas, are dispatched by the regions through their agricultural departments, by specific public agencies and in collaboration with farmer union organisations. These services, carried out by trained agricultural experts as specified in regulation EEC 270/79, are based on the work of local units in direct contact with the territory and by regional central units responsible for co-ordination and technical support. With the specialisation of
the service, a growing number of regions have established laboratories for soil analysis, agricultural meteorological networks, information services, etc. The departments of agriculture are also responsible for the professional training of both technical managers and farmers; this work is generally carried out by Training Centres for Regional Promulgation (CIFDA) and/or farmer unions.

All Italian regions have a basic law outlining the tasks, organisation and activities of regional agricultural services; a comparative analysis of these bills highlights the strong diversity among the different organisations.

The specific responsibility for professional training is entrusted to the Ministry for Work and to regional departments for employment and professional training, and is generally carried out by organisations that have a convention; activities related to education are entrusted to the Ministry for Public Education, while university training falls under the auspices of the Ministry for Scientific Research.

Public scientific research on agricultural and environmental matters is carried out in universities under the responsibility of the Ministry for Scientific Research, research institutes of the National Research Centre (CNR), and research and experimental Institutes of the Ministry of Agricultural Policies and Forestry. Many regions have autonomous research centres working on agricultural matters.

Among the different segments of the system, and often among the various sectors of the same segment, there are no systematic links; however, some interesting synergies have been occurring over the past few years with respect to specific projects.

Further details on tasks and activities related to the knowledge system are given in a specific report on this subject.

5. Knowledge system and safety of food products.

Agriculture advisory services (Agriculture Development Services -- Regional SSA, services managed by trade-union organisations or by producers’ associations) have always given particular attention to the problems of farms and, to a lesser extent, to processing and marketing industries, whereas consumer problems have always been considered as of secondary importance. The main targets and related activities have aimed at reducing production costs and improving farm incomes.

The topic of food safety does not have a specific role within the Italian agricultural knowledge system. Therefore, all actions aimed at extending knowledge in the field of security depends on the institutional bodies concerned and on different operational structures. In order to describe activities dealing with this topic, the latter has been divided into three previously defined areas.

Interventions on production

The growing attention given to environmental problems has encouraged the number of initiatives taken by advisory public services aimed at reducing chemical inputs according to the specifications of Community rules and regulations. One example is the implementation of agro-environmental regulations, such as n°2078/92 (see document on the relationship between agriculture and environment).

Moreover, regional structures have produced a number of regulations on production aimed at rationalising production modalities, reducing the use of chemical inputs, and increasing firm efficiency. These actions are, generally, well accepted by farmers and they play an important role in the SSA activities.
**Preservation, processing and distribution of products**

In this phase of the agro-food chain, farmer unions intervene specifically first through actions taken to inform, to train, and providing technical support and advisory services. Activities carried out in the last years are closely linked to the application of recent rules in food hygiene, particularly through information on regulations and application procedures of the HACCP methodology, and by the publication of manuals on correct hygiene procedures. Professional associations have organised many training and information activities for their own experts so as to guarantee the right kind of support to producers. A number of other training initiatives have been also been undertaken by professional training centres (which are generally private or which act in agreement with the regions).

As far as improvement of commonly used products and their promotion are concerned, both public structures and representative bodies are taking action. Noteworthy are the activities connected to the Community initiative LEADER, which through the intervention of animators and local development agents intervene on the territory and address different users (firms, consumers, various bodies).

**Consumer protection**

Interest in food safety has also brought about an increase in initiatives taken by a growing number of involved bodies: associations, ministries, regions, etc. A particularly interesting initiative is in the domain of food education, for example the interregional Programme “Food communication and education”, planned by the Regions and the Ministry of Agricultural Policies and Forestry, and approved in application of the Deliberation of CIPE of 18 December 1996 and Law N°578 of 5 November 1996. The programme provides for the implementation at the interregional level of initiatives outlined in regional programmes but that are of common interest to all regions.

The aim of these initiatives is to give the greatest access to the greatest number of people on information concerning the territorial and socio-cultural context, on sustainable agriculture and associated pest control and biological products, on commonly used products and collective labels, as well as on the nutritional characteristics of products.

Interventions involving the participation of schools seek to promote:

- the values of a healthy lifestyle,
- greater awareness of the link between health and environmental safekeeping,
- efficient controls of the intrinsic,
- extrinsic and service quality of agro-food products,
- proper eating habits,
- encouraging school refectories, cooking staffs, administrators of school catering facilities to act responsibility when purchasing foodstuffs,
- promoting correct information,
- improving specific knowledge on food safety and market value, on attested quality and label, on food hygiene and the preservation procedures.

This programme is managed by a national committee whose members come from the Ministry of Agricultural Policies and Forestry, the Ministry of Public Education, the Ministry of Health, regional groups, ISMEA, the National Institute for Nutrition, and the Italian Cellar. The tasks of this Committee are
to supply methodological indications, to enable ongoing exchanges of information between the different actors as well as to oversee the operative approaches of the different regions.

At the regional level, there are co-ordination committees formed by representatives from the various regional Department of Agriculture, Health, Public Education and Culture, as well as from the Regional School Service and Provincial Education office, and the Regional Body or Agency of Agriculture Development. These committees assure a continuous and functional link between these institutional bodies in order to co-ordinate the different initiatives. They are assisted by scientific committees, the representatives of which come from scientific and expert bodies working in the field of food production and safety.

6. Types of collaboration within the Agricultural Knowledge System

The development of AKS has essentially branched out into three separate systems of research, training and extension (for a more in-depth analysis, see report on the topic). These three systems, however, have had great difficulty in communicating and interacting in a positive way. This characteristic is also present in the communication and interaction within these three separate systems: between territorial advisory bodies and central offices; between training centres and professional institutes; and among research bodies.

In order to overcome this situation, the Ministry of Agricultural Policies and Forestry, within the framework of the Multiregional Operational Programme Activities of support to development services for agriculture co-financed by the EU, has provided for a specific measure to finance research activities in agriculture aimed at decreasing unit costs of production, improving product quality and environmental safeguards, and improving knowledge of structural and socio-economic phenomena linked to the agriculture system.

The novelty of this measure is found in the planning procedures for interventions: agreement on targets between research institutes and regional Services of Agricultural Development; multiregionality; and subdivision of projects into targets, methodologies, instruments, monitoring and evaluation procedures.

With an investment of approximately 6 million ecus, 79 interregional research projects have been selected and financed. These focus at defining and disseminating information, not only of an agricultural and agronomic nature, but also of a socio-economic nature. Through this intervention about 300 bodies of AKS have been promoted: national and regional research institutes, universities, producers associations, regional agencies of agricultural development, and union associations. The organisational model which inspired all these projects is the multiregional partnership (binding) between research organisations and (public and private) agencies of agricultural advisory service.

In the phase which determines the goals and choice of areas to be studied, each project has already undergone the phases of research and has provided for co-operation and exchanges among institutes of research and agencies of agricultural extension; moreover, interventions of expansion, training and extension towards agriculture entrepreneurs are foreseen not only in the final phase of the project, but intertwined with research activities.

This approach allows for the possibility to consider the transfer not only as a “final” stage of research, but also as a horizontal action allowing for greater co-operation on the project. Eighty-five per cent of the involved bodies come from the public sector (university, research institutes, regional bodies) while 15 per cent is from associations, consortiums, and private or public enterprises.
Among the selected research projects some have links with the topic presently discussed, in particular projects dealing with production processes and waste disposal of agricultural product processing, while others are linked to quality, seen as added value to the agricultural product. Particular attention in research projects is given to the decrease, within the production process, of external inputs in order to reduce both the environmental impact of agricultural procedures and production costs.

**Table. 4. Projects financed within the POM**

<table>
<thead>
<tr>
<th>Activities of support to the agricultural development programme</th>
<th>Total in ECU</th>
<th>N° of Projects</th>
<th>% Compared to the total measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement of quality: decrease of chemical inputs in the process of production of food products to reduce the impact on the environment</td>
<td>5.175.000</td>
<td>7</td>
<td>8.73%</td>
</tr>
<tr>
<td>Improvement of quality: decrease of biological risks of food products and sanitary self-control systems on the production process</td>
<td>3.789.000</td>
<td>4</td>
<td>6.38%</td>
</tr>
<tr>
<td>Decrease of the impact on the environment within the production of food</td>
<td>4.705.000</td>
<td>9</td>
<td>7.94%</td>
</tr>
<tr>
<td>Improvement in quality: typicality and decrease in the environmental impact</td>
<td>18.345.000</td>
<td>17</td>
<td>30.95%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>32.014.000</strong></td>
<td><strong>37</strong></td>
<td><strong>54.00%</strong></td>
</tr>
</tbody>
</table>

At present, several projects have been completed. Many initiatives on co-operation between research, training and extension are successfully underway. In particular, interesting results have been obtained through the organisational procedure of the project committee, which in many cases have been set up as a periodical co-ordination committee among the involved bodies.

Another interesting initiative, from the point of view of collaboration among the various bodies of AKS, is represented by the 1996-1999 multiregional programme Services for the trade improvement of the Southern agricultural productions (reg. EEC 2081/93). The aim is to finance service activities for the quality improvement of agriculture productions in the south of Italy and to rationalise the distribution channels of products consumed in very large quantities. The following interventions are foreseen:

- organisation and concentration of the offer of some southern productions as a condition for greater integration between the agricultural sector and the processing and trade sectors;
- co-ordination of synergies at a multiregional level for the improvement, reclamation and restructuring of interventions of southern agricultural products promoted by a single regional programme;
- quality improvement of production and control through specific trade regulations and the introduction of a quality system as stipulated by Community regulations.

The basic strategy is to create Macro Trade Organisations (MOC), bodies which, through re-organisation, integrates industrial and/or trade operators and /or specific structures of service for producers.
7. Types of financing

There is no particular financing channel for food safety. Activities of plant adjustment, as stated above, are closely linked to Community legislation and, therefore, also to the relevant possibilities for financing.

Within the 12 “interregional projects” financed through national laws during the period 1994-1999, two the most important projects dealt with “Agriculture and quality” and “Technical assistance to livestock sector” (50 per cent of financial resources). The first project focuses on quality from a variety of perspectives: classification of production, use of plant protection products, use of meteorological data, control of distribution efficiency of agricultural machinery, and definition of a pedologic map. The second project aims at improving competitiveness and efficiency of Italian livestock, with particular attention to quality, through interventions of technical assistance.

Another project of particular interest is “Communication and food education”. Research, training and expansion in Italy are financed through different channels; generally an important source is Community contributions. For example, 70 per cent of funds for professional training, managed by the Ministry of Labour and the regions, come from Community funds.

8. Conclusions

Even if food has a great importance in Italy with respect to quantity and quality as well as for traditional gastronomic reasons, it appears that there is no general legislative framework of reference on product safety. As for the other important topics, there is a fragmentation of tasks and of management and control fields of initiatives.

In general, there is great difficulty in establishing and implementing enforcement procedures at both the regional and multiregional levels. Moreover, there is no systematic evaluation of the work at both the operative and organisational levels in the different sectors involved on a project. The result is widespread difficulty for the monitoring of physical results and the socio-economical effects of a particular project, and difficulties in obtaining a general framework for all projects carried out. This situation is no different as far as the AKS is concerned. With few exceptions, there is in general no common link among the different segments of the system.

The experience of the Multiregional Operative Programme Activities of support to development services for agriculture gives an opportunity to start and, in some cases, to strengthen collaboration between different bodies and organisations. This experience could also encourage reflection on AKS among the different segments of the same system.
1. Introduction

Increasing concern on food safety means that improved measures need to be implemented in food production, processing and distribution to ensure the safety of food. In the production step, we encourage producer efforts to ensure food safety by establishing production guidelines. In the process and distribution sectors, Japan not only promotes the introduction of HACCP system but also attempts to increase the sophistication of hygiene management and quality controls. Experimental and research organisations must develop basic technologies for the implementation of these policies.

2. Description of related policies

With numerous cases of food poisoning caused by the enterohomorrhagic Escherichia coli O157 and increasing awareness among consumers, social demand for enhanced safety and concerted quality control of food products has heightened. In response and in order the HACCP method, the Law on Temporary Measures for Enhancing the Control Method of the Food Production Process was promulgated in 1998. This law makes it possible to receive long-term, low interest rate loans and special tax arrangements for the investment in equipment which would enhance control methods of food manufacturing processes.

3. Framework for monitoring the need for research

To monitor the need for research, officials from administrative and research bureaus are obliged to maintain a full exchange of information and views on the necessity, the appropriateness and urgency of research with reference to important projects proposed by administrative bureaus. In food-related bi-yearly research promotion meetings, views are exchanged concerning the need for research by national or public experimental and research organisations. Projects to be implemented are first evaluated by external specialists.

4. Major results of research and their application

The following achievements have resulted from project research.

a) Among various food additives tested, calcinated calcium provided strong anti-microbial activity against \textit{E.coli} O157:H7. The volatile pungent component in horseradish not only exhibited anti-microbial activity but also increased the sensitivity of bacteria to high - hydrostatic pressure. Some low molecular peptides showed the possibility to regulate microbial growth.
b) It was shown that electrical treatment could efficiently eliminate microbes. Improvements in experimentally-made equipment allowed continuous sterilisation of both spore cells and vegetative cells of bacteria.

c) Lactobacilli from the bovine digestive tract were cultured and formulated. It was shown that feeding a lactobacillus formulation twice daily to cattle infested with *E.coli* O157:H7 could eliminate *E.coli* O157:H7 from the cattle.

d) Field experiments showed that *E.coli* remained viable for a month or longer at 25°C in soil, for two months or longer in summer, and for one month or longer in winter where manure was applied. It became clear that *E.coli* in processed compost can be killed by increasing temperature.

e) Following revaluation of the need for hygiene management of vegetable seeds during the culturing process, additional experiments on seed disinfection will be conducted starting in 1999 at the National Research Institute of Vegetables, Ornamental Plants and Tea.

5. Related budget and overview of projects

The following projects are under way, mainly at the National Food Research Institute, National Institute of Animal Health and the National Research Institute of Vegetables, Ornamental Plants and Tea.

*Pathogenic E.coli, 1999 -2001: budget allocation ¥40.24 million*

For the purpose of constructing production, process and distribution systems that enable consumers to feel safe eating foods, Japan plans to (1) explicate *E.coli* behavior in cattle and its surroundings, (2) develop cleaning technology, and (3) improve microbial control systems.

*Joint research with developed countries - food safety, 1999 - 2003: budget allocation ¥19.90 million*

Since foods are traded internationally, microbial contamination problems need to be solved through international joint research. Japan will exchange information on fungal toxins and *E.coli* contamination with institutes in Germany, France, Britain and the US, and promote joint studies on ensuring safety.

6. Evaluation of projects

It is necessary to perform strict evaluations of projects in order to obtain steady results that match the research resources invested. The results of evaluations should be appropriately reflected in changes of research pace and assignments, modification of plans, and decisions on whether projects should be continued. In concrete terms, this should be done by setting evaluation items for each project, evaluations should be done by external evaluators, etc., during the yearly planning and implementation as well as upon completion of the project (detailed intermediate evaluations are performed once every three to five years for long-term projects).
7. **Summary**

Research projects have thus far provided good results for ensuring food safety and preventing microbial contamination, thus offering a basis for the establishment of guidelines. Some of the results have been published in the media and are available for general use.

In so far as the global trade of food is concerned, information exchange with other developed countries is planned and basic data is to be accumulated through the promotion of international joint research. An international workshop on food safety is planned for 1999.

Although food safety problems would appear easily solved through the use of independent sterilisation techniques, this is actually not so. Consistent systems to ensure safety that cover everything from production and processing to distribution for ensuring safety need to be established.
KOREA

1. Introduction

Korea has been pursuing its endeavour to increase agricultural yield, and particularly of rice. Research and development activities for higher crop yields have been enhanced with the increased use of fertilisers and pesticides. In the 1980s, Korean attained self-sufficiency in rice as a staple food grain due to new agricultural technologies and the availability of agricultural equipment for cropping.

In spite of this achievement, the ratio of food self-support as a whole has been decreasing. For example, the value of food self-support in 1997 was only 27 per cent. This was caused by a decrease in arable land due to rapid industrialisation and urbanisation, as well as by a change in food consumption patterns consequent to a more affluent economy. The current food consumption pattern is oriented more towards vegetables, fruits and animal products; these developments have been accompanied by increasing concerns on food safety and hygiene.

Food safety has been in fact a concern in Korea for many years. More recently, some individuals and environmental groups have questioned the safety of food containing pesticide residues, which are monitored as hazardous contaminants in agricultural products. Nitrates and heavy metals are also of concern. Consumer unions have been most active in addressing such issues, while government offices have been campaigning against excessive use of fertilisers and pesticides. Policies for both producers and consumers have been pursued to promote sustainable or environmental agriculture or low-input agriculture.

Consumer demand for meat and poultry free of harmful chemicals and/or pathogenic micro-organisms has increased rapidly. Nevertheless, there has been a clear increase in the number of research initiatives to develop and commercialise genetically modified organisms (GMO). Most striking has been the emphasis on the positive aspects of biotechnology, such as improving the productivity and quality of crop plants, creating public concern over possible safety and environmental risks.

2. Responsibility structure of AKS

The responsibility of managing Korean AKS (research, extension and education) at the government level is divided among several ministries and administrations of the central and local governments as well as semi-governmental institutions. For agricultural research and extension at the central government level, the Government of Korea established the Rural Development Administration (RDA) in 1906 as the principal national authority. Its principal mandate is the improvement of crops and cropping technologies directly applicable to local farm fields. Research areas cover all agricultural sciences related to rural development, including crops, livestock, agro-machinery and chemicals, agricultural processing, water management and other environmental aspects, rural nutrition and home life, agricultural economics, electronic information systems. Moreover, the RDA has effectively institutionalised collaborative linkages with educational/academic institutions such as universities and colleges involved in
agricultural education and research (currently 33 nation-wide) which fall under the responsibility of the Ministry of Education (MOE).

Another government institution under the responsibility of the Ministry of Agriculture and Forestry (MAF) involved in agricultural research is the Veterinary Science and Animal Quarantine Office (VSAQO). This office specifically conducts veterinary research. There are semi-governmental research institutions, which are under the jurisdiction of MAF, such as the Korea Rural Economics Research Institute (KREI) for policy advice and the Korea Food Development Institute (KFDI) for food processing research. Other semi-governmental research institutions are under the Ministry of Science and Technology (MOST), for example the Biotechnology Institute which also participates in related biotechnology research in agriculture on a project basis.

The Korea Food and Drug Administration (KFDA), which is under the Ministry of Health and Welfare (MOHW), determines various guidelines for food safety such as the maximum residue limits (MRLs) of pesticides. This administrative agency enacts regulations and guidance. Five local branches investigate pesticide residues in imported agricultural products. There are also fifteen Domestic Health and Environment Research Institutes that inspect pesticide residues in domestic agricultural products.

The National Agricultural Products and Grade Inspection Office (NAPIO) under MAF including its nine branches regulates the area of production, pesticide residues in growing crops. NAPIO ensures that the level of pesticide residues in agricultural products in markets does not exceed the maximum residue limits.

In 1997, the government decided to create a special technical college under RDA to foster elite farm managers to further enhance agricultural productivity. This is the Korean National Agricultural College (KNAC) and it offers three-year courses related to agriculture providing training for future farmers with full government support with the aim of assuring obligatory farming upon completion of the course.

3. AKS’s Strategies for food safety

3.1 Identification of problems

Issues on the food safety are dealt with by governmental or non-governmental organisations (NGOs). Governmental authorities, such as RDA, NAPIO, KFDA, inspect food safety according to their respective mandate. NGOs, such as consumer's unions, monitor food safety in marketing, and consumer unions have often detected safety problems. Issues regarding pesticide residue are of the greatest concern, followed by heavy metals or nitrate.

Sometimes food safety problems are identified through outbreaks of foodborne illness caused by pathogenic micro-organisms such as salmonella, E. coli O157, etc.

With increased public concerns on genetically modified organisms (GMO), workshops/seminars/symposia are often offered to the general public or interested groups by RDA institutions.

3.2 Programme planning

AKS includes government institutions, local governments, universities and farmers. The aim of the AKS project is to conduct actual research and development with quality or improved agricultural techniques. Food safety is of utmost priority. Various training programs are offered to upgrade specialist
expertise as well as to give instructions to farmers. Farmers have recognised the importance of the safety of agricultural products and the need to know how to manage and cultivate farms.

Researchers or technicians who will produce data on the safety of agricultural products must necessarily have certain qualifications and take special college courses. They must also have basic training experience in the application of safety measures. Pesticide dealers or advisers should take the courses of training programs executed by Korean government.

RDA is also establishing a Committee of Safe Food Production, which will be comprised mainly of scientists and extension workers and which will seek to identify various problems related to food safety as well as provide solutions through research and extension plans.

Pesticides for minor crop protection, such as lettuce, perilla and endives, are out of interest to get registration by manufacturers. These minor crops often exceed MRLs of pesticides due to farmers’ improper use of non-registered pesticides. Today, RDA institutions are testing to screen suitable pesticides and to set up application frequency and pre-harvest intervals for these minor crops.

3.3 Strategies

AKS recognises that no single technological or procedural solution exists for the problems of food safety but the AKS’s goal will be achieved only through continuous efforts to improve hazard identification and prevention.

The food safety strategy of AKS includes the following major elements:

− provisions for systematic, science-based regulatory systems; for example, related legislation and guidelines to control and prevent potential hazards;
− targeted research to develop proper crop cultivating and animal husbandry techniques and to develop cost-saving techniques able to detect harmful chemicals or pathogenic micro-organisms in/on food with precision;
− systematic dissemination of agricultural technology to farmers in order to control and reduce contamination in the production step; and
− strengthened monitoring of regulated hazardous contaminants in the food channel.

4. Government policies

4.1 Safe crop production in farming step

The government has initiated two policy measures to ensure the safety of agricultural crop products. One is to discourage crop cultivation in regions highly polluted by hazardous chemicals, and the other is to decrease the use of pesticides and fertilisers in agriculture. The first policy is limited to regions contaminated with heavy metals from mining wastes or industrial wastes. Any water containing hazardous substances is prohibited for irrigation. To prevent pesticide contamination in agricultural products, rational pest control operations such as IPM (Integrated Pest Management) are being advised. The use of pesticide is strictly permitted to registered crops, application frequency and pre-harvest intervals. The regulation of pesticide residues in crops is applied to all cultivations, harvest and distribution. Pesticide residues in agricultural products are regulated on the basis of MRLs set by KFDA. In addition to the above regulations, strategic research and promotion of organic or precision farming involving biological control
tools with fewer side-effects is being developed. The government is also encouraging the use of environment and ecosystem-preserving techniques. All these regulations, however, must be in accordance with OECD guidelines.

4.2 Introduction of Hazard Analysis and Critical Control Point (HACCP) system in meat and poultry production

MAF and KFDA are preparing an HACCP-related regulatory registration and implementation timetable in order to keep meat and poultry product free of pathogens or harmful chemicals. Government considers the application of HACCP, created by NASA and recommend by the Codex Committee, as a new regulatory approach system that can be used to prevent hazards in the food supply, and as a tool for control, reduction, and prevention of pathogens in meat and poultry. The HACCP system can presently identify specific hazards and implement corresponding preventative measures aimed at ensuring the safety of food, particularly for meat and poultry.

4.3 Food safety inspection

Government inspects food to ensure food safety from farmer’s gate to dietary level for public health. NAPIO under MAF is in charge of inspection at farmer’s gate, while KFDA under MOHW inspects the food on the market. All food must meet regulatory guidelines, such as MRLs of pesticides, number of pathogenic microbes, etc., to ensure safety. Government takes proper actions on any non-safe agricultural product which exceeds MRLs for harmful chemicals or is contaminated by pathogens.

4.4 Strengthening quarantine for imported food

With the exception of rice, Korea must import many agricultural products, such as various grains, fruits, livestock and dairy products, to meet national demand. Therefore, quarantine of imported foods has recently become one of the leading activities in AKS. Government are undertaking measures to strengthen quarantines of imported food through systematic science-based inspection systems. These measurements include recruiting highly educated and trained experts and increasing investment for the instalment of state-of-the-art quarantine facilities and analytical instruments at national institutions.

4.5 GMO product registration and safety management

Recent participation in domestic or international workshops/seminars/symposia has generated awareness as to the safety issues and/or possible biohazards of GMOs. AKS has reviewed all the necessary steps for the commercialisation of GMO products and is implementog a reliable biosafety framework, including related law legislation, Test and Safety Assessment guidelines, etc.

5. Existing regulations

5.1 The Soil and Environment Protection Act

This Act controls the contamination of soil in agricultural production. The source of contamination should be eliminated in the case where the level of a hazardous substance exceeds its limit. Cultivation is also prohibited as the case may be. These limitations include six heavy metals, one example is cadmium, and three organic chemicals, including phenolics.
5.2  **The Water and Environment Protection Act**

This controls the contamination of agricultural products with hazardous substances through water irrigation. The items are COD, BOD, phosphorus content, nitrogen content, heavy metal contents (for lead, cadmium, chromium, etc.), and any suspicious organic compounds. These substances are controlled by the enacted tolerance levels.

5.3  **The Agricultural Product Quality Regulation Act**

This administers how to minimise the pesticide residues in crops before harvest. This act helps in the identification of the producers of the agricultural products in the markets. It also provides clarify on the source of contamination and identify which region or farm has problems.

5.4  **The Agrochemicals Management Act**

This Act decides on the safe use of pesticides. Its guidelines enforces the use of pesticides as regards crops, insects, the frequency of applications, and the pre-harvest intervals to be respected. The application of pesticides and the pre-harvest intervals are important factors related to pesticide residues found on a product. The level of pesticide residues in commodities should not be over the maximum residue limits.

5.5  **The Food Sanitary Act**

This is the most direct and integrated regulation to control food safety. The act establishes maximum residue limits of pesticides in commodities. The determination of violated food is based on these guidelines. The same guidelines are applied to both imported and domestic products.

On the other hand, AKS is in the process of preparing legislation for introduction of HACCP system applicable to meat and poultry and it is expected to reduce and control the harmful chemicals and pathogenic micro-organisms. AKS also is in the preparation of the related laws, guidelines or rules to ensure that GMO products are fully tested, assessed and registered with their regulatory systems.

6.  **Mechanisms by which the AKS is involved in policy formulation and implementation for the Food Safety**

**MAF plans the basic policy on safe agricultural food production and supply**

RDA plays a key role in the development of the agricultural sector in terms of administration, research and extension services, and is mainly comprised of the Bureau of Research Management, Technical Dissemination, and Farm Management. There are ten national research institutions under the general direction of the Bureau of Research Management and two non-research and educational institutions under RDA.

In addition to these national research institutes, each of the nine provincial governments has its own Provincial Agricultural Research and Extension Services (PARESs) with two bureaus: Agricultural Research and Extension Services. Since 1995, region specific experiment stations have been established for specialised crop commodities at major production areas. Currently, there are 32 specialised commodity
experiment stations throughout the country administered by their respective PARES. RDA and PARES offices also co-ordinate the extension programs of 157 Agricultural Development and Technology Centres (ADTECs) under the city/county governments.

6.1 Research

AKS develops agricultural crop cultivation technology or animal rearing technology for safe food production at its institutes or universities. It also also investigators and develops state-of-the-art techniques to detect harmful contaminants in food.

6.2 Extension

The technologies developed at research institutions are reflected in extension services as well as agricultural policies. AKS emphasises that the production of safe crop or meat in farming step is more effective and economical than regulatory measurements for non-safe food through post-harvest detection. As such, AKS has made continuous efforts to guide and educate farmers so that they could farm with proper cultivating technologies and safer sanitation procedures.

6.3 Food inspection

AKS monitors harmful chemicals or pathogenic micro-organisms in/on food from farmer’s gate to dietary level. Through such monitoring, AKS can determine the degree of contamination degree in foodstuffs and critical point from farm to table. These monitoring results also guide decisions for research and extension activities.

7. Interlinkages and networking of the AKS functions and co-operation between the AKS, the private sector and other institutions/associations

AKS aims to develop a new agricultural technology and to supervise the overall process of extension and training in the transfer of the new technologies. It also aims to have a well-organised relationship with other related departments. To co-operate with non-agricultural departments, a proposal to solve the present problems are carried out through information-exchange. For example, the AKS has established MRLs and regulatory criteria for each formulation by discussing with KFDA. In addition, KFDA analyses the inspection data and submits it to the Regional Health and Environment Research Institute. These are carried out through extension and education. The agricultural producer in the area of production are the recipients of information on pesticide residue in agricultural products. NGOs, such as environmental and consumer organisations, have also been involved to increase the efficacy of achievement of the agricultural products safety program. At present, networks of AKS to conduct agricultural products safety program are as follows:

The Rural Development Administration. RDA evaluates the test data of pesticide residue and establishes the Safe Use Guideline. Moreover, it prepares the status of pesticide residues from analysis of data from periodical monitoring, and finally makes a guideline for extension and education programs.

The Local Agricultural Technology Institutes. They deliver this guideline to the Agricultural Technology Centre in their province.
The staff of the Agricultural Technology Centre should complete special training program in each appropriate subject and directly instruct farmers on new agricultural technology. The technological guidance for instructing farmers includes many types of data produced not only by AKS and other departments, but also universities and NGOs.

8. Resource generation/funding source for food safety programs

The Government supports most of the budget for food safety. The Local Governments and also NGOs provide funding. In a special case, industries are charged of some expenses. For example, the Ministry of Agriculture and Forestry supports the funds for rearrangement or expansion of base facilities and the Rural Development Administration gives funds for research and extension. The local governments support part of the funds for basic facilities and research and extension. The Agricultural Co-operatives which is a semi-governmental organisation supply the expense for farming and marketing of agricultural products and agricultural technology extension. A greater portion of the fund for conducting a study of policy projects are supported by the Ministry of Agriculture and Forestry, but, according to types of projects, the Ministry of Science and Technology and other departments are asked to support part of the funds. Also the KFDA and the local Health and Environmental Research Institutes financially support the expenses for research, inspection, among others.

9. Results Assessment, SWOT(Strength, Weakness, Opportunity, and Threat) analysis, lessons learned and future implications

Experts from universities and research institutes carry out the planning of research projects and evaluation of the results. The results, packaged as a technological instruction sheet, are selected for dissemination to farmers as new agricultural technology. These sheets are delivered to the Agricultural Technology Centres in local provinces and used for instructing to farmers. Sometimes these process may not be complete and the result of extension activities may be not effective. In most cases, guidelines are often not followed by farmers when spraying pesticides and, as a result, pesticide residues of agricultural product exceed the MRLs in markets.

The Committees composed of experts from other departments or organisations, make and agree on a decision during their meeting. In some cases, however, the process to mediate disagreements or conflicting opinions is long and consequently decreases the efficacy of discussions to make a decision.

10. Conclusion

The contamination of heavy metals and pesticides on agricultural products is a topical food safety concern. Agricultural policy is currently changing its priority from increasing crop yield to pursuing safety of agricultural products and environment-friendly agriculture. Heavy metal pollution has been controlled by establishing a regulatory criteria for water and soil quality. Nevertheless, preventing contamination of foodstuff by heavy metals is not enough. Pesticide contamination has been controlled by establishing MRLs on pesticides and inspection of residues in agricultural products on the market.

The AKS has played an important role in the process of producing scientific data and making a decision. Therefore, AKS has had a well organised continuous system in planning, operating, and evaluation of research projects and extension services or training for farmers.
The other departments, except for AKS, have also contributed considerably on activities related to food safety and have been controlled by each other's regulatory acts. The experts working for related institutes belonging to AKS participate in the intradepartmental committee and make a common decision together. The common decision is then introduced to AKS. This process is very effective to make a complementary co-operative relationship with other departments.
MEXICO

1. Introduction

The intensification of the production and processing procedures, the rational and efficient use of practices and inputs to protect the environment, the agricultural workers hygiene and sanitary conditions, the dynamic of the international agricultural food trade, the attention of commitments derived from the agreements regarding technical obstacles to trade and from the application of sanitary and phytosanitary standards of the World Trade Organisation (OMC), as well as a broad coverage from the media, have forced the governments of most countries to increase their efforts in these topics, permitting a more efficient attention to problems related to illnesses caused by the consumption of food.

Nowadays, the developed countries that dominate the global agricultural market have reinforced their control tools, surveillance, inspection and certification of foods to achieve the food safety. This is due in part to the fact that consumers demand higher surveillance from their governments to safeguard the supply of safe foods by diminishing the biological, chemical and physical risk factors.

The food safety, that is to say, the guarantee that food consumption will not cause health damage, has become a priority in as much for the protection of public health, as for the agrifood products to maintain their position within the markets. Besides having implications in those aspects, this issue has a direct impact in the offer, demand, worker's hygiene and health, all of which rebounds in the cost structure of the agrifood network.

It is argued within the public health sector that the incidence of foodborne illnesses, has increased in the last few years and has become a growing concern, in as much from the governments, as from the international organisations responsible for the public health worldwide.

In the commercial environment, the market force has propitiated these instruments to evolve from voluntary to obligatory, constituting a technical barrier to the trade of economic impact in the exchange flows. This occurs nowadays in several countries of the European Union, Asia, and in the United States, where the importers of those countries have converted this type of guidelines or voluntary recommendations in obligatory.

Exporters will not have access to their traditional clients or such access will be, during the necessary transition time to adapt their procedures and systems, from the field to the shelf drastically punished in price and consequently displaced to inferior sections of the market if the exports to countries of those regions do not comply with the new requirements that diminish the risk factors of microbiological, chemical, physical, phytosanitary, zoosanitary, environment, the hygiene and sanitary of agricultural workers, as well as goods quality, packing and labeling.
2. Description of Government policy

It is the duty and responsibility of the Federal Government, research institutions, and economic agents directly involved with agricultural production to take urgent, clear, and decisive measures, not only oriented to preserve this important export market, but also to expand efforts that guarantee improved sanitary and hygiene conditions in the handling and consumption of agricultural products, whether for the domestic or international market.

The governments of the countries have the responsibility to:

− propose and review legislation concern to food safety.
− define and evaluate standards and procedures and oversee the compliance with same.
− establish and apply sanctions for violations of standards and procedures.
− comply with international commitments on food safety and represent the country before international organisations and agreements.

The ministries of agriculture have shared this technical responsibility with the ministries of health and other related institutions. Nevertheless, governments should adequate their legislative and standards framework so that ministries of agriculture responsibilities regarding food quality and safety, be from the farm or production facility to the slaughterhouse, packaging or customs, as the case may be, when dealing with domestic or export meat products for human consumption.

In the case of agricultural products, the action of the ministries of agriculture concerning food quality and safety, must be from the production line through primary industrialization, wholesale market, or customs when dealing with domestic or export agricultural products for human consumption.

3. Description of existing regulations.

In spite of the existence of several mandatory and voluntary standards in some countries, which regulate specific aspects for diminishing such risks, there is a problem in standardization and certification. However, it has been detected that, even though there is an over-regulation, there are also deficiencies in enforcing such standards.

Likewise, it can be said that currently there are no specific governmental regulations of the new requirements to diminish biological, chemical, and physical risk factors associated with the production, cultivation, processing, distribution, and consumption of agricultural goods.

Nevertheless, in the last two years, the Executive and Legislative Branches of the United States have carried out several administrative actions and presented, to the corresponding legislative bodies, diverse initiatives that allow them to reform the country’s judicial frame on Food Safety. In this sense, in May 1997, President Clinton announced an initiative known as Food Safety from Farm to Table, and months later, he presented an additional initiative which purpose is to Ensure the Safety of Imported and Domestics Fruit and Vegetable Products.

In this context, on 30 October 1998, the Food and Drugs Administration (FDA) published in the United States Official Newspaper (the Federal Register), the “Guidance to Minimize Microbiological Food Safety Hazards for Fresh Fruits and Vegetables”. This Guide seeks to be a non-obligatory recommendation for the producers of domestic and imported fresh fruits and vegetables.
The guide also establishes controls and standards to reduce the microbiological risk factors associated with the production, processing, distribution and consumption network, by adopting the Good Agriculture Practices (GAPs) and Good Manufacturing Practices (GMPs). Such risks are associated to factors such as:

- water quality.
- handling of fertilizers, drains and residual waters.
- agricultural workers sanitary and hygiene condition.
- infrastructure for sanity and hygiene in the production and processing facilities.
- the product’s shipping and packing conditions.

On the other hand, the Codex Committee on Food Hygiene is developing a “Code of Hygienic Practice for the Primary Production, Harvesting and Packaging of Fresh Fruits and Vegetables”.

This code addressed GAPs and GMPs for all stages of production of fresh fruits and vegetables from harvesting to packing. It provides a general framework of recommendations to allow uniform adoption by this sector rather than providing detailed recommendations for specific practices, operations or commodities. Therefore the code concentrates on microbiological hazards and addressed the physical and chemical hazards only and so far these related to GAPs and GMPs.

Besides, in the case of processed agricultural products is being developed a separate Code. Currently, there are the “Codex Alimentarius Code of Hygienic Practices” and the “General Principles of Food Hygiene”, which cover some aspects to maintain the food safety at retail, food services or at home.

4. The responsibility structure of the AKS

4.1. Kind of knowledge products related to food safety used by the consumers, producers on the public

Presently, there are not enough scientific or technical knowledge in any part of the world to substantiate the decrease in microbiological contamination risks on fresh fruits and vegetables; therefore, it is necessary to generate, through research and technological development, the scientific and technical bases to allow risk control.

Due to the lack of science-based methodologies to diminish microbiological risks, an option available to the production sector is the adoption of GAPs in the field and GMPs in packing. However, in order to adopt these processes, what is required is infrastructure and rural equipment investments, the amounts of which may vary depending on the region, crop, size of the production or processing unit, and the technology employed.

In this sense, the public demand for knowledge on Food Safety is represented by the need to have the identification of control critical points to avoid the fresh fruits and vegetables contamination and the acceptable levels for each one of them.

The AKS should articulate its research projects on food safety with the World Health Organisation, international institutions, country governments, research agencies and producers associations, in order to base its efforts in the specific demands of knowledge.
4.2. Description of existing fora on food safety

In the international context, the most important group is the Codex Committee on Food Hygiene, which are involved directly in the establishments of parameters to evaluate the food safety. Therefore, this group has constant meetings with representatives of several countries, in order to identify problems related with the food safety and to propose possible solutions for them.

The United States of America counts with the “Research Institute on Food Safety” (RIFS) and the “President's Council regarding Food Safety” (PCFS) created in July and August 1998, respectively. The RIFS goal is to design a Strategic Plan to coordinate public and private research in this matter. On the other hand, the PCFS will design a five-year Strategic Program that will consider the complete range of risk factors associated with the consumption of domestic and imported foods.

Specifically, in the case of Mexico, the “Technical Working Group for Food Safety” is responsible to gather representatives from the public and private sectors in order to submit a Proposed Food Safety Strategy to be implemented by the Federal Government.

5. How is the AKS addressing the food safety?

5.1. Identification of problems and description of desired outcome

There are many experiences all over the world directed to the improvement of quality of agricultural food products by training personnel and continuous improvement in the production and manufacture systems and procedures. Therefore exists an increased interest in the search for quality and an attitude that seeks competitiveness and markets based in total food quality products.

Nevertheless, it is necessary to impel research and qualification projects on food safety, to define the science-based methodologies to diminish microbiological risks.

The mainly desired outcome is to generate basic and applied research to diminish the risks factors associated with consumption of foods by transferring the technology to zones of production and processing facilities.

5.2. Program planning and development

It is suggested that AKS accomplish projects for the following topics:

- general information and commitment establishment.
- identify risk factors associated with foods.
- training and technical assistance.
- research projects in the alimentary field.
- agricultural workers sanity.
- water quality.
- quality assurance programs.
5.3. **Qualifications required for program implementation**

The AKS must to develop the knowledge and abilities of the program participants, to make possible the transformation of productive procedures, and technological change in the production and processing facilities, in order to improve the food safety of agricultural products.

The participating sector must have the scientific bases to identify critical points associated with agriculture and packaging facilities, as well as corrective actions programs.

5.4. **Description of strategies and instruments to deal with food safety.**

It is necessary to impel through national and international organisations for research projects, working facilities, conferences and fora which will generate knowledge to diminish biological, chemical and physical risks associated with the alimentary sector. In the same way, involve the productive sector in each country in the definition of the national and international organisations research agenda. Diffuse the AKS approach for food safety among the national and international research organisations and promote agreements to instrument the research projects within the alimentary sector.

5.5. **Mechanism by which the AKS is involved in policy formulation for food safety**

The AKS should participate in the meetings of the national and international organisations, in order to identify the needs of knowledge about food safety, as well as to propose the scientific bases for the establishment of regulations.

The AKS should also collaborate in developing proposals and draft laws, regulations and standards, concerning agricultural sanitary, food quality and safety, based on the new and current tendencies and realities that prevail on the agricultural sector.

6. **Forms of cooperation.**

6.1. **Cooperation between the AKS functions**

The research, education-training and extension activities of the AKS, should be connected with themselves, in order to provide an opportune flow between the new knowledge and the agricultural producers; as well as the needs of knowledge and the research programs.
6.2. **Cooperation between the AKS and other institutions**

Arrange with the national organisations cooperation agreements concerning training, technical assistance, inspection, surveillance, certification, financing, legislation and standards framework, as well as infrastructure and rural equipment to adopt the Quality Assurance Programs. Diffuse within these organisations, the food safety activities that the AKS is setting up in an effort to enrich with the ability and experience that these organisations have.

In the same way, it is recommendable to take advantage of proposals, plans and projects regarding Food Safety developed by agencies such as the NCA, FAO, World Bank, Interamerican Development Bank, OIRSA, CODEX-Alimentarius, OMS, OPS, NAPPO, OIE, INPPAZ, and foreign governments, among others.

7. **Forms of program funding.**

Arrange for a joint financial plan with international organisations and agencies such as the ones mentioned above on this document. The cost of AKS could be covered with the funds currently set aside for their regular programs by national and international organisations.

8. **Assessment of results.**

At this moment, due to the recent importance that the Food Safety have had in our Country, the research, education and extension activities are still in the programming phase. In this sense, currently is not possible to assess the results of these activities.
9. **Summary and conclusions.**

Scientific research over the last decades has shown that a diet rich in fruits and vegetables is protective against many cancers and lowers the occurrence of coronary heart disease. This recognition of the importance of routine consumption of fresh fruits and vegetables, together with a marked increase in the year-round availability of fresh fruits and vegetables from global market, has contributed to the substantial increase in consumption of fresh fruits and vegetables over the past two decades. However, recent increase of reported food borne illness associated with these products has raised concerns from public health agencies and consumers about the safety of fresh fruits and vegetables which are not processed to eliminate pathogens.

In the same way, the industry of fresh fruits and vegetables has a high degree of complexity and is as diverse as the commodities and the climatic and the environmental conditions and seasons where fresh fruits and vegetables are produced, harvested, and packaged.

Presently, there are not enough scientific or technical knowledge in any part of the world to substantiate the decrease in microbiological contamination risks on fresh fruits and vegetables; therefore, it is necessary to generate, through research and technological development, the scientific and technical bases to allow risk control. In this sense, it is necessary to impel research and qualification projects on Food Safety, to define the science-based methodologies to diminish microbiological risks.

This document is a proposal for the AKS actions concern to Food Safety. The agricultural research is essential factor to develop the knowledge to diminish the risks factors associated with consumption of foods by transferring the technology to zones of production and processing facilities. Also, the education and extension are indispensible to transmit this knowledge to the agricultural producers and industry.
1. Introduction

Food safety has become an important issue as Dutch consumers increasingly relate ethical and ecological aspects to it. Discussions on food safety may cover safety of feeds, animal well being and environmental policies. This country section will focus on food safety as such and not on the actual food chain. Dutch people have been for centuries an international trading nation. From this perspective, the Netherlands have a strong position in trade and in agribusiness and most government-funded research is aimed at contributing or solving policy and societal problems related to these activities.

2. Description of topic related Government policy

General trends in the Dutch knowledge policy are:

− an integral approach of knowledge generation, dissemination and utilisation;
− research funding on food and food related topics is increasing, from government to industry;
− increased attention towards closer co-operation between RTD and educational institutions, and between RTD organisations and industry.

Food safety, toxicology and food control

For EU-legislation, it is necessary that the methods for controls on products, contaminants and GMO’s remain up-to-date, effective and adequate. The programmes of several institutes (DLO and TNO) give attention to the development of techniques and methods and their application.

Consumer research

There is a growing desire to study consumer behaviour, civilian concerns and prevention. Key words are: mass individualisation (the breakdown of the mass of consumers into smaller groups which are more or less the same in attitude/behaviour), food choice, civilian concern on methods of food production and acceptance of food in relation to GMOs and decision patterns concerning food choice. The Government also organises national food consumption surveys.
Human nutrition

Interest in the relation between health and food consumption is increasing, particularly between the occurrence of diseases, food and health protecting (bioactive) agents/components of food.

Chain of knowledge and logistics

The intention is to improve and strengthen co-operation in this field between agri-business and research institutions. Public/private co-operation is stimulated and the involved companies take an active part in determining the research topics (as well as the fundamental-strategic topics). This topic is only partially linked to nutrition and food safety, but has strong implications because of the relation in and between food chains on the quality of the final products. It is not exclusively the task of AKS.

Development of models

The development of models by TNO, RIILT, RIVM and University of Maastricht focus on the study of kinetics of body components, for example the gesto-intestinal tract. The focus of these studies, which is not specifically focussed on contaminants, includes the interaction and effects of food components on the internal physiology. This initiative was taken in reaction to demands from industry.

3. Description of existing regulations

Policies developed and enacted by the Netherlands follow EU-legislation. The focus is on the application and control of European regulations: referential tasks, checks and samples, and inspections. Two institutes, DLO-RIKILT and RIVM (food and environment), have a function established in specific legislation. The RIKILT (quality) is based on a provision. The DLO-institutes in the Wageningen UR (see country note) act as the executive for specific legislative tasks, for example the evaluation of EU-files, quality security, development of methodology and support of control-tasks.

4. Food safety in the responsibility structure (of the AKS)

Institutional responsibility for the general knowledge infrastructure rests with the Ministry of Education, Culture and Science, and for specific issues with the Ministry of Agriculture, Nature Management and Fisheries.

Three Ministries are involved in food science:

− Agriculture Nature management and Fisheries from the perspective of production, quality and safety,
− Health, Welfare and Sports for human health, and
− Economic affairs for industrial innovation and technology.

Food safety is a matter for the first two Ministries.

Major players (with substantial R&D facilities) are: Unilever, Cosun, Numico, AVEBE, Cebeco Handelsraad, CSM, Campina-Melkunie, Friesland Coberco Dairy foods, and Gist Brocades (at present in DSM).
There is strong private and public collaboration in the following fields:

- programme on vertical chain research,
- Wageningen Centre for Food Sciences, and
- on the acceptance of biotechnology (Unilever in particular is discussing matters with consumer groups).

### 4.1 Knowledge products used by consumers, producers and the public

As a result of research, national databases are available for:

- databank on food contaminants;

- monitoring databank on residues and contaminants in Dutch dairy products, meat, fish, vegetables and fruit. The databank itself is not accessible to third parties, but information/printout on products or certain compounds, etc., is available. Financed by government and industry. The Institute also administers the National Network for Monitoring Radioactivity in Food;

- databank for food hypersensitivity ALBA (TNO-Food): This databank consists of lists of brand names of (food) products that are 'free from' (allergens and food intolerance inducing) substances; about 10 000 products are listed. Data are renewed annually on the basis of information from manufacturers, laboratory and/or literature research. Data are available through the Netherlands Nutrition Centre. Most publications are in Dutch. The aim of this Centre is to increase knowledge and perception thus enabling the consumer to choose a healthy diet. Tasks and activities of the following four organisations are integrated: The Bureau for Food and Nutritional Education, the Information Centre for Food Sensitivity, the Nutrition Foundation and the Steering Committee on Healthy Nutrition.

### 4.2 Existing public fora for food safety discussions

A strong link is made in the development of policies between demands for research and development and offer. Most R&D programmes are guided by a committee chaired by a policy department of the Ministry of Agriculture, Nature Management and Fisheries. Industrial and societal organisations also take part in the committee so as to ensure that research contributes to current political and societal questions.

There are no existing foras where public concern with respect to food safety can be addressed. Discussion about novel foods between consumers/civilians and researchers is an initiative supported by the government. This, however, is (still) an exception. Research on consumer behaviour is a common issue between the Ministry of Agriculture and business. Civilian responsibility itself is not yet the subject of studies.

An overview of present government roles follows:

- broker: creating networks (rare);
- financing: sponsoring of programs with the ministerial policy frame and funding in combination with programs;
− setting targets: facilitating discussions about targets (e.g. product research to inform the public, policy information and governmental control for own use, and consumers research for industry);
− user: policy information and governmental control for own use; and
− producer: there are no institutes directly tied to as they are all private.

5. AKS addressing food safety

Food safety is an ’old and settled’ issue. Most of the problems are known and the appropriate networks are in place and in operation.

5.1 Identification of problems and description of desired outcome

At a high level, food safety is the subject of general forecasts, for example by national councils. Next to this it is the subject of policy departments of the ministry of agriculture. Guidance committees, at present chaired by the department Science and Knowledge Dissemination of the Ministry, bring policymakers, researchers and interest groups together to negotiate programs with the lines of broader policy (also EU-regulations).

5.2 Programme planning and development

A part of the food safety work is embedded in the Wageningen UR structure; four areas are mentioned:

1. Sustainable agricultural production
2. Agrotechnology, food and health
3. Nature development and management of natural resources and
4. Use of the multifunctional green and blue (aquatic) rural area.

For point 2, the following topics are mentioned:

− processing of raw-materials
− food and health
− consumer perception and product acceptability, and
− quality of product and process.

Annual amounts in 1999 US$, on the basis of integral programmes (not purely nutrition/food safety):

− Several programmes of TNO: $4 million in 1997 topics: food and health, food-chains, safety objective: precompetitive applied research for the benefit of industry and society
− Several programmes of DLO: $5 million in 1997 topics: technology, safety, quality, food control, objective: precompetitive strategic-applied research concerning the development of industrial needs at the mid-term range period. One programme consists of National legislative control.
\[ \text{National fundamental research programme (NWO): period 1998-2004, $1 million annual topics: food-health (bio-active components), consumer, food safety objective: to broaden views on fundamental aspects remarks: Programme works via tender system.} \]

\[ \text{National R&D programme (IOP) on industrial proteins: 1997-2001, $1 million annual topic: structure-functionality relationship, objective: to link fundamental protein chemistry research groups to applied food scientists, to develop a network and to prepare the grounds for industrial applications remarks: Tender system, fundamental-strategic research} \]

\[ \text{National Programme on agri-chains 1994-1998: $0.5 million annual topics: logistics, food quality, chain building, management, technology objective: National programme to strengthen the infrastructure of chain expertise remarks: tender system, projects only funded if co-makership industry-research organisations is realised} \]

\[ \text{Wageningen centre for food sciences 1998-2004: $5 million minimum per year. Topics: food and health, structure-functionality, functionality and food technology. Remarks: virtual institute on the basis of co-operation between industry <Unilever, AVEBE, NZO (Dutch Dairy Board of all dairy companies), Gist-Brocades, Cebeco, Cosun>, ATO-DLO, NIZO, TNO-food and LUW; finance on 50-50 basis industry/government} \]

\[ \text{Several RIVM-programmes deal with relation food-health, topics: epidemiology, toxicology, nutrition (e.g. contaminants, intentional components, and packaging).} \]

\[ 5.3 \text{ Qualifications required for food safety} \]

There are no structural problems; food safety is an integral part of curricula at the senior secondary and higher vocational education levels as well as in universities.

There does exist a problem of friction within project management that must be addressed. There is also a general problem resulting from the high pace of development (the resolution of which will be greatly helped by new information technology) and the problem of people keeping up-to-date.

\[ 5.4 \text{ Education and training} \]

Government supports no special training and mobility activities towards EU Member-States. This is the responsibility of the research organisations themselves. Programmes with an international perspective are:

\[ \text{Graduate schools: The graduate school VLAG (advanced studies in food technology, agro-biotechnology, nutrition and health sciences) is a co-operative endeavour of ATO-DLO, RIKILT-DLO, TNO-Food, LUW, RUU, Catholic University Nijmegen and NIZO. This school will perform research and provides post-graduate training.} \]

\[ \text{The graduate school Environmental chemistry and Toxicology (M&T) is a combination of LUW, and Catholic University of Nijmegen} \]

\[ \text{International training activities Agricultural University:1. MSc programme on biotechnology; part of the programme is dedicated towards agrofood 2. International MBA courses for food industry (several courses; more food technology than nutrition!)} \]
5.4 **Approaches and instruments to deal with food safety**

Programming is based on views and strategies to realise policy goals. The programme-cycle is a permanent provision. In general programs four years, cost US$0.5 - 1 million and are evaluated annually as to whether they will be continued or not. The programme discussion are between senior staff officers and senior researchers.

5.5 **AKS involvement in food safety policy formulation forecast is to provide views.**

The two forecasting councils are:

- Health Council (including food issues), The Hague,
- National Council for Agricultural Research (including food), The Hague

The Councils invite stakeholders, in a broad sense academia, and related to topics specialists in Round Tables and brainstorms.

At the level of views and strategies, researchers participate at e.g. EU-levels in scientific advisory committees. Researchers advice policy officers to validate and judge EU-files. Researchers are involved in policy at a global level for example in the scientific committees of JECFA (Joint Expert Committee on Food Additives and Contaminants) and the Codex Alimentarius for expert judgement functions.

6. **Description of forms of co-operation**

Co-operation and joint initiatives are organised at the following levels:

- TNO and Wageningen UR agree an administrative level between organisations
- RIVM and DLO do the same at institutional level
- The Graduate School VLAG links between public knowledge institutions
- The Technological Top Institute ‘Wageningen for Food Sciences’ negotiates and links between public and private knowledge institutions (and works on public-private-collaboration, PPC-arrangements).

Suggested areas of greater co-operation are the following:

- food safety and control (standardisation; development of detection methods);
- risk analysis and risk management;
- databases;
- food education and training.

7. **Programme funding and sources of funding**

See points 4, 5.2, 5.4 and 6 above.
8. **Assessment of results (including any indicators)**

Evaluation of results remains difficult. Program evaluation is in development, but not in operation. The evaluations in the form of visitations were mainly at an institutional level. Recently, visitations have been carried out for themes, but not yet for food safety.

9. **Summary and conclusions**

This note has focussed on food safety in the Netherlands but not on the whole of the food chain. Food safety is a matter for the Ministry of Agriculture Nature Management and Fisheries and the Ministry of Health, Welfare and Sports for human health. The two forecasting councils are:

- Health Council (including food issues), The Hague,
- National Council for Agricultural Research (including food), The Hague

Government-funded research is aimed at contributing or solving policy and societal problems as well as challenges connected to trade, imports and export. The trends are:

- an integral approach of knowledge generation, dissemination and utilisation;
- research funding from government and industry on food is increasing;
- increased attention towards close co-operation between RTD and educational or organisations and between RTD organisations and industry.

Fostered are the strong positions in the Netherlands: food safety, toxicology and food control, consumer research, human nutrition, chain knowledge and logistics, and development of models. The programme-cycle for research is a permanent provision. Programs last in four years are US$0.5 - 1 million in size, and are evaluated annually to determine whether they will be continue or not.

Private and public collaboration exists in the following fields:

- programme on vertical chain research,
- Wageningen Centre for Food Sciences, and
- on acceptation of biotechnology.

Food safety is an integral part of curricula at senior secondary and higher vocational education levels as well as in universities.
1. **Introduction**

An AKS system for food security is comprised of almost all sectors, institutions and individuals working with issues relating to the food chain. An AKS-system will thus include the basic and higher training at universities and colleges, research and development, and the communication systems between these training institutions. Furthermore, it will include the institutional knowledge of responsible ministry(ies), its implementing agencies at central, regional and local levels, as well as the knowledge of farmers, the food industry, wholesalers and retailers all the way to the consumer. This section will, however, be limited to higher training, research and development in the field of food safety, as well as the Norwegian Food Safety Risk Communication Programme.

2. **Description of Government policy on food safety**

There has been an increasing focus on food safety and consumer issues in recent years. A white paper was presented to the Norwegian Parliament on this issue in 1997. The overall objectives of the policy were the following: (i) food shall be safe and of high quality, and (ii) consumers shall be satisfied. The government shall ensure a sustainable production system in farming, aquaculture and in the food industry.

One of the principal tasks facing Norwegian authorities is ensuring consumers safe access to top-quality foods, as well as facilitating the choice of a nutritionally balanced diet. Mutual confidence between the consumers and authorities on food-related matters is crucial. In order to maintain and develop this confidence, frank and open communication with consumers and consumer organisations, and the building of structures for consumer participation are essential.

3. **Description of existing regulations**

Norwegian food legislation is comprised of five acts regulating production from stable to table. Animal and public health issues are included. There are three responsible ministries: health, agriculture, and fisheries. Through the EEA agreement, Norway has implemented the major parts of EU legislation in the veterinary sector, including regulations on hygiene in food production.
4. **The structure of the AKS on food safety**

**Training**

Training in agriculture and food sciences is given in several high schools, colleges and universities. The main institutions in higher training are The Agricultural University of Norway and The Norwegian College of Veterinary Medicine.

The agricultural quality assurance system, funded by the Government, is one form of co-operation between the Government and agricultural organisations. Quality assurance systems should be implemented on each farm. Health and food safety issues are comprised by the system.

**Research**

The Research Council of Norway plays a vital role in developing and implementing the country’s national research strategy. It acts as a government adviser identifying present and future needs for knowledge. It is a funding agency for independent research programmes and projects, and strategic programmes at research institutes. It facilitates and co-ordinates Norwegian participation in international research programmes. Furthermore, it promotes co-operation between R&D institutions, ministries, business and industry, public agencies and enterprises, other sources of funding, and users of research. The Research Council is organised into a number of programs, of which bioproduction and processing are the most important with respect to food issues.

The primary goal of the Bioproduction and Processing Division at the Research Council is to develop a scientific foundation for the sustainable utilisation of biological resources and to promote profitable, sustainable economic development based on such resources. The division’s priorities include promoting competitiveness of agriculture; sustainable and profitable fishery and aquaculture; food and beverage industry with a focus on food quality and safety; improved profitability in the pulp and paper industry; and innovation and economic development in coastal and rural communities.

Most of this research takes place within the framework of programmes, which include both basic and applied research. User-driven research is an important instrument in this context. Particular emphasis is attached to strategic programmes designed to stimulate co-operation, long-term professional and human resource development, the recruitment of new researchers and international activities. The Bioproduction and Processing Division is responsible for 15 research programmes and each year it provides support for approximately 800 projects. There is a specific program on food safety and quality.

The National Veterinary Institute is comprised of the Veterinary Institute in Oslo and regional laboratories in Sandnes, Bergen, Molde, Trondheim and Harstad. The central institute carries out research for agricultural authorities in the field of veterinary medicine and its main tasks include veterinary diagnostics and animal disease control. The institute also serves in an advisory capacity on matters relating to the implementation of regulations relevant to the hygiene of food products and animal feed, as well as the health of livestock, fish, domesticated reindeer and game animals.

The Norwegian Food Research Institute (Matforsk) conducts research and development activities in the field of foodstuffs. The institute’s research revolves largely around the concept of food quality, ranging from methods for measurement and control to specific problems concerning meat, vegetable and cereal products. Important subject fields include analysis of unprocessed products, analysis of quality parameters, product development methodology, fermentation, hygiene and shelf life.
The Norwegian Crop Research Institute (Planteforsk) is a national applied research institute of international standing. The institute is responsible for research and development in agriculture and horticulture, including research in soil and environment, agronomy, plant breeding, crop production systems and plant protection. Planteforsk is associated with institutions across the country, and collaborates with universities and other research institutions, both in Norway and abroad.

The Norwegian College of Veterinary Medicine is performing extensive research in food hygiene

**Government administration**

The Norwegian Agriculture Inspection Service is a directorate of the Ministry of Agriculture. Its primary goals are to support the development of an agriculture production devoid of harmful residues, which protects the natural environment and maintains high safety standards for agricultural workers. The high quality of inputs into the production chain is emphasised with the aim of sustainable production of healthy plants for food and feed.

The authorities officially in charge of food control include the Norwegian Food Control Authority (SNT), the local (municipal) food control authorities (KNT), and the quality control service of the Directorate of Fisheries. The food control authority in Norway plays an important role in the implementation of a comprehensive food and nutrition policy. Its main responsibility is to administer food legislation and to supervise that such legislation is followed and implemented. The official food control authorities should meet consumer demands and concerns by providing information on foods, both regarding composition and processing. The aim is to enable consumers to make informed choices on the basis of the broadest possible range of facts.

The Norwegian Food Control Authority is the national directorate responsible for administering food control legislation laid down by the Ministry of Health and Social Affairs, the Ministry of Agriculture and the Ministry of Fisheries. Administratively SNT is part of the Ministry of Agriculture.

Through legal powers delegated by SNT, the local food control authorities carry out meat inspections, import control, and checks on food manufacturers producing products of animal origin, in addition to controlling food establishments supplying products for distribution outside the immediate local district.

The local food control authorities (KNT) carry out inspections of food manufacturers, catering establishments, food retailers, etc., decisions concerning these enterprises being taken by the appropriate municipal bodies. The KNTs represent the first contact interface for consumers and food manufacturers.

The Directorate of Fisheries’ control agency – with five regional offices – is responsible for the control of fish and fishery products intended for export. Responsibility for the control of enterprises producing fish and fish products for the domestic market rests with the local food control authorities. The Directorate of Fisheries is subordinate to the Ministry of Fisheries

The County Governors in Norway are the Regional Representatives of the Central Government. They are the connecting link between the central government and the municipalities. The County Governor should help to achieve the agricultural policy goals set by the Storting at any given time. The county governor must help to strengthen the agricultural sector by measures within new and traditional forms of agriculture-based development. Moreover, the County Governor must implement measures for income and welfare policies, such as the control of subsidies under the agricultural agreement.
The county governor must ensure that the municipalities perform their role as the prime authority responsible for agriculture and forestry.

**Food Safety Risk Communication Programme**

The Ministry of Agriculture launched a communication programme in 1996 entitled Food Safety. This is a pilot programme on risk communication, i.e. open communication between all interested parties on what’s known and what’s unknown about risk assessment and risk management associated with food. It is based on the wish of the authorities to create an open dialogue and active consumer participation. The goal is to clarify and eventually meet the demands of consumers, media, food industry, trade and organisations for communication and information on food safety. The Communication Programme has become an integrated part of government food policy.

The Norwegian College of Veterinary Medicine has food and water hygiene as part of its curriculum.

5. **Forms of programme funding and sources of funding**

One third of Norway’s public sector research investment is channelled through the Research Council of Norway. The remainder is transferred directly from the ministries to the relevant research institutions. In 1996, Norway spent a total of NOK 16 billion on R&D, of which public sector allocations accounted for roughly NOK 8 billion. The Research Council of Norway has an annual budget of approximately NOK 2.7 billion.
1. Background

Poland, with an area of 312 685 km², is situated in Central Europe. Tables 1 and 2 present the different land uses according to type of utilisation expressed in hectares. Data concerning land utilisation in Poland as compared to the rest of the world and the European Union are shown in Table 3. Poland, with a population of 38 600 000, 58 per cent being less than 40 years, is a relatively young country in demographic terms if compared to EU member States. The percentage of the urban population is 61.9 per cent and 38.1 per cent in rural areas. The demographic structure of the population grouped according to age, gender and place of residence is presented in Table 4.

The share of the active population and the population involved in agriculture in Poland against the situation in the EU is presented in Table 5. The data indicate the percentage of the population working in the agricultural sector is four times greater in Poland than in the EU. The total working population is employed in agriculture and forestry is 26.9 per cent, although the environmental conditions for agricultural production are unfavourable. Poor soil quality and variable climatic conditions greatly affect agricultural production: yields per 1 ha are on average 30 per cent lower than in west European countries. The quality of agricultural land in Poland expressed as the percentage of an area of a given group of agricultural land is presented in Table 6. It shows that poor and very poor quality soils dominate. Low yields per hectare are also the result of low levels of artificial fertiliser used, as shown in shown in Table 7.

As regards plant production, cereals dominate accounting for 65 per cent of the total plant grown area. The size of cereal production and the structure thereof are not sufficient to meet the demand. Therefore, on average, approximately 1.8 million tons of cereals are imported annually. Of great importance for agricultural production are potatoes and sugar beets, the production of which meets the demand for sugar on the domestic market and enables export of surpluses.

The volume of fruit and vegetable production in Poland meets domestic demands. Poland is the third ranking vegetable producing country in Europe and the sixth fruit producing country. However, due to inadequate storage facilities, it is necessary to supplement supplies with imports.

Of great significance for agricultural produce processing is the extent to which the agri-food industry is developed. Employment in the agri-food industry in 1997, by type of activity, is presented in Table 8. According to this table, the largest number of employed people is found in meat production, processing and preservation of meat products, bread and bakery product manufacture, pastry and cake, as well as dairy production.
Table 1. Poland’s area according to type of utilisation in 1997
(Status at the end of the year)

<table>
<thead>
<tr>
<th>Agricultural land</th>
<th>Plantings</th>
<th>Waters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Of which rural areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 268 502</td>
<td>29 172 969</td>
<td>18 607 762</td>
</tr>
<tr>
<td>14 205 069</td>
<td>317 996</td>
<td>4 084 697</td>
</tr>
<tr>
<td>8 809 429</td>
<td></td>
<td>219 485</td>
</tr>
<tr>
<td>8 809 429</td>
<td></td>
<td>832 763</td>
</tr>
</tbody>
</table>

a) According to land surveillance records.

Table 2. Poland’s area according to type of utilisation in 1997
(Status at the end of the year)

<table>
<thead>
<tr>
<th>Mining grounds</th>
<th>Areas</th>
<th>Various areas</th>
<th>Idle land</th>
<th>Equalisation area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used for transport</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roads</td>
<td>40 316</td>
<td>849 493</td>
<td>883 060</td>
<td>66 759</td>
</tr>
<tr>
<td>Railways and other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not built-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>23 1440</td>
<td>50 5489</td>
<td>27 662</td>
</tr>
</tbody>
</table>

a) Difference between land surveillance area and the sum of administrative units (towns, gminas) shown in land records.

Table 3. Land use

<table>
<thead>
<tr>
<th>Country</th>
<th>Years</th>
<th>Agricultural land</th>
<th>Forests</th>
<th>Agricultural land</th>
<th>Arable land and orchards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>Arable land and orchards</td>
<td>Meadows and pastures</td>
<td>As % of the total area</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>World</td>
<td>1980</td>
<td>4 750.4</td>
<td>1 417.1</td>
<td>3 333.3</td>
<td>4 100.3</td>
</tr>
<tr>
<td></td>
<td>1984</td>
<td>4 846.1</td>
<td>1 450.8</td>
<td>3 395.3</td>
<td>4 138.0</td>
</tr>
<tr>
<td>of which EU</td>
<td>1980</td>
<td>153.0</td>
<td>91.0</td>
<td>62.0</td>
<td>110.9</td>
</tr>
<tr>
<td></td>
<td>1984</td>
<td>143.8</td>
<td>87.5</td>
<td>56.3</td>
<td>113.3</td>
</tr>
<tr>
<td>Poland</td>
<td>1980</td>
<td>18.9</td>
<td>14.9</td>
<td>4.0</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>1984</td>
<td>18.6</td>
<td>14.6</td>
<td>4.0</td>
<td>8.8</td>
</tr>
</tbody>
</table>

### Table 4. Population according to gender and age  
(Status at 31 December 1997)

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Total</th>
<th>Men</th>
<th>Women</th>
<th>Towns</th>
<th>Villages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>'000.</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Total</td>
<td>38660.0</td>
<td>48.6</td>
<td>51.4</td>
<td>61.9</td>
<td>38.1</td>
</tr>
<tr>
<td>0-2 years</td>
<td>1259.0</td>
<td>51.4</td>
<td>48.6</td>
<td>54.1</td>
<td>45.9</td>
</tr>
<tr>
<td>3-6</td>
<td>2001.0</td>
<td>51.2</td>
<td>48.8</td>
<td>54.5</td>
<td>45.5</td>
</tr>
<tr>
<td>7-14</td>
<td>4909.5</td>
<td>51.2</td>
<td>48.8</td>
<td>58.8</td>
<td>41.2</td>
</tr>
<tr>
<td>15-17</td>
<td>1996.0</td>
<td>51.0</td>
<td>49.0</td>
<td>63.1</td>
<td>36.9</td>
</tr>
<tr>
<td>18-19</td>
<td>1296.5</td>
<td>47.2</td>
<td>52.8</td>
<td>63.5</td>
<td>36.5</td>
</tr>
<tr>
<td>20-39</td>
<td>1025.2</td>
<td>50.8</td>
<td>49.2</td>
<td>61.9</td>
<td>38.1</td>
</tr>
<tr>
<td>40-49</td>
<td>6206.6</td>
<td>49.6</td>
<td>50.4</td>
<td>68.0</td>
<td>32.0</td>
</tr>
<tr>
<td>50-59</td>
<td>3696.9</td>
<td>47.5</td>
<td>52.5</td>
<td>66.5</td>
<td>33.5</td>
</tr>
<tr>
<td>60-64</td>
<td>1750.6</td>
<td>45.1</td>
<td>54.9</td>
<td>62.2</td>
<td>37.8</td>
</tr>
<tr>
<td>65-74</td>
<td>2981.7</td>
<td>40.7</td>
<td>59.3</td>
<td>58.5</td>
<td>41.5</td>
</tr>
<tr>
<td>75 and more</td>
<td>1537.0</td>
<td>32.8</td>
<td>67.2</td>
<td>55.0</td>
<td>45.0</td>
</tr>
</tbody>
</table>

Source: 1998 Demographic Yearbook.

### Table 5. Active population and population working in agriculture

<table>
<thead>
<tr>
<th>Country</th>
<th>Active population in agriculture as % of the total active population</th>
<th>Total population per one person active in agriculture</th>
<th>Population working in agriculture '000</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>6.4</td>
<td>4.8</td>
<td>33.6</td>
</tr>
<tr>
<td>Poland</td>
<td>27.5</td>
<td>23.3</td>
<td>7.4</td>
</tr>
</tbody>
</table>

Table 6. Agricultural land quality

State at 1 January

<table>
<thead>
<tr>
<th>Specification</th>
<th>1990 Total</th>
<th>1990 Including individual farm holdings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good and good soils</td>
<td>11.4</td>
<td>11.3</td>
</tr>
<tr>
<td>Arable land and orchards</td>
<td>14.2</td>
<td>14.0</td>
</tr>
<tr>
<td>Grassland</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Poor and very poor quality soils</td>
<td>34.5</td>
<td>35.9</td>
</tr>
<tr>
<td>Arable land and orchards</td>
<td>32.3</td>
<td>33.6</td>
</tr>
<tr>
<td>Grassland</td>
<td>42.6</td>
<td>44.6</td>
</tr>
</tbody>
</table>

a) Arable land and land under orchards of soil quality classes: I, II and III, and land under grassland of soil quality classes: I and II.

b) Arable land and land under grassland of soil quality classes: V and VI.


Table 7. Use of artificial fertiliser (calculated as pure ingredient)

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Nitrogen (N)</th>
<th>Nitrogen (N)</th>
<th>Phosphorus (P₂O₅)</th>
<th>Potassium (K₂O)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>95.1</td>
<td>84.5</td>
<td>39.9</td>
<td>47.6</td>
</tr>
<tr>
<td>EU</td>
<td>132.6</td>
<td>120.7</td>
<td>69.3</td>
<td>66.7</td>
</tr>
</tbody>
</table>

Table 8. Average employment in food industry according to type of activity

<table>
<thead>
<tr>
<th>Specifications</th>
<th>1993</th>
<th>1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL</td>
<td>471.0</td>
<td>498.8</td>
</tr>
<tr>
<td>Meat and meat product production, processing and preservation</td>
<td>128.3</td>
<td>114.2</td>
</tr>
<tr>
<td>Fish and fishery product processing and preservation</td>
<td>12.2</td>
<td>13.1</td>
</tr>
<tr>
<td>Dairy product production</td>
<td>66.4</td>
<td>61.3</td>
</tr>
<tr>
<td>Manufacture of cereal milling products, production of pasta, noodles and similar</td>
<td>19.1</td>
<td>19.6</td>
</tr>
<tr>
<td>products made of flour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production of bread and bakery products, production of pastry and cakes</td>
<td>10.2</td>
<td>62.9</td>
</tr>
<tr>
<td>Sugar production</td>
<td>28.8</td>
<td>26.5</td>
</tr>
<tr>
<td>Potato processing</td>
<td>4.9</td>
<td>4.6</td>
</tr>
<tr>
<td>Production of fruit and vegetable juices; fruit and vegetable processing</td>
<td>36.8</td>
<td>41.5</td>
</tr>
<tr>
<td>otherwise not classified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production of oils and fats of plant and animal origin</td>
<td>5.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Production of biscuits and crackers, production of cake and pastry with long</td>
<td>27.6</td>
<td>40.5</td>
</tr>
<tr>
<td>shelf like, Production of cocoa, chocolate and sugar confectionery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production of distilled alcohol beverages, production of ethyl alcohol</td>
<td>8.9</td>
<td>9.4</td>
</tr>
<tr>
<td>resulting from raw material fermentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production of grape wines, production of apple and other fruit wines, production</td>
<td>7.2</td>
<td>7.6</td>
</tr>
<tr>
<td>of other not distilled beverages resulting from raw material fermentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production of beer, production of malts</td>
<td>14.7</td>
<td>15.3</td>
</tr>
<tr>
<td>Production of tobacco products</td>
<td>12.1</td>
<td>12.2</td>
</tr>
</tbody>
</table>

\(\text{a)}\) According to type of activity -- data concerning economic operators employing more than 5 people


On the other hand, the smallest number of the employed is to be found in potato processing, production of oil and vegetable oils as well as animal fats, production of wine and other not distilled beverages resulting from raw material fermentation. Of great significance for the proper development of agribusiness is to increase employment in food processing industries and reduce proportionately employment in agriculture.

At the beginning of the 1990’s agriculture was still of dominating importance within the structure of Polish agribusiness; it accounted for 53 per cent of the total product and 43 per cent of value added of the whole agribusiness. On the other hand, in 1989 agriculture in the United Kingdom generated only 16 per cent of value added of the whole food economy and the number of the employed in the catering business was three times bigger than that directly involved in agriculture. Also more people worked in food processing plants than in agriculture. In Poland in 1997, 800 000 people were directly involved in agriculture, 498 800 in agricultural inputs production and 74 600 in food processing.
The area of agricultural production in Poland is relatively clean. Data pertaining to heavy metal residues in soil in 1996, such as lead, cadmium, nickel, zinc, copper, arsenic and mercury are shown in Table 9. According to the data, the percentage of samples exceeding the permitted levels of heavy metal residues such as lead, nickel and copper were not more than 3 per cent. However, the percentage of samples exceeding the permitted level was much higher for cadmium and zinc.

Environmental factors affecting food quality comprise the quality of water for economic purposes and of potable water. In recent years water supply for the population has greatly improved. Water pipelines were expanded in rural areas and new water treatment methods were introduced. Water supply from central supply sources increased whereas the area of regions with water deficit in the summertime decreased. Water quality in rural areas with regard to sanitary aspects varies greatly, which is shown in Table 10. The percentage of poor quality water intakes in the public water pipeline facilities controlled, is 2 per cent, whereas in the case of enterprise water pipelines it is three times more than that and in the case of local water pipelines it is equal to 14.7 per cent. The percentage of wells, in particular wells located near houses with poor quality water is very high. However, the situation has greatly improved in this respect due to the fact that the number of wells is successively going down because of the water pipeline network development. Since most of wells are those located near houses and a high percentage of them contains water of poor sanitary quality, it is necessary to carry out more urgent work than so far aimed at improving the quality of water in wells in rural areas.

Of great significance for food safety is the sanitary condition of food processing plants. Data relating to this issue are shown in Table 11. These are the data of 1997 as compared to those of 1990 representing the percentage of plants in bad sanitary condition relative to the total number of plants controlled by the sanitary inspection in 1997.

According to the data presented in the table, within 11 groups of food production and food marketing facilities the worst situation was observed in cereal and milling industry, market places and milk purchasing stations. A relatively small percentage of factories in poor sanitary condition was found among dairy plants, fruit, vegetable and mushroom processing plants as well as canteens open to the public.

It is of great concern that as compared to the 1990 data, the share of facilities in bad sanitary condition increased in as many as 7 groups out of 11 examined.

The sanitary condition improved significantly in milk purchasing stations, grocer shops as well as canteens open to the public and those with restricted access. This pertained to numerous facilities, however, with a relatively small number of employees.
Table 9. Heavy metal content in soil in 1996

<table>
<thead>
<tr>
<th>Specification</th>
<th>Number of samples</th>
<th>Concentration value in mg/kg</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Number</td>
<td>Not exceeding</td>
<td>Exceeding</td>
</tr>
<tr>
<td></td>
<td>% Number</td>
<td>% Number</td>
<td>%</td>
</tr>
<tr>
<td>Lead</td>
<td>400</td>
<td>388</td>
<td>97.0</td>
</tr>
<tr>
<td>Cadmium</td>
<td>400</td>
<td>358</td>
<td>89.5</td>
</tr>
<tr>
<td>Nickel</td>
<td>400</td>
<td>389</td>
<td>97.2</td>
</tr>
<tr>
<td>Zinc</td>
<td>400</td>
<td>333</td>
<td>83.3</td>
</tr>
<tr>
<td>Copper</td>
<td>400</td>
<td>389</td>
<td>89.2</td>
</tr>
<tr>
<td>Arsenic</td>
<td>400</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>Mercury</td>
<td>400</td>
<td>.</td>
<td>.</td>
</tr>
</tbody>
</table>

a) No extreme values


Table 10. Sanitary assessment of a water taken by population in rural areas in Poland in 1997

<table>
<thead>
<tr>
<th>Water pipelines</th>
<th>Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>Factory</td>
</tr>
<tr>
<td>Uncertain</td>
<td>Bad</td>
</tr>
<tr>
<td>Un- certain</td>
<td>Bad</td>
</tr>
<tr>
<td>6.1</td>
<td>2.8</td>
</tr>
</tbody>
</table>

a) Made on the basis of field and laboratory tests

Table 11. Sanitary assessment of certain plants with regard to food and nutrition hygiene

<table>
<thead>
<tr>
<th>Plants in bad sanitary condition as % of controlled plants</th>
<th>Years</th>
<th>Milk purchase stations</th>
<th>Dairies</th>
<th>Bakeries and confectioneries</th>
<th>Fruit and vegetable and mushroom processing plants</th>
<th>Delicatessen producing plants</th>
<th>Cereals and grain milling plants</th>
<th>Food concentrate factories</th>
<th>Grocers shops</th>
<th>Canteens</th>
<th>Market places</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1990</td>
<td>36.3</td>
<td>6.6</td>
<td>18.0</td>
<td>12.2</td>
<td>15.1</td>
<td>31.8</td>
<td>10.1</td>
<td>45.0</td>
<td>23.9</td>
<td>29.0</td>
</tr>
<tr>
<td></td>
<td>1997</td>
<td>25.4</td>
<td>8.1</td>
<td>18.1</td>
<td>14.4</td>
<td>23.5</td>
<td>41.6</td>
<td>20.8</td>
<td>23.5</td>
<td>16.9</td>
<td>18.7</td>
</tr>
</tbody>
</table>


Data concerning health quality of certain foodstuffs inspected by the Sanitary Inspection in 1997 as compared to the 1990 data, presented as a percentage of rejected samples out of the overall number of the examined samples, are shown in Table 12. According to the data, out of 10 types or groups of foodstuffs, the highest percentage of rejected samples concerned butter, delicatessen and milk for human consumption. Relatively lower percentage of rejected food samples was noted in the case of vegetable fats, bakery products, animal fats as well as fruits and vegetables, mushrooms and food preparations thereof.

Table 12. Assessment of health condition of certain foodstuffs

<table>
<thead>
<tr>
<th>Years</th>
<th>Liquid milk for human consumption</th>
<th>Butter (excluding tinned meat)</th>
<th>Fish and fish products</th>
<th>Fats</th>
<th>Delicatessen</th>
<th>Fruits, vegetables, mushrooms and preparations</th>
<th>Bakery products</th>
<th>Non-alcoholic beverages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vegetable</td>
<td>x</td>
<td>Animal</td>
</tr>
<tr>
<td>1990</td>
<td>20.8</td>
<td>17.5</td>
<td>20.9</td>
<td>20.8</td>
<td>5.1</td>
<td>11.3</td>
<td>17.3</td>
<td>6.3</td>
</tr>
<tr>
<td>1997</td>
<td>21.4</td>
<td>24.5</td>
<td>18.3</td>
<td>15.4</td>
<td>3.7</td>
<td>8.5</td>
<td>22.6</td>
<td>8.5</td>
</tr>
</tbody>
</table>


However, an unfavourable trend is observed in the food safety situation as with regard to four types of foodstuffs, i.e. milk for human consumption, butter, delicatessen as well as fruits and vegetables, mushrooms and preparations thereof, the percentage of rejected samples in 1997 was higher than that in 1990.

As regards health safety of products, improvement was noted in 1997 as compared to 1990 with respect to meat (excluding tinned meat), fish and fish products, vegetable and animal fats as well as bakery products and non-alcoholic still beverages. More detailed analysis of source data concerning health quality of these products indicates that the reason for rejection was mainly inadequate microbiological quality of these foodstuffs. Heavy metal residues detrimental to health, nitrates and nitrites or antibiotic residues exceeding permitted levels were relatively rarely the reason for rejection.

According to the data presented so far, conditions for producing agricultural produce safe to human health, taking as the basis the contamination with metals detrimental to health, can be considered as...
satisfactory. Due to low levels of mineral fertilisers used in Poland also the contamination of cultivated plants with nitrates and nitrites does not exceed the permitted limits in the majority of the samples tested.

However, of concern is the fact that the unsatisfactory sanitary condition in some of the food processing plants persists and the fact that part of the examined food samples does not comply with hygiene requirements. According to the assessment made by the official food health quality services, food samples are most often rejected due to microbiological contamination. Chemical contamination is much more rarely the reason for rejecting the tested food samples.

The situation described above is a serious challenge for the agricultural knowledge system linked with education and extension services as it is necessary to decide which preventive measures should be taken, to be able to counteract the situation more effectively than so far. An urgent solution to this issue is needed not only because of public health protection but also because of the timetable of the integration process with the EU.

The agricultural knowledge system relating to agricultural research with particular reference to food safety has been built in Poland for several decades, if only the period after the Second World War is taken into account. In fact, according to some researchers, the history of the beginnings of the system dates back to the turn of the Middle Ages and the Renaissance period.

Currently, the main objective of the existing agricultural knowledge system regarding food safety is to solve the most important economic and social problems of Poland through scientific research relating to the production of food safe to human health and nutrition of the population.

The food safety aspect of the agricultural knowledge system has also its health dimension ensuring not only the production of sufficient quantities of food fulfilling the demand for energy and nutrients but also food safe to human health, thus free from contamination and pollutants. The agricultural knowledge system created in Poland takes into account within its structure, in a practical aspect, all elements of the food safety system for the population as recommended by FAO. The system, that follows the WHO model, is presented below in a graphic form.
PORTUGAL

1. Introduction

Through Portugal’s full integration in the European Union and the inherent free circulation of products, food and fisheries, surveillance and quality control became necessary for public health defence and consumers protection.

Therefore, the Government, through the Ministério da Agricultura, do Desenvolvimento Rural e das Pescas (DGFCQA) - Ministry of Agriculture, Rural Development and Fisheries has created a new structure for the safeguard of consumers concerns, referring to food safety, balance and correctness of the different economic businesses which trade in the national market.

Such structure includes the Direcção-Geral de Fiscalização e Controlo da Qualidade Alimentar (D.G.F.C.Q.A.) - General Directorate for Food Quality Law Enforcement, the Direcção-Geral de Veterinária (D.G.V.) - General Directorate of Veterinary Services and the Direcção-Geral de Protecção das Culturas (D.G.P.C.) - General Directorate for Farming Protection.

The Direcção-Geral do Desenvolvimento Rural (D.G.D.R.) - General Directorate for Rural Development has also an important role in this area - promoting products of quality.

2. Government policies

The government policies within its service areas are as follows:

D.G.F.C.Q.A.

- Priority of intervening in businesses, since its proper action is necessary in order that consumers may trust in what they eat.

Such an intervention has two purposes:

- (Structural purposes - culmination both with business licensing and veterinary control number industries working with animal origin products).
- Operation purposes - implementation of self-control systems (HACCP) with training and diffusion components.

- Quality control through the whole food chain in foodstuffs commodities, through regular sampling for laboratory analysis.
- Improvement in laboratorial response terms.
• Participation of consumers groups in law enforcement decision making.
• Performance transparency with MEDIA systematrical information over control inspection measures and results.

**D.G.P.C.**

• Control of pesticide residues in natural and processed agricultural products according to international safety standards - Maximum Residues Limits (MRL) determined by the EU or defined by CODEX-FAO.
• Establishing of national MRL.
• Experimental studies to set up national MRL’s, in some cases.
• Monitoring programme of pesticide residues in agricultural products.

**D.G.V.**

• Surveillance programmes of animal fresh products, through systematrical controls, with sampling in manufacture and processing units in order to check sanitary regulation in the different establishments (fishing industry; fish markets; slaughterhouses; cutting plants; refrigeration centres; milk treating centres; food caterings).

• Residues control in live animals and products - carried out by the Laboratório Nacional de Investigação Veterinária (L.N.I.V.) - National Laboratory for Veterinary Research, whose main purposes are:
  - To detect illegal supply of prohibited substances and abusive supply of authorised substances.
  - To check if veterinary medicine residues are in accordance with maximum residues limits established in Council Reg. (EEC) nr. 2377/90.
  - To control environmental contaminant concentration.

3. **Description of existing regulations**

As a member of the European Union, Portugal follows the legislation in force in such area, having transposed the Community Directives to national law, such as those referring to Controlo Oficial dos Géneros Alimentícios (Official Control of Foodstuffs), Legislação Veterinária (Veterinary Legislation) and Controlo dos Resíduos de Pesticidas em Produtos de Origem Vegetal (Control of Pesticide Residues in Vegetable Products).

On the other hand, our main acting sectors, such as fruits and vegetable products are reported in publications referring to “Normas de Qualidade” (Quality Standards), published by our Ministry, under the “Programa de Reforço da Aplicação das Normas Comuns da Qualidade das Frutas e dos Produtos Hortícolas Frescos” - (Reinforcement Programme of Joint Quality Standards for Fruits and Fresh Vegetable Products) - (subsidised by the European Union) and include specifications diffused in several EEC Regulations.

Once criteria applicable to establishments without industrial capacity were fixed, it was possible to establish specific legislation referring to licensing.
Following these measures, a large production area was comprised such as small-sized food enterprises, meant basically for local demand, with direct selling of its products (meat products, milk and dairy industries, fruit and vegetable juice production, shelling and processing of hand-shelled fruits, drying and dehydration of fruits and vegetable products and manufacture of sweets and similar products) - Decreto-Lei nº. 57/99, de 1 de Março.

According to a large number of enterprises framed under such criteria, the publishing of this legislation and further implementation are decisive for the products quality, presented to consumers.

4. Structure of responsibilities within AKS Services

The responsibilities for food control are shared among Ministries of Agriculture, Health and Economy and are accomplished at central, regional and local levels.

Generally speaking, one may say that the Ministry of Agriculture is responsible for all matters referring to food and controls, including the set up of standards and levels of residues allowed in medicines, contaminants and pesticides.

The Ministry of Health is mainly responsible for public health and consumer protection; once there is a link between food consumption and an eventual hazard for human health, the Ministry of Health is automatically involved in such matter, since the administration of all cases that represent risks for physical welfare of populations is entirely within its scope (ex: food poisoning).

The Ministry of Economy is particularly responsible for the repression of economic infractions and public health, within the food area, through the Inspecção-Geral das Actividades Económicas (General Inspection of Economic Activity), that, as a criminal police is authorised to take proceedings against offences to public health, which are notified to the prosecutor.

Sharing of competencies among Ministries was suspect to specific legislation, which allows that they may act under a legally transparent structure.

The Ministry of Agriculture is responsible for the co-ordination of food control, both in animal or vegetable products.

The Ministry acts, at a central level, through the Direcção-Geral de Fiscalização e Controlo da Qualidade Alimentar (D.G.F.C.Q.A.) - (General Directorate for Food Quality Law Enforcement), national authority for the official control of foodstuff hygiene (including fish products), the Direcção-Geral de Veterinária (D.G.V.) - (General Directorate of Veterinary Services), responsible for all matters concerning veterinary and Direcção-Geral de Protecção das Culturas (D.G.P.C.) - (General Directorate for Farming Protection), responsible for pesticides residues control in vegetable products.

At a regional level, the General Directorates of this Ministry carry out their purposes through 7 Direcções Regionais de Agricultura (Regional Directorates for Agriculture), which are independent (autonomous) and some of them are equipped with Laboratórios de Controlo de Qualidade (Laboratories for Quality Control).

The D.G.F.C.Q.A. includes the Laboratório Central da Qualidade Alimentar (LCQA) - (Central Laboratory for Quality Control) which carries out checks for the official control of foodstuffs. The key working areas of the LCQA are: raw materials, foodstuffs and drinks, food additives and processing aids.
and food contaminants. The LCQA is one of the national reference laboratories for milk and milk products and is also an International Olive Oil Council (IOOC) accredited laboratory.

The above-mentioned L.N.I.V., Central Service, with administrative autonomy, has, within its competencies, among many others referring to veterinary areas, the carry out analysis, tests and microbiological, physicochemical and technological assays concerning nutrition quality and animal food quality for human consumption, including its contamination through non-food substances, such as cattle breeding promoters and medicines.

The D.G.P.C. is responsible for the co-ordination of the national programme for residues and pesticide monitoring in national and imported agricultural products. This monitoring programme is carried out by 4 laboratories - the DGPC laboratory and the laboratories of Direcções Regionais de Agricultura de Entre Douro e Minho and Algarve and Região Autónoma da Madeira.

4.1. All information on this matter is given both to consumers and public, as well as to producers, in several ways, such through associative structures (namely consumers organizations), MEDIA (press, specialised publications, TV, radio) and even through the proper services - leaflets, panels, short films, advertising spots and INTERNET.

The different Services are aware of the public’s need to be informed, not only by the experts perceptivity, but also by direct requests and complains made by all those involved in such matter. MEDIA has also an important role on this matter.

For instance, referring to D.G.P.C., publications on phytopharmaceutical products and correct phytosanitary procedures are prepared and diffused among agricultural experts and farmers. For consumers, the report on the residues monitoring programme is prepared and published each year. Wherever there is repeated infraction established LMR (MRL’s) and if it refers to national production, a strong information pressure is made among farmers involved.

4.2. In a world ruled by MEDIA, which reveals public concerns, whether through factual news or global/particular (businesses, products) thrilling news that don’t match with reality, we do our best to try to clear up such matters, through our Services performance (visiting businesses, sampling for analyse, questions put to dispatching Member Countries, etc.) followed by publication of our activity.

5. 5.1 to 5.3 - Referring to how AKS Services (Agriculture Knowledge System) deal with the problem on foodstuffs safety, the above mentioned Services operate in their own areas and following community decisions. As for problem of identification, the Instituto Nacional de Investigação Agrária (I.N.I.A.) - (National Institute for Agrarian Research) is responsible for that area. Referring to the staff training, besides the work done by each Service, the Ministry of Education has created several degrees/diplomas for this area of study. The different services follow technical-scientific and legislation developments, whether at proper structure level, community or national levels. Purposes are identified in a realistic way in order to be performed properly and in due time, according to priorities. Programmes on medium and short terms are established in order to achieve the established purposes according to the existing human and material means.

For instance, in the area of agrarian research, the I.N.I.A. performance is made through some research fields, such as:

- **In post-production Technologies**
  - Bacteria antimicobrial activity and olives quality;
- Occurrence in wines, of some chemical vestige species important for food safety;
- Production processing improvement in cheese “Serra da Estrela”; Improvement of traditional fermentations for olives, type ‘negra natural da cv. “Galega”’;

• **In livestock farming**
  - Evaluation of crossed reactions intervening in ovine brucellosis serological diagnosis;
  - Epidemiological survey of paratuberculosis in ruminants in Alentejo;
  - Pathology study of central nervous system in small ruminants;
  - Diagnosis of *Brucella melitensis* infection in ovinos: comparative study of ELISA test and other serological tests;
  - Epidemiological importance, in small ruminants of biotypes “LC” and “SC” of *Mycoplasma mycoides* spp *mycoides*, isolated from bovine and caprine/ovine;
  - Diagnosis and preventive measures against Bovine Spongiform Encephalopathy;
  - BSE - automatic disclosure of spongiform charges in histologic samples of central nervous system (SNC);
  - Maedi-Visna: infection prevalence in ovinos and genotype characterization of national virus;

• **In vegetal farming**
  - Heavy metals (cadmium, copper, nickel, mercury, lead and zinc) in agricultural soils in Portugal;

• **In pollutant pesticides**
  - Studies of fungicide residues deterioration (benomyl, carbendazim, iprodiona, mancozeb) in hot-house and outdoors horticulture, in order to establish maximum residues (MRL);

5.4. Referring to strategies and means used by the AKS to deal foodstuffs safety, each Institution has its own programme and co-ordination.

The resources used are the Services own material and human structures but they may also appeal to consultees or experts, depending on available budgets, necessary staff, purposes to achieve and urgency.

The trimestrial or semi-annual reports allow an evaluation of programme performance and eventual strategy corrections to be made in order to achieve a better purpose programme.

5.5. Co-ordination means between AKS Services and the Institutions responsible for the enforcement in safety areas of foodstuffs barely exist.

Besides, the national organic structure does not foresee such co-ordination, as mentioned before wherever there is a need, through, Working Groups are formed, in order to consider common problems that may justify a wider approach.

6. The co-ordination between institutions is made through participation and co-operation protocols in joint projects. Taking I.N.I.A. as an example, we can see that, concerning the programme in operation, there are co-operations with other institutions in 92 per cent of projects (Programação institucional básica - 1997), mainly with other Services of the Ministério da Agricultura, but also with other institutions,
particularly Universities. The PAMAF-IED has strengthened this co-operation systems through the priority
given to joint proposals.

In the area of training and propagation of official measures, the co-operation is made through
protocols with economic agents, namely its organisations. That is, food industry organisations participate
in the making of regulations and documents concerning their activity.

7. Financing sources come from the national budget, including the Programa de Investimentos e
Despesas de Desenvolvimento da Administração Central (PIDDAC) - Programme of Investments and
Development Costs in Central Administration - and its own revenues. One of the forward budget
financings is that referring to the Programa de Apoio à Modernização Agrícola e Florestal (PAMAF) -
Programme of Support to Agriculture and Forest Modernisation (subsidised by E.U.), particularly for IED
(Investigaçao, Experimentação e Desenvolvimento) - (Research, Experiments and Development), Training
and Diffusion.
Abbreviators

- **AKS** - Agriculture Knowledge Systems
- **BSE** - Bovine Spongiform Encephalopathy
- **DGDR** - General Directorate for Rural Development
- **DGFCQA** - General Directorate for Food Quality Law Enforcement
- **DGPC** - General Directorate for Farming Protection
- **DGV** - General Directorate of Veterinary Services
- **FAO** - Food and Agriculture Organisation of the United Nations
- **HACCP** - Hazard Analysis and Critical Control Point System
- **INIA** - National Institute for Agrarian Research
- **LCQA** - Food Quality Control Central Laboratory
- **LNIV** - National Laboratory for Veterinary Research
- **LMR** - Maximum Residues Limits
- **MADR P** - Ministry of Agriculture, Rural Development and Fisheries
- **PAMAF** - Programme of Support to Agriculture and Forest Modernisation
- **PAMAF - IED** - Programme of Support to Agriculture and Forest Modernisation - Research, Experiments and Development
- **PIDDAC** - Programme of Investments and Development Costs in Central Administration
- **SCA** - Agriculture Knowledge Systems
1. Introduction

Consumers in the United States (US) enjoy a remarkably abundant and affordable food supply. Modern methods of transport, preservation, and preparation enable consumers to have an almost limitless array of foods at any time of the year. While the US food supply has a high degree of safety, changes in types of foods, preparation methods, and use of more fresh vegetable products have also added new risks of food-borne illness. The global marketplace has also increased the potential for food-borne infections with agents not normally present in the US. In the past decade, the safety of the food supply has become an increasingly visible public health issue and a national priority for the Federal Government.

A recent study of the US food safety system by the National Academy of Sciences (NAS) was conducted and published in 1998. This document, “Ensuring Safe Food from Production to Consumption,” has helped to define the issues and proposed solutions to some of the issues which are documented below. Issues, such as the balance in cost of regulatory activities with the public health risk are considered. Possible solutions to the multiple agencies and statutes which focus on the food safety system are also proposed.

At the present time, the food safety system has 12 primary agencies involved in implementing 35 primary statutes that regulate food safety plus the many interactions with other public agencies at the state level with assigned responsibilities for food safety. Because the food safety regulatory function is divided among multiple agencies, no single agency has a primary role to ensure that policy is correctly implemented and resources are directed to the most urgent issues. A further problem is that many of the statutes which support food safety regulations are inconsistent, and at times not current, thus inhibiting the use of modern scientific approaches to the issue of food safety.

Recent food-borne illness outbreaks in a variety of food products have caused a heightened sense of concern by consumers, with a concurrent call for much stronger efforts in food safety, including tighter regulations; more research to provide needed information to support specific actions; and a much larger effort in education of the public in all categories, from producers to processors to consumers. The initial public reaction was to an outbreak of food-borne illness caused by Escherichia coli (E. coli) from undercooked hamburgers in a fast food establishment. Other outbreaks have included Salmonella from eggs and, more recently, outbreaks were linked to consumption of fresh fruits and vegetables, such as lettuce, strawberries, sprouts, and raspberries contaminated with various organisms.

The initial public reaction focused on the E. coli contamination of ground beef with the expected suggestion that the problem was caused by modern techniques of animal production or factory farming. With later outbreaks linked to contamination of products, such as lettuce or sprouts, it became clear that the food-borne organisms that can cause diarrheal disease in humans could come via a wide variety of food products. Also, the routes of contamination with these mostly enteric origin bacteria have been difficult to
elucidate in many outbreaks. While domestic livestock production units are often cited, both wildlife and human waste are also possible sources of contaminants.

The Agricultural Knowledge System (AKS) contributes to food safety in funding and conducting research and educational projects focused on the highest priority issues. Priority setting occurs following input from a wide variety of stakeholders, including consumers, producers, members of the AKS; and the regulatory agencies themselves, which often express their need for specific information for initiation of control strategies. In this sense, the research needs of the regulatory agencies may receive the highest priority due to the need for information to institute appropriate control measures within the food system.

Producers of both animal and plant derived food products believe that they have been responsive to many of the consumers’ demands, and, in fact, they have been much more responsive to consumer issues during the past 3-5 years. However, the increasingly small percentage of the population which has had any substantive contact with actual agricultural production, results in a large segment of the population with little or no understanding of the issues which daily confront the producer. Thus, the nostalgic image of the “family farm” bumps up against the economic reality of having to be economically sustainable, and the public often perceives only a negative view of modern agriculture.

If the US food safety system is to be built on a base of science, then more resources will be required to provide support for the research needed to foster improvements in the methods by which we approve food as safe. The necessary broadening of the food safety research and attendant knowledge system will require more funds than have already been mobilised. Criticism by the NAS report identified the fact that consumers had only limited knowledge about food safety and failed to act on the information they did have to alter their behaviour. Therefore, educators will need to make sure that the knowledge is being transmitted and that there are actual behavioural changes in response to the training.

Related government policy

As identified in the NAS report, a major problem is the number of statutes (35) related to food safety, and the fact that they direct activities in several agencies, with an absence of focused leadership and variable missions. On the legislative side of government, 28 separate committees within the US House of Representatives and US Senate provide oversight for these statutes. There are four agencies with major roles in implementing food safety regulatory activities: Food and Drug Administration (FDA) in the Department of Health and Human Services; Food Safety and Inspection Service (FSIS) in the Department of Agriculture; Environmental Protection Agency (EPA); and National Marine Fisheries Service (NMFS) in the Department of Commerce. More than 50 interagency agreements have been developed to link the activities of these various agencies. In terms of jurisdiction, FDA regulates all domestic and imported foods marketed in interstate commerce, except for meat and poultry products. FSIS is responsible for ensuring that all meat and poultry products are safe, wholesome, and correctly labelled if they are sent through interstate or international commerce. In addition, FSIS shares responsibility with FDA for shell eggs and egg products. However, while FSIS is mandated to have virtually continuous inspection of slaughter and processing plants, FDA is permitted to have intermittent inspection of facilities for the products for which they are responsible. Also, if a product has both meat and non-meat components, both agencies may be required to have oversight of the processing facility.

EPA licenses all pesticide products and establishes tolerances for pesticide residues in or on food commodities and animal feed. EPA also has jurisdiction over environmental contaminants (chemical and microbial) in air and water. NMFS conducts a voluntary seafood inspection program related to wild caught seafood. At the same time, FDA has a mandatory Seafood HACCP program (initiated in 1995), which now has an extensive educational program to support the implementation of these regulations.
The major public health surveillance and monitoring system is operated under the supervision of the Centers for Disease Control and Prevention (CDC) of the Department of Health and Human Services. This includes operation of FoodNet, a surveillance system with seven centres throughout the US and PulseNet, a system for rapid “fingerprinting” and identification of bacterial isolates from food-borne outbreaks of diarrhoea, which facilitates tracing of point of origin and linkages between outbreaks.

Wider implementation of regulatory programs based on Hazard Analysis Critical Control Points (HACCP) was begun with the issuance of the Pathogen Reduction and HACCP Regulation by FSIS, which required that all meat and poultry plants would implement mandatory HACCP programs on a staged schedule. First to implement these new programs were the 312 largest plants (over 500 employees) in January 1998. In the subsequent two years, all other plants will be expected to follow with implementation in their facilities. This latter group includes several thousand plants across the US with worker staffs of 10-500 (small) and under 10 employees (very small). Especially in the case of the last group, this program will be difficult to implement due to lack of technical expertise. The assistance of the AKS to provide training programs and assistance with implementation will be critical to the success of the program.

Since implementation of the Pathogen Reduction and HACCP Program by FSIS in 1998, several other Federal events have continued to shape the agenda. In January 1997, President Clinton announced his Food Safety Initiative, which stimulated overall improvement in the food safety program and required a report back to him on plans to be implemented (This Report was submitted in October 1997). On October 2, 1997, President Clinton directed the FDA and USDA to develop guidance for good agricultural and manufacturing practices specifically related to fresh fruits and vegetables. Following a series of public hearings at which consumers and producers, as well as other interested parties were asked to present their views on what was needed in this area, FDA issued a “Guide to Minimize Food Safety Hazards for Fresh Fruits and Vegetables.” After more public comments, a further revision was issued for comments, and the final document was issued in the Fall of 1998, under the title “Guide to Minimizing Microbial Contamination of Fresh Fruits and Vegetables.” This is a voluntary program which provides suggested production practices for growers of fresh fruits and vegetables. It will also be made available to growers in non-US settings who intend to export such products to the US.

In July 1998, a Presidential Directive established a Joint Institute for Food Safety Research (JIFSR) for the purpose of providing planning and co-ordination of food safety research among the various agencies in the Federal government. This structure, JIFSR, is to be a virtual institute with an Executive Director and a small staff drawn from the contributing agencies. It will be involved in monitoring on-going research programs to ensure that high priority needs are being met with a minimum of duplication. In August 1998, a Presidential Executive Order established the President’s Council on Food Safety which is co-chaired by the Secretary of Agriculture (USDA), the Secretary of the Department of Health and Human Services (DHHS), and the Director of the Office of Science and Technology Policy (OSTP). The remaining members of this Council are drawn from other cabinet level units and the Office of Management and Budget. In the current structure, the Executive Director of JIFSR will report to the President’s Council on Food Safety.

In order to facilitate the development and initiation of some of these activities, an Interagency Working Group representing USDA and DHHS was formed to collect information on the current Federal research portfolio for food safety, provide an analysis of this effort and suggest future directions based on this analysis. This document will provide a basis for the beginning work of the JIFSR. It is apparent that these recent actions by the President in issuing several Directives and Executive Orders have created a climate for very significant changes in how Federal agencies approach the issue of food safety and the degree of collaboration and co-operation which is occurring in order to meet the desired goals of these Directives. Numerous interagency working groups or task forces have been established to provide priority setting and leadership in program development on such topics as pre-harvest food safety; safety of fresh
fruits and vegetables; co-ordination of food safety education programs; antibiotic resistance; and mycotoxins.

2. The responsibility structure of the AKS

In the United States, the system of Land Grant Universities is the major non-federal component of the Agricultural Knowledge System. They function as the state partners in a joint effort with the Co-operative State Research, Education, and Extension Service (CSREES). Funding of the system from CSREES is through several different mechanisms. They include formula funds distributed as block grants to institutions based on specific criteria. Hatch Act (research) and Smith-Lever (extension) funds are distributed on the basis of rural and farm-based population in each state. Animal Health and Disease formula funds are allocated based on the size of the state’s animal agricultural enterprise and research capacity. There are also national priority special research grant programs, e.g. food safety, plant pest management, aquaculture, and water quality; and competitive grants focused on fundamental research from the National Research Initiative (NRI) in CSREES. Formula funds are often used to develop preliminary information needed for submission of a larger competitive grant proposal; to meet new or emerging problems arising in agriculture; and to provide for support of certain infrastructure needs such as major equipment. The third component of the AKS is the Agricultural Research Service (ARS), the intramural research agency of the USDA. Several of the ARS research facilities are co-located in close proximity to, or within, major Land Grant Universities, which fosters significant interactions. In addition ARS scientists participate in regional projects involving Land Grant scientists.

Scientists from the Land-Grant system are often involved as members of advisory committees or task forces which are asked to provide input on policy decisions being made about food safety regulations. In this manner, information developed within the AKS can be used to inform policy makers and lead to better decisions and, ultimately, a safer food supply.

Information about food safety is disseminated to the public (producers, processors, retailers, consumers) in a variety of ways. Organised training courses can be developed and provided to appropriate audiences with financial support from CSREES through competitively awarded educational project grants. Knowledge generated through research can be transferred to the university extension specialists and other trainers, who will then work directly with the end user of the information. For implementation of HACCP programs in meat and poultry plants, funds from CSREES and other sources have enabled the development of training videos, which can then be used at local sites for individual instruction of small plant operators. Private sector organisations, such as the Institute of Food Technologists, International HACCP Alliance, and the American Meat Institute have developed formal training programs designed to educate workers and managers about the principles of HACCP and improved food handling techniques.

There are many public hearings scheduled by the regulatory agencies to gain public input on proposed new regulations or guidelines. These meetings touch on such topics as implementation of HACCP programs in meat plants and the information needed to support such efforts; issues and needs related to the implementation of guidelines for reducing microbial contamination of fresh fruits and vegetables which were obtained through a series of regional town meetings; and discussions of food-borne illness outbreaks caused by specific organisms, e.g. *Listeria*, and the need for more or different regulations to prevent future outbreaks.

The research agencies also sponsor public meetings; workshops with invited speakers plus scientists, producers, consumers, and other stakeholders; and invite input at any time from commodity groups, consumers, or other interested parties. Panels convened to review research proposals are queried to learn about unmet needs, which the research community has identified through existing research outcomes.
or interactions with stakeholders. The 1998 Agricultural Research, Education, and Economics Reauthorization Act specifically states that institutions will engage in dialogue with appropriate stakeholders to ensure that the needs of the community and end users will be met by current and future research and education programs. Formal oversight and input on a wide variety of programs, including food safety, is provided by the Agricultural Research, Education, and Economics Advisory Board, a group of 30 individuals representing the many constituents of the USDA research and education programs, and appointed by the Secretary of Agriculture.

3. How is the AKS addressing the topic?

3.1. Identification of problems and desired outcomes

Problems or issues are identified by regulatory agencies, producers, processors, consumers, and other stakeholders. In some instances, the regulatory agencies have very specific needs which may relate to a requirement for a diagnostic test that is needed to monitor compliance with regulations. In other instances, the need may be more broad, such as seeking information on the epidemiology of a food-borne pathogen to facilitate rigorous application of risk assessment to that organism.

Desired outcomes include knowledge about the specific organisms, which allow informed development of prevention and control measures; diagnostic tests that permit accurate, inexpensive, and timely recognition of the presence of food-borne pathogens; risk assessment models; information about food handling methods that provide a basis for educational programs in all segments of the food system, including the consumer; and technology transfer with educational programs that result in a real improvement in the safety of food products.

3.2. Program planning and development

Within the AKS, there are several avenues for planning and development of programs. For the intramural research agencies, such as the Agricultural Research Service, the agency holds regular meetings with stakeholders, e.g. producers, processors, consumers, to establish priorities for food safety programs. These occur frequently and may address specific subsets of issues within the broad context of food safety. In addition, ARS and FSIS hold an annual meeting of their scientific staffs to discuss current research in progress, tentative outcomes, and planning the future year’s agenda. In part, this is an activity which implements the role of ARS to serve as the research support agency for FSIS.

In the Land Grant system, there is an oversight committee for research, which is composed of Directors of Agricultural Experiment Stations. This committee, the Experiment Station Committee on Organisation and Policy (ESCOP), serves to bring together the information on needs and priorities from all sectors of the Land Grant system, and to make recommendations about budget priorities. Because the individual institutions are now required to seek and document stakeholder input into their priority setting process, this entire effort is heavily influenced from the grassroots level. On the extension program side of these institutions, there is a comparable structure, the Extension Committee on Organisation and Policy (ECOP), which serves to bring together the input from the system and make recommendations on budget priorities to the Federal partner, CSREES.

At the same time, CSREES may, and often does, pursue the gathering of input from a wide variety of stakeholders at the national level. This information can then be used by CSREES, along with the input from ESCOP and ECOP, to formulate budget proposals for future fiscal year support. These budget proposals also are affected by the views of the national program leaders in CSREES, who provide programmatic leadership for specific areas, such as food safety at the national and international level.
Ultimately, all of this information may be brought together in meetings of inter-agency co-ordinating committees or working groups to decide on the goals and the final annual Federal research and education budget requests. As we move forward in the next 6-12 months, it is anticipated that the newly established Joint Institute for Food Safety Research will serve this co-ordinating role and make recommendations about the allocation of resources for the greatest benefit among the various agencies involved in food safety.

3.3. Qualifications required for program implementation

Program implementation will depend on both financial and personnel resources. For food safety, the current emphasis on this issue by the public has resulted in increased funding. Many institutions have expanded their efforts in this field, and both regional and national alliances have been formed. These multi-institution efforts are beneficial in that the strengths of the various universities can be blended to provide maximum effort on any topic.

Although significant progress has been made to link the research and extension education components, this remains a continual challenge. Stakeholders properly expect rapid implementation of any new methods or processes, which have potential for reducing the hazard of food-borne illness. The other issue is that of proper interactions and co-ordination among the several agencies involved in food safety. While it has improved greatly in the past 2-3 years, there can be more improvement in this important aspect.

The AKS receives its support through a variety of funding mechanisms. As mentioned above, the Land Grant Universities receive formula-based funds from CSREES. Other funding mechanisms used by CSREES include competitive research project grants and integrated research/extension grants, which are usually initiated by scientists in the AKS. There are also more directed funding sources which CSREES administers and which are targeted to specific issues in food safety. It is also important to note that the Federal funds are highly leveraged by the Land Grant Universities with the Federal component representing only 20-30 per cent of the total research budget. The larger part of their funding comes from state government funds and private sector organisations.

3.4. Description of strategies, approaches and instruments to deal with the subject

Within the research area, there must be a flexible strategy that will permit some shifting of the research emphasis on a relatively short term basis. As control and prevention measures have an impact and reduce the problem associated with one organism, another organism suddenly arises as the first priority. Programs have to be able to adapt their focus to the most pressing need(s). Also, a variety of funding sources is important for the research portfolio because there are different questions being asked by the constituents and multiple sources of funding permit diverse needs to be met.

Research projects must cover the entire spectrum from basic research to the most applied studies. The latter sector also can be important to the extension component as it provides a venue for on-site teaching of clientele about new practices and the economic benefits from these improved approaches. Joint funding of research programs or projects from two or more agencies provides an avenue for collaboration, but also permits better outcomes because the integration occurred at the beginning of the project, and not at the end.

For extension/education, there are other strategies. A national extension initiative, “Food Safety and Quality Initiative (FSQI)”, relies on a group of experts from the Land Grant system for part of its planning and prioritising. In addition, FSQI provides funding through two mechanisms -- distributing part
of the funds to all Land-Grant institutions on a formula basis (US$30 000/institution) with the balance of
the funds being used to support projects selected by a national review panel after a competitive review
process has occurred. To facilitate accomplishing specific goals of special interest to an agency like FSIS,
which is not permitted a research role, funds can be transferred to CSREES, for awarding and oversight of
the projects. This fosters improved collaboration between FSIS and CSREES, while also being effective in
meeting the needs of FSIS or other regulatory agencies, such as FDA.

3.5. **Mechanism by which the AKS is involved in policy formulation**

As mentioned earlier, the regulatory agencies (FDA, FSIS, EPA) all have external advisory
groups (boards, committees, councils), which provide public information and feedback on any proposed
changes. Many of these advisory groups have faculty or administrators from the Land Grant system, which
provides a direct avenue for the AKS to have input to the budget process and the focus of the agency’s
mission. This input, which includes the latest research information and outcomes, provides the scientific
information which supports a science-based regulatory system. This is critical to the success of the overall
system because it provides a documentable basis for all food safety regulations, and, implicitly, the
opportunity to change such regulations when new scientific information is available and changes are
needed.

4. **Description of forms of co-operation**

Within the individual Land-Grant institutions, there may be varying degrees of co-operation. At
one end of the spectrum is the university, in which both research and extension functions are integrated so
that common discussion of strategic plans is a regular occurrence and plans of work are written in a joint
effort, ensuring close linkage between these two components. Many faculty members in Land Grant
Universities have appointments which include an assignment for both teaching and research. This does not
guarantee collaboration between the two components, but does provide an avenue for such interactions.
Similarly, the linkage of research with the resident instruction educational effort is easily accomplished
because most faculty members have appointments and job assignments that include both teaching and
research, thus providing the opportunity for faculty to bring information from their research programs into
the learning environment on campus.

At the Federal level, the 1994 merger of the Cooperative Extension Service and the Cooperative
State Research Service into a single agency, the Cooperative State Research, Education, and Extension
Service, provided an opportunity for much closer co-ordination between the extension and research
functions. Considerable progress has been made in linking these two functions since the merger, and some
projects are now funded which combine research activities with technology transfer and extension
educational activities to ensure that research findings are rapidly and effectively implemented. In food
safety, the major extension effort, FSQI, and the food safety research programs have continuous dialogue
about program direction and focus. A specific concern is that the research outcomes are being carried
forward into the extension sector, and that the research being done has relevance to the problems which the
end users are facing and for which the Extension System is developing educational programs.

The AKS also has interactions with the commodity groups, both animal and plant, to develop
common goals to be achieved in solving food safety problems. With the current implementation of
mandatory HACCP programs in small and very small processing plants, linkages have been formed
between Land Grant Universities and state Departments of Agriculture to establish teams of experts who
can assist and facilitate the development of HACCP plans and their later function. Within the AKS, there is
now a consortium of universities and ARS called the Alliance for Food Safety, which includes about
30 institutions at this time. They are developing a database to catalogue the various kinds of expertise available in the Alliance and would expect to develop various collaborative efforts in the near future.

A significant collaborative arrangement that began in 1995, which has been very successful is the Seafood HACCP Alliance. Composed of industry, government, and university experts, this Alliance developed a single set of training materials and modules to train personnel in the seafood industry for implementation of the mandatory HACCP program for seafood, which was put forward by FDA in 1995.

In food safety education, the Partnership for Food Safety Education, provides leadership for a co-ordinated program of education directed primarily to the public sector, especially consumers. Members of this Partnership include industry, Federal agencies, regulatory officials, and consumer groups. They have been instrumental in the development of a comprehensive educational program for consumers, “FIGHT BAC, Keep Food Safe From Bacteria.” Funding for this program has come from a variety of both public and private sources and supports a wide variety of educational activities. Posters, educational materials, and radio/television spots are prepared and made available for use by any organisation. FIGHT BAC is a comprehensive public education campaign which involves many components of the food system, providing educational materials for use in food processing, handling, retail, and for use in the schools. The educational goal is to educate the consumer or food preparation persons in the procedures involved in safe food handling and preparation.

5. Forms of program funding and sources of funding

Funding for agencies, such as ARS, FDA, and FSIS comes directly from appropriated funds from the Federal government. In development of specific technologies, ARS can establish Cooperative Research and Development Agreements (CRADAs) with private sector companies, which facilitate the transfer of specific technologies into the user community.

Within CSREES, program funding for food safety comes from several types of sources. Formula funds for research and extension provide unrestricted funds to the AKS to conduct projects or programs in food safety. These funds are distributed on the basis of rural population, research capacity, etc. The decision about which projects to recommend for funding and the scope of such projects rests with the individual institutions with oversight and approval by the agency. However, the project or program is initiated at the discretion of the institution.

A second category of funding is by competitive review and awarding of funds by a centrally directed process. This can be either within the National Research Initiative in CSREES, which has a primary focus on fundamental research, or through a Food Safety Special Research Program line item. In the latter case, the projects can be more directed in their scope, and are often more applied. Also, many projects in this program would be expected to have extension or technology transfer components as an integral part of the project.

CSREES also administers site specific special research grants, which are designated by Congress to be directed to specific food safety issues in a specific state. Many of these projects also are addressing problems of national significance.

The last funding option is the Food Safety and Quality National Extension Initiative. This is directed to the support of educational/extension activities. Part of the funding is used to provide a fixed allocation to all institutions for base support while the majority of the budget is used to fund projects after a merit review by a panel of experts. At present, these funds can not be used to support a mixed applied research/extension project.
6. Assessment of results

With the marked increase in Federal funding which has increased activities in regulatory affairs, research, and education, it is difficult to determine which components are having the greatest impact. It is recognized that research results have resulted in specific improvements in food safety. The implementation of competitive exclusion products for poultry is one example. The use of steam vacuum treatment of beef carcasses to reduce bacterial contamination also gives promise of success. A number of new diagnostic tests have been developed, which have enabled the FSIS to monitor the implementation of mandatory HACCP programs in slaughter and processing plants.

Using data from the FoodNet program of CDC, it appears that there has been a slight decrease in the number of human outbreaks of *Salmonella* since the beginning of the Pathogen Reduction and Mandatory HACCP program in January 1998 by FSIS. However, there was no change in the incidence of food-borne outbreaks caused by *E. coli* for this same period. Because of the partial coverage of food-borne illness outbreaks with resultant gaps in the data coverage, it is difficult to determine cause and effect until a much longer data collection period has occurred.

The multi-faceted nature of the food safety system is both a strength and a weakness. It represents strength in that some of the overlapping responsibilities provide for more than one look at a specific issue. Also, if one agency misses something, another may cover it. At the same time, these separate units can lead to conflicting signals to industry and to consumers, and may not be efficient in results related to costs. There is no question that there has been a major increase in coordination and much improved collaboration through the activities initiated in response to the presidential directives and the study conducted by the National Academy of Sciences. Agencies have responded well to the issues and the system is functioning much better than before. Interagency groups are working on joint strategic plans, joint budget requests, and other similar efforts, which will improve the food safety system and contribute to better public health outcomes.

There is still a question as to which approach works best—regulatory vs voluntary. In working to reduce environmental problems, EPA has utilised a strategy of negotiating with individual companies on an agreed reduction in pollution without imposing penalties. If the company meets the voluntary, negotiated limits, then no penalties are assessed.

In the meat and poultry processing industries, FSIS has utilised its regulatory powers to impose a mandatory pathogen reduction and HACCP implementation plan. The goal is to reduce the level of enteric organisms, specifically *E. coli* 0157:H7 and *Salmonella*, and thus reduce the probability of food-borne illness in humans. While preliminary data are inconclusive, it does appear that the plants are meeting the standards for reduction of organisms, while the more general outcome of reduced human illness is not yet clear.

The FDA has taken a different approach to reduction of microbial pathogens in fresh fruits and vegetables by holding many public hearings and issuing a voluntary “guidance” document which sets forth some Good Production Practices (GPP), which growers are encouraged to use. Partners in this total effort are CSREES and the Land Grant University system, which are responsible for delivering educational programs to growers and others on how to best meet these guidelines and improve the safety of fresh fruits.
and vegetables. It is also important to remember that a regulatory approach for fresh fruits and vegetables would have required some type of oversight or inspection. Given the number of farm operations, such enforcement would be very difficult and expensive.

7. Summary and conclusions

The food safety system in the United States has many characteristics of an effective system. There is a strong science base which undergirds the regulatory process. Because of the size and complexity of the US food system, all levels of government need to be involved. The key functions of food safety include monitoring; surveillance; inspection; enforcement; outbreak management; research; and education. These are presently being performed by 12 agencies and require significant co-ordination efforts. Improved collaboration and co-ordination are now occurring under the impetus of the President’s Food Safety Initiative with formation of the Joint Institute for Food Safety Research and the President’s Council of Food Safety. These two entities will bring a greater level of co-ordination and common priority setting to the food safety system. It is already evident that the increased level of integration of research and education programs with the regulatory mission has resulted in a strengthened scientific base for the actions of the regulatory agencies.

The increased funding, which has been provided for both research and extension education programs, has been of great assistance in initiating needed programs both to generate more knowledge and deliver appropriate educational programs. Substantial input from a variety of stakeholders has helped to inform the process and led to the recommendations on changing direction within some of the programs. The increased collaboration between agencies to make more effective use of their respective strengths has increased the effectiveness of the overall system. An example of this linkage is the increased research on fresh fruits and vegetables by ARS, coupled with an increased funding of extramural grants by CSREES on this topic. At the same time, CSREES has moved to provide the educational outreach needed to help growers implement the FDA guidelines on Good Production Practices.

More information from the research community, however, is still needed if well informed risk models are to be available. Risk models become important tools in determining research needs or in the planning/design of control measures, and when or how they should be implemented.

While the interactions between research and extension programs at all levels are important in building a most effective program, interactions among agencies such as FDA, CDC, ARS, CSREES, and FSIS are also very important. Interagency working groups can assist greatly in improving the co-ordination of food safety programs, but may not be able to pre-empt the desire to consolidate into fewer agencies with a clearer focus to the total program. The role of the Federal agencies involved in research and education along with the rest of the AKS in providing unbiased and reliable scientific information can not be overemphasised. Such information is crucial to the determination of appropriate regulatory responses and initiating co-ordinated educational programs that enhance implementation of new or changing regulations or guidelines. The presence of scientists from the AKS on external groups advisory to the regulatory agencies assists in the transfer of such knowledge into the final decision.

The current system has demonstrated it is capable of making changes and responding to new threats to the safety of the food supply. While the risk of food-borne illness continues to be a public health concern, the system is moving forward and continually improving the safety of the food supply. The current large increases in Federal funding for research and educational programs in food safety should ensure that this progress continues.
BELGIUM (ENGLISH VERSION)

1. Food Safety

The following excerpts are taken from a document published by the CRIOC (Centre de Recherche et d'Information des Organisations de Consommateurs) entitled “Eating safely also means looking at the date”, which was itself the result of collaboration between consumers’ associations, the CRIOC, the federal authorities concerned (the inspection services of the Ministry of Agriculture and the Middle Classes, the Ministry of Public Health and the Ministry of Economic Affairs), the Association Interprofessionnelle pour la Viande Belge (IVB), the Fédération de l’Industrie Alimentaire (FEVIA) and the Fédération des Entreprises de Distribution (FEDIS).

The present document is primarily concerned with the microbiological quality of foodstuffs. The quality of food can rapidly deteriorate between the time a fresh or pre-prepared product is placed on sale and the time it is actually consumed. However, throughout the entire process of purchasing and then consuming a product, the consumer can check the quality of food products and take precautions to ensure that the food he consumes presents no danger to his health.

The discussion does not address other aspects of food quality such as the absence of pesticide residues, veterinary drugs, hormones or heavy metals in view of the fact that, when purchasing food or preparing a meal, the consumer is unable to verify personally that the food products in front of him are free of such substances. The analyses need to check the levels of these residues are so complex that they can only be carried out by the inspection authorities, who can then take the necessary action should the results fail to meet the requirements of food standards or indicate the presence of banned substances. In this respect, the consumer must place his trust in the authorities who carefully monitor compliance with regulations and who can take swift and determined action when necessary.

It should be noted that regulations which apply to the whole of Belgium are the responsibility of the federal government which has passed its own legislation and introduced regulations or translated in Belgian law directives and/or regulations issued by the European Union or even at world level.

In view of the fact that the Ministry of Agriculture and the Middle Classes has only limited responsibility for food, the present document should on no account be considered to be a comprehensive review of the situation in Belgium. While the picture it paints is necessarily only a partial one, the following discussion nonetheless illustrates the extent to which issues relating to food are taken seriously in the interests of both the consumer and public health, and shows that there are a variety of agencies and institutions which closely monitor the quality of foodstuffs intended for human consumption.

1. The original French version is presented from pages 17 to 36.
2. Food can only be kept for a limited period of time

Shops are bursting at the seams with different foodstuffs and yet paradoxically it is not easy for consumers to eat a healthy and balanced diet. Food products have now become so complex that consumers increasingly find themselves wondering how to eat healthily.

Quality first, of course

Minimum standards for many food products are laid down by legislation. These products may contain micro-organisms or parasites that might cause illness or adverse changes in the product and/or produce toxins. However, it is difficult for the consumer to evaluate the microbiological quality of foodstuffs. A consumer cannot tell simply by looking at a product whether it has been contaminated by undesirable micro-organisms. The consumer relies on the manufacturer assuming his responsibilities and above all on the efficiency of the relevant public authorities. There are several inspection agencies involved in monitoring the quality of food products. The consumer usually does not possess the requisite information to make an informed choice of product, one reason for this being the distance between manufacturers and consumers. A survey has shown that in most cases consumers rely on the appearance of the product (smell, colour, general presentation). The consumer demands products that are fresh and that taste good; these are the determining criteria for the consumer when he shops for food. In addition, the consumer expects to be able to keep the products he buys for a further period of time at home.

Food products do not last forever

Foodstuffs cannot be kept indefinitely. While a wine can be expected to mature with age, the same is not true of other food products. Most deteriorate over time: milk goes sour, fats turn rancid, vegetables become discoloured and rot. Alternatively, micro-organisms may develop and make the product unfit for consumption. By their very nature food products are not sterile. Problems can arise if a product is not treated in accordance with the rules of the art. The consumer can avoid these problems, however, by being aware of the risks of contamination and by not creating the conditions in which infectious germs can develop. Everybody, from the farmer to the consumer, has a part to play in this process.

Why is the date of durability important?

One of the qualities demanded of products by the consumer is that they be fresh. When buying food products, the consumer checks to see whether they are fresh. Most food products are prepacked, however. The consumer can hardly see them, is unable to smell them, and for hygiene reasons is obviously not allowed to touch them. Consequently, because of the information it contains, the product label has an important role to play. The label on prepacked food products must specify the length of time the product may be stored. For highly perishable products, the label provides a precise indication of the latest date by which the product must be consumed. For other food products, the label specifies the date of durability. This storage period is only valid, however, on condition that the product is kept and handled under the appropriate conditions. The following section describes how the date is specified on the label. However, the label does not always give a date and, even when it does, the date is not always legible.
3. **How long is the life of a food product? Read the label!**

Use-by date, sell-by date, freshness date … all terms commonly used to refer to the “date of minimum durability” given on prepacked food products. The legislation defines this “date of minimum durability” as the “date until which a food product retains its specific properties under appropriate storage conditions”. **Since 1986 Belgian legislation requires all prepacked food products to be marked with a date that clearly indicates the period of time during which the product may be kept.** This legislation, enacted in order to implement a European regulation, also requires other information to be specified. Accordingly, next to the date of durability may be found other information such as the name of the product, a list of constituent ingredients, special conditions of storage, etc.

2.1 **Which date is shown on a label?**

The label on prepacked foods has one of the following three phrases on it: “use by”, “best before” or “best before end” followed by a date. This date may be replaced by an instruction to look elsewhere on the packaging, for example “see side of pack” or “see lid”.

For **highly perishable food products**, the legislation requires the packager to specify a **use-by date**. Highly perishable foodstuffs are products such as fresh fish, raw meat (particularly ground meat), pre-cooked dishes, pre-prepared vegetables, etc. These are food products that are highly fragile in microbiological terms and that have a very short storage period. The use-by date gives a precise indication of the end of the period during which the producer guarantees the quality of his product, provided, of course, that the product is stored under appropriate conditions. The guarantee of quality (which among other things includes microbiological and organoleptic quality) is an assurance that the product may safely be consumed. The use-by date is indicated by the phrase “USE BY” followed by a date in terms of the day, month and, in some cases, year.

Food products that can be kept for a longer period of time are marked with a **“date of minimum durability”**. This “date of minimum durability” may be specified in one of two ways:

- either by the words “BEST BEFORE” followed by a date in terms of the day, month and year;
- or by the words “BEST BEFORE END” followed by a date in terms of the month and year.

The date of durability need not necessarily specify the day, month and year, however:

- For food products that will not keep longer than 3 months, an indication of the day and month is sufficient;
- For food products expected to keep for between 3 and 18 months, an indication of the month and year is sufficient;
- For food products expected to keep for more than 18 months, an indication of the year is sufficient.

Some prepacked food products are an exception to the rule, however, in that the indication of a date of minimum durability or a date of durability is not compulsory:

- Fresh vegetables and fruit, including potatoes, which have not been peeled or chopped and which have not undergone any comparable form of treatment;
- Wine and beverages containing 10 per cent or more by volume of alcohol;
• Soft drinks, fruit juices and fruit nectars packaged in containers of more than 5 litres for supply to mass caterers;
• Vinegar;
• Cooking salt;
• Sugar and confectionery;
• Chewing-gum;
• Individual portions of ice-cream;
• Chocolate;
• Breads and cakes normally consumed within 24 hours of manufacture.

2.2 **What does the date of durability mean?**

The date of minimum durability or the date of durability is a date mark specified by the manufacturer that indicates the period during which he guarantees the quality of his product, provided that the storage conditions shown on the label are properly observed. The conditions of storage are therefore extremely important and any special conditions that may apply must be specified on the label. It is essential that the link between the date of durability and the conditions of storage be properly determined. This means that all links in the agro-food chain bear responsibility for the quality of the product consumed. Everybody is involved, ranging from the manufacturer to the consumer (during and after purchase) and including all intermediaries (wholesalers, carriers, retailers).

**Once the packaging has been opened the guarantee no longer applies**

The quality of the product is guaranteed for as long as the packaging remains intact. Once the packaging has been opened, the food product once again becomes a perishable product which can rapidly go stale.

For example:

• UHT milk can be stored for several months at room temperature, but once the carton has been opened it must be refrigerated and consumed within 48 hours;
• Frozen meat can be stored in the freezer at -18°C for several months, but once taken out of the freezer must be defrosted in the fridge and cooked within 24 hours.

Unfortunately, manufacturers generally provide no information about how long a product may be kept once the packaging has been opened. This prompts the following question: **“Who determines the date of minimum durability and how?”**. The answer to this question may be found in section 5.

2.3 **What about food products that have not been prepacked?**

There are no legal requirements with regard to the labelling of non-prepacked food products. What this means in practice is that the consumer is given no information about the durability of non-prepacked products placed on sale. He must therefore rely upon his senses when assessing the freshness of a product. The general appearance of the product, its smell (if it has one), colour, consistency, etc., are all criteria which the consumer can use to guide his choice. This might seem simple in the case of a cauliflower, but not quite as straightforward in the case fish, ready-cooked meals, pastries, meat or eggs. In addition, the consumer can also take into account the relationship of trust he has with the shopkeeper, who has every interest in ensuring that his customers are properly served and kept well informed.
3. From the farm to the table -- What guarantee is there?

3.1 Quality -- a shared responsibility

Everybody involved in the food chain can affect the quality of food products. Maintaining the quality of food therefore calls for all actors, ranging from the farmer to the retailer as well as the consumer, to exercise care and vigilance. The public authorities also have an important role to play. The current legal framework in Belgium for the protection of consumers’ health is the Act of 24 January 1977 and its enabling orders, in addition to a large body of agricultural and economic regulations.

Quality control at each link in the chain

The legislators originally adopted principle that the finished product should meet all requirements with regard to quality and safety. Accordingly, inspections targeted the final outcome of the manufacturing process. During the 1980s it became clear that the manufacturing process per se should also be managed in accordance with certain basic rules of good practice and should therefore also be subject to inspection. The overall aim was to introduce rules with regard to infrastructure, plant, transport, water and waste management, personnel hygiene, etc. The number of inspections remained limited, however; they were carried out on an ad hoc basis and mistakes were always detected after the event. Nowadays the legislation goes further and rests on the principle of a quality control system based on prevention. The aim is to prevent problems from arising at any stage in production and distribution. It is for this reason that there is growing support for the idea of total branch control. Any chain is only as strong as its weakest link. Current hygiene regulations are based on the requirement that the agro-food sector implement safety procedures, sometimes referred to by the acronym HACCP (Hazard Analysis Critical Control Point).

3.2 Who controls the quality of food products in Belgium?

Many departments are involved and collaborate in controlling the quality of food products and verifying compliance with legislation. When an infringement of the regulations is noted, the inspection service can impose several different types of sanction. The authorities can:

- Issue a warning;
- Issue a statement which will be considered to be correct until proved otherwise. This statement may lead to an administrative fine or legal proceedings;
- Withdraw goods from sale and have them destroyed;
- Order a firm to close if there is a danger to public health.

3.2.1 Federal Ministry of Agriculture and the Middle Classes

Various departments within the Federal Ministry of Agriculture and the Middle Classes are responsible for the inspection of the entire production chain in the agricultural and stock-rearing sectors. These departments fall within two administrations. The scope of inspection activities ranges from the use of raw materials on farms to the quality of finished products.
Quality of Raw Materials and Plants Administration (DG4)

The Inspection Générale des Matières Premières et des Produits Transformés is responsible for animal feed producers and farms. This department inspects:

- The quality of animal feed;
- The quality of raw materials (maize, etc.);
- The composition of fertilizers;
- Agricultural trials of genetically modified crops.

The Inspection Générale des Végétaux et des Produits Végétaux is responsible for farms and for fruit and vegetable auctions and markets. Its work includes:

- Control of plant parasites;
- Monitoring pesticide residues in fruit and vegetables;
- Approving and monitoring alternative crop-growing methods (integrated crop growing, organic farming).

Animal Health and Quality of Animal Products Administration (DG5)

The Inspection Générale des Services Vétérinaires inspects farms and is responsible for:

- Identifying and combating animal diseases (mad cow disease, tuberculosis, swine fever, etc.);
- Prevention of animal diseases;
- Detecting and combating the use of banned products (hormones and other products used to stimulate growth);
- Controlling the use of veterinary drugs.

The Inspection Générale de la Qualité des Produits Animaux inspects farm, dairies and abattoirs; it carries out checks on:

- The composition and quality of milk and milk products, as well as hygiene within establishments;
- Egg quality;
- Carcass classification.

The Ministry of Agriculture and the Middle Classes can also draw on the scientific expertise of the Centre de Recherches Vétérinaires et Agrochimiques (CERVA). One research area in which the centre is currently engaged is that of mad cow disease (BSE).

3.2.2 Federal Ministry of Social Affairs, Public Health and the Environment

The IGDA (Inspection Générale des Denrées Alimentaires) is part of the Health Protection Administration of the Ministry of Social Affairs, Public Health and the Environment. The inspection service has a central office located in Brussels and a number of external departments. The central office monitors changes in food legislation. Belgian legislation is currently heavily influenced by EU regulations. The inspectors who work in the external departments of the IGDA carry out inspections and checks.
Tasks, remit and areas of responsibility of the IGDA.

One of the tasks of the IGDA is to promulgate and update legislation relating to food products. The IGDA’s scope of responsibility does not extend to the agricultural or economic aspects of food. Belgian food legislation lays down standards for foodstuffs and other products with regard to composition, additives, contaminants, labelling, advertising, hygiene, etc. These other products include, *inter alia*, cosmetics, tobacco products, detergents and cleaning products, aerosols, additives and flavouring agents, materials in contact with food, toys, textiles, etc.

The basic legislation currently applicable to food is the Act of 24 January 1977 on the protection of consumers’ health with regard to foodstuffs and other products, as amended by the Acts of 22 March 1989 and 9 February 1994.

Information

The IGDA provides information for consumers, advises manufacturers, retailers and professional organisations, deals with permit applications, notification files, etc. The civil servants working in its external departments monitor compliance with food legislation in order to protect consumers and combat fraud and misrepresentation.

Inspections

Civil servants protect the health of consumers by ensuring that the risks to health attributable to food products *per se* or to the incorrect handling of such products (contamination, presence of residual chemicals or harmful additives, spoiling, etc.) are kept to a minimum.

To this end the IGDA inspects the hygiene of:

- Food manufacturing and retailing premises; hotels, restaurants and cafés; institutional kitchens and refectories (canteens, residential homes, hospitals, schools, etc.);
- Personnel (handling, personal hygiene, work clothing);
- Automatic vending machines selling food products;
- The IGDA monitors compliance with safety procedures relating to hygiene, in accordance with the HACCP principle (Hazard Analysis Critical Control Point). Manufacturers and retailers must therefore be licensed to pursue their activities.

The IGDA also looks for pathogenic germs and chemical substances that may endanger the health of consumers, including:

- Nitrates, heavy metals, pesticide residues, dioxins and other contaminants, for which maximum permissible levels have been prescribed;
- Unauthorised additives and excessively high quantities of additives.

The IGDA also examines the composition and nutritional quality of food products. For example, a maximum fat content applies to ground meat and compliance with requirement is regularly checked.
Institut d’Expertise Vétérinaire (IEV)

The Institut d’Expertise Vétérinaire (IEV) protects consumers’ health against risks associated with the consumption of meat or fish and derived products. The IEV inspects the quality of meat, fish, poultry, game, rabbit meat, etc., from the abattoir to the retail outlet including the entire chain of meat-butchering and processing facilities. The IEV is known above all for its work in detecting the presence of residual products (hormones, drugs, heavy metals). It is responsible for hygiene in establishments and checks compliance with safety procedures; it also issues approvals to establishments. The 750 veterinary practitioners who work at the Institute also carry out spot-checks. The IEV has a special team responsible for policing the illegal use of hormones and has recently set up a fraud unit.

L’Institut Scientifique d’Hygiène Public -- Louis Pasteur (ISHP-LP)

In the performance of their tasks the legislative and executive bodies draw upon the findings of scientific research. In Belgium, it is the Institut Scientifique d’Hygiène Public -- Louis Pasteur which carries out research for such purposes.

This Institute has its own laboratory and manages a number of databanks relating to public health. The scope of the research activities pursued by the Institute covers such areas as food, drugs and vaccines, genetic manipulation, radioactivity, laboratory inspections, epidemiological data, mildews and moulds, viruses and bacteria, etc.

Le Conseil Supérieur d’Hygiène

The Conseil Supérieur d’Hygiène, founded 150 years ago, is an advisory body which assists the government with all issues relating to public health. This scientific council is made up of members drawn from the academic world and the federal administration.

Nubel

The non-profit making association Nubel manages a databank containing information on the nutritional value of 650 food products sold on the Belgian market. Nubel has published a Belgian table of composition of food products and also a simple software program known as the Nubel diet planner. This program is a simple tool that any user can follow in order to manage his diet. In additional to an automated table of composition of food products, it also contains a personal diary and a book of recipes.

3.2.3 Federal Ministry of Economic Affairs

Economic Inspections Administration (AIE)

The role of the AIE is not only to carry out inspections but also to provide information. The Administration answers both telephone and written enquiries concerning the rights and obligations of consumers and retailers. It also verifies compliance with the Act on business practices. This verification work encompasses business practices, advertising and marketing techniques, labelling, the designation and composition of products, price labelling and weights and measures. The AIE is empowered to detect, report and institute proceedings with regard to any infringement of this Act.
The central offices of the AIE are located in Brussels. The AIE also has regional inspection departments.

Business Policy Administration, protection of consumers’ rights

The Consumer Advice Unit provides information and advice on consumers’ rights. It also provides legal opinions, either by telephone or in writing. If necessary it can steer consumers towards more specialised departments.

3.3 Information on food

A food policy that does not provide citizens with information makes no sense. In Belgium a number of different information centres are launching initiatives to help consumers eat healthily. In Flanders these centres are grouped within a co-ordinating agency, the VIG (Vlaamse Instituut voor Gezondheidspromotie) and its “Voeding en Gezondheid” department.

In Wallonia, the ICAN (Institut Communautaire de l’Alimentation et de la Nutrition) provides information on nutrition.

4. The health hazards associated with contaminated food

Micro-organisms are essential to life and are to be found everywhere. Most pose no danger to health and in some cases are actually useful; others, however, can be dangerous. What about the presence of micro-organisms in food? What are the risks? Is it dangerous to eat food whose date of durability has been exceeded?

4.1 The microbiological quality of food products

Micro-organisms are tiny living creatures. The micro-organisms found in food products primarily consist in bacteria, yeasts and moulds. The microbiological quality of a food products is determined by the type and number of micro-organisms the product contains. Besides useful micro-organisms, such as those which ensure the fermentation of beer or the transformation of milk into cheese and yoghourt, there are others -- posing greater risks and therefore less desirable -- which determine the microbiological quality of foods. Some of these unwanted germs are relatively harmless but can nonetheless cause food to rot. Their growth produces a number of non-toxic substances that can adversely affect sugars, fats, proteins and other ingredients, making food products unfit for consumption. We can all recall the unsavoury appearance of rotting fruit, for example, or the bad taste of sour milk or rancid butter. The advantage to these germs is that their effects are visible to the naked eye or can instantly be tasted, thus warning the consumer. Other micro-organisms, on the other hand, can make us ill. The presence of the latter may be due to one of a number of causes:

- Poor quality of raw materials;
- Failure to comply with hygiene rules during food preparation;
- Improper storage conditions.

The problem with these so-called pathogenic micro-organisms is that they cannot be detected by the consumer. A food product may appear to be wholesome and may even taste good, while at the same
time being host to bacteria that are dangerous to health. With regard to the safety and safe storage period of foods, a distinction must be drawn between products that are microbiologically stable and those that are unstable.

**Microbiologically stable products** are products such as preserves, dried and dehydrated foods, products with high sugar contents or highly acidic foods that can be kept at room temperature. During the manufacture of such foods, the micro-organisms present are eliminated are kept under control to prevent their proliferation. As a general rule, such foods remain safe and fit for consumption even for a period of time after expiry of the date of durability.

**Microbiologically unstable products**, on the other hand, are unprocessed, raw foods that as a general rule have not undergone a “hard” treatment process (sterilisation, etc.) and that are therefore more perishable. Such products are primarily fresh products that must be kept at low temperature, as in the case, for example, of yoghurt, fresh cheese, sliced pork products, pre-diced and prepacked vegetables, pre-cooked meals sold from refrigerated counters, and pasteurised milk.

All of these foods constitute an ideal medium for bacterial growth. Observing the storage conditions can slow the growth of certain pathogenic germs, but generally cannot inhibit such growth completely. It is for this reason that it is of such importance to take account of the date to which products can be kept and the recommended temperature for storage. If the consumer fails to respect these conditions or if the manufacturer fails to exercise all due care in setting the use-by, there may be a risk to health. The following section reviews the undesirable and pathogenic micro-organisms that can contaminate food.

### 4.2 Pathogenic micro-organisms that can contaminate foods

In terms of pathogenic bacteria, a distinction can be made between those responsible for food-borne infections and those responsible for food poisoning.

#### 4.2.1 Bacteria responsible for food-borne infections

**In the case of food-borne infections**, germs that are still living are ingested with food. Some of these germs are destroyed by stomach acids, while others lodge in the intestine where they start to proliferate. Once there are enough of them, they infect the wall of the intestine. After an incubation period ranging from half a day to a few weeks, the symptoms of the food infection start to become apparent. These symptoms consist primarily in fever, nausea and in some cases vomiting or bloody diarrhoea and mucous. This condition may sometimes result in gastro-enteritis. The main pathogenic germs that can contaminate food products and directly infect the digestive system are *Salmonella* and *Listeria* and coliform bacteria. Over the past few years, new pathogenic germs have appeared in the human food chain, notably *Campylobacter* and *Yersinia*.

The *Salmonella* bacterium accounts for practically half of the cases of food infections reported. *Salmonella* is mainly to be found in animal products such as chicken, ground pork meat, and above all eggs. However, it is also to be found in other foods such as meat, prawns, milk products such as cheese or raw milk, spices and aromatic herbs. *Salmonella* can survive in a refrigerator, but will not multiply there. In contrast, it multiplies very rapidly at room temperature and is only destroyed at a temperature of above 65°C.
Escherichia coli is a bacterium that normally resides in the intestinal tract of Man and animals and that in most cases is harmless. There are, however, certain types of E. Coli that can cause serious intestinal infections. The presence of this bacterium is an indicator of the level of hygiene. It is usually found on raw food products, but may also be present in reheated foods. Given that these germs normally live in the intestine, their present in food indicates contamination by faecal matter.

Whereas Salmonella and the coliform bacteria are typically intestinal bacteria (residing in the intestinal trace of Man and animals), Listeria, on the other hand, occurs fairly commonly in nature. These bacteria are routinely found in kitchens (in bins, on tea-towels, in refrigerators, etc.). They can occur in all types of uncooked foods (meat, poultry, vegetables, fish, etc.), but also in soft cheeses manufactured from raw milk. Listeria are highly resistant, can withstand salt and can survive in an environment that is either rich or conversely poor in oxygen. Listeria can even survive in acid and dry foods, but are unable to multiply in such an environment. Unlike other pathogenic germs such as Salmonella, Listeria can survive and continue to grow in the refrigerator. It can only be killed by heating to a temperature of over 70°C.

4.2.2 Micro-organisms responsible for food poisoning

In cases of food poisoning, it is not the bacterium itself but a poisonous substance known as a toxin which the bacteria produce that is responsible for the illness. The most frequently encountered case of food poisoning are also accompanied by a gastro-enteritis. As soon as the toxin enters the intestinal tract, it can begin to contaminate it. It is for this reason that the period of incubation is shorter in the case of food poisoning than it is in the case of an infection; the first symptoms can already start to become apparent within six hours after the meal. The symptoms do not usually include fever and generally include stomach cramps, nausea, vomiting and/or diarrhoea.

The main bacteria responsible for producing toxins are:

- **Clostridium botulinum**, which is responsible for botulism. This form of contamination, which is extremely rare, is transmitted through salt meat or canned meats or fish. The toxins affect the central nervous system and can lead to fatal paralysis.

- **Staphylococci** are bacteria that affect both Man and animals. They can contaminate food through the air, through sneezes or through hand contact. Unlike most pathogenic germs, staphylococci are extremely resistant to high levels of salt and can therefore survive (and even grow) in highly salted products. The toxins produced by Staphylococcus aureus are resistant to heat, hence the importance of properly storing food products under cool conditions prior to cooking given that Staphylococcus aureus cannot multiply, and therefore produce toxins, at temperatures below 10°C.

Toxins can also be produced by certain moulds, for example Aspergillus flavus. This mould produces aflatoxin, a toxin that in time lead to cancer. Moulds of this type are primarily to be found on certain nuts, aromatic herbs and spices and also on certain oleaginous grains and cereals. They proliferate and produce toxins when foods have not been properly dried or have been kept in too hot and humid an atmosphere.

3.3 Causes of food-borne infections and food poisoning

Food can therefore be contaminated at any point in the food chain linking the manufacturer to the and consumer, including the transport, storage and distribution stages. In most cases, the infection or food
poisoning will only occur if large number of pathogenic germs are present. It is therefore the role of each link in the chain to ensure that food products are treated hygienically by minimising the possibility of contamination by pathogenic germs or by preventing such germs from multiplying.

There are a number of factors that will promote the proliferation of bacteria, of which the most important is temperature. Temperatures between 30°C and 40°C are ideal for most bacteria. If food is stored at such temperatures, any bacteria they may contain will rapidly proliferate and multiply. At such temperatures some bacteria double in number every 20 minutes. It is also the reason for which there are more infections and cases of food poisoning in the summer. Examples that spring to mind include summer barbecues where salads and meats remain non-refrigerated on tables for long periods of time, and holiday “runs” or travellers’ diarrhoea which strikes down so many tourists in hot countries. It is therefore essential to avoid keeping foods at temperatures of more than +7°C. In addition to temperature, relative humidity also plays a role in bacterial growth. All bacteria, as well as yeasts and moulds, need water to multiply. Dry foods (such as spices, rice, flour, biscuits) contain only minute amounts of water, thus preventing the germs present from multiplying. When such foods are kept under conditions that are too humid or if the packaging is not waterproof, products may absorb water that germs can then use to reproduce.

4.4 Are the risks the same for all consumers?

Eating a contaminated food product will not automatically result in food poisoning or an infection. Besides the nature and number of pathogenic germs present in the food, the resistance of the consumer also has a capital role to play. Children under four years of age and the elderly are particularly prone to infections and food poisoning. Persons whose immune system has been weakened (during and immediately after treatment with antibiotics, after a transplant, AIDS sufferers, persons who have recently undergone chemotherapy or radiation treatment, drug addicts, etc.) are more at risk than healthy adults. Pregnant women are another high-risk group. The Listeria bacterium is particularly dangerous for both pregnant women and the foetus.

4.5 Is it dangerous to eat foodstuffs whose date of durability had expired?

Highly perishable foods

Prepacked, highly perishable food products can be recognised by a label giving a use-by date. The manufacturer thereby guarantees that the product is safe up to that date, provided that it is stored in accordance with the instructions given on the label and provided that it has been properly prepared. Fish, meat and pre-cooked meals, for example, must be kept at a temperature of less than 4°C. The microbiological quality of such foods can deteriorate; they may start to rot and thus pose a risk of food poisoning. Once the use-by date has expired, food products must be withdrawn from sale. When the consumer buys highly perishable foods (and this is certainly the case for all products that are sold at the delicatessen counter and that must be kept refrigerated), it is imperative that the use by date be respected. Once this date has expired, it is better to throw the product away. Indeed, it is recommended that the product be consumed as soon as possible before the date marked on the product.
Foods that can be kept for longer periods of time

Food products marked with a date of minimum durability (“best before”) are products which have been treated or whose composition is such that putrefying or pathogenic germs can no longer proliferate and can only multiply at a reduced rate. In principle there is no risk to the consumer if the product is consumed slightly after the date of minimum durability. Once that date has expired, however, the nutritional value (vitamins) and/or appearance (taste, smell, sight) are changed. Although the taste may not be as good, there is no risk to health. Products whose date of minimum durability has expired can still be legally offered for sale, but on the responsibility of the retailer and no longer that of the manufacturer. The sale of products in damaged packaging is banned under all circumstances, even if the use-by date has not yet expired.

Comment

Once the packaging has been opened, the date of minimum durability marked on the product no longer serves any useful purpose. The ideal conditions for storage have obviously not been observed and there is a real risk of fresh contamination (through hand contact, soiled covers, the air, etc.). This is certainly the case for highly perishable products marked with a use-by date. For example, mayonnaise is sold on the shelf and not from a refrigerator and is marked with the instruction “best before, but in most cases the label will add that the product must be stored in the refrigerator once opened. Fruit juices sold in cartons are increasingly marked with a label saying “May be kept for three days after opening the carton”, despite the fact that the product can easily be kept for up to a year provided that the carton has not been opened. In contrast, dry foods marked with a “best before” date, such as coffee, rice, flour, etc., remain stable. They may be consumed in all safety up to the date indicated, even if the packaging has been opened.

4.6 What should I do in the event of food poisoning?

Fortunately, the problems that manifest themselves in a normal, healthy adult after consumption of a contaminated food product in most cases amount to no more than a mild form of gastro-enteritis. Some bacteria may cause severe diarrhoea, however, leading to dehydration. The treatment of food infections therefore varies according to the bacteria responsible for the contamination and also the physical condition of the person infected. For children, elderly persons, pregnant women and anybody whose immune system has been weakened, food infections and poisoning are by no means harmless and in such cases medical assistance must always be sought. In most cases of infection or food poisoning, it is important to avoid dehydration. In some cases antibiotics or medication will need to be prescribed in order to halt the diarrhoea. In other cases, there is no need for medication and the symptoms will disappear of their own accord. It is for this reason that in the event of an unusual reaction it is preferable to consult a doctor. If the latter suspects a case of food infection or poisoning he must report the case to the Hygiene Inspection Service in his district and submit a declaration. If the consumer has doubts over the quality, and above all the safety, of a food product, he can contact the IGDA through the Ministry of Social Affairs, Public Health and the Environment.

5. Responsibilities of manufacturers and distributors

The food manufacturing sector has radically changed over the past few decades. Primary production in the agricultural and stock-rearing sectors is now organised in accordance with modern methods of management and the distribution sector has also been modernised. Most food products arrive
on shop shelves after transiting via the agro-food industry where they are subjected to one or another treatment or preserving processes. Packaging and treatment techniques now allow food product life to be extended. Besides traditional techniques such as pasteurisation, sterilisation, refrigeration or freezing, recent years have seen the emergence of techniques derived from new technologies such as vacuum cooking or packing, irradiation and packaging under a protective atmosphere. These latter techniques allow producers to offer products that are better suited to modern living conditions. Ready-cooked meals, pre-prepared fruit and vegetables, ready-to-eat salads are all much appreciated by many consumers. The entire manufacturing sector, up to and including distributors, operates in accordance with national, European and sometimes even international legislation.

5.1 General principles

Manufacturers are only allowed to sell products that are wholesome and safe. For some years now the food production has been obliged to comply with specific hygiene rules and introduce safety procedures in order to ensure the quality of food products. In addition, all actors in the food chain must now obtain an operating licence issued by the Inspection Générale des Denrées Alimentaires after inspection of their premises. The purpose of hygiene legislation is to guarantee the safety of food products at all stages in the food chain by preventing any risk of contamination. The legislation applies to all products and to all sectors downstream of agricultural production. All firms that deal with food products, from the farm gate to the retailer, restaurant owner or automatic vending machine operator, are concerned by this legislation.

Hygiene legislation:

- Sets out basic hygiene requirements;
- Imposes the principle of safety procedures;
- Allows federations and professional organisations to draw up guides to good hygiene practice for their sector. The term "hygiene code" is also currently used.

Compulsory quality control through self-assessment

The agro-food sector is obliged to put in place safety procedures and is doing so by means of the new HACCP concept. The aim of HACCP is for each firm to set up a monitoring system which will allow it to demonstrate that it is perfectly familiar with its production processes and all the attendant risks and that, in addition, it can control these processes. In the event of a problem (risk of bacterial contamination), the manufacturer must be able to prove that he can take direct action either to adjust or to restore the process. All data relating to ingredients and to all stages of production and product control must be routinely and meticulously updated. The manufacturer must regularly check that his monitoring system is operating correctly. This process is known as self-assessment. The principle whereby the “manufacturer” is himself responsible for managing hazards is a novel development in food legislation. The authorities check that the manufacturer is properly implementing his monitoring programme and that he is doing everything in his power to analyse and control risks.

5.2 Quality begins at source -- agriculture

The source of the quality of food products lies in the agricultural and stock rearing sectors. The microbiological conditions under which these sectors operate are, by definition, high-risk. The soil, livestock and fertilisers are all products that intrinsically contain harmful bacteria. It is primarily with regard to milk, eggs and meat that farmers are subject to specific safety procedures.
5.3 Responsibility of the manufacturer

It is the manufacturer or packager who, depending upon the type of product, determines the date by which a product must be consumed or its date of minimum durability. Until that date he remains responsible for the safety, nutritional value and the appearance of the product, provided that the conditions of storage have been complied with. It is the manufacturer or packager who is best placed to know the quality of the raw materials and the processing operations they have undergone, as well as the methods of storage and packaging that have been used.

Storage methods can slow the putrefaction of food products

Most micro-organisms capable of putrefying food products multiply rapidly at temperatures between 30 and 37°C in the presence of water and oxygen. Above or below this temperature range, the process of multiplication is slower. Raising the temperature of a product to above 80°C (pasteurisation or sterilisation) for a sufficient period of time kills micro-organisms. Reducing the temperature to below 4°C (storage in a refrigerator) or to below -18°C (freezing) respectively slows or stops their multiplication but does not kill them. Other techniques influence other parameters to slow the multiplication of micro-organisms, for example reducing the water content through dehydration (drying or freeze-drying), modifying the oxygen content (packing under vacuum, use of packaging gases), or product acidity (sauerkraut pickled in vinegar). To extend the storage period, manufacturers may also make use of additives. The use of additives is regulated. Lists of permitted additives have been established at the European level and specify in which products and in what quantities they may be used. These additives are assigned a European code beginning with the letter E. Manufacturers must specify all additives in the list of ingredients. Preservatives are substances that prolong the life of food products by protecting them against decay caused by micro-organisms. These additives are numbered from E200 to E252.

The lifetime of products to be stored in the refrigerator is a direct function of the temperature at which they are stored. The lower the temperature, the slower the rate of bacterial growth and the longer the product can be kept. The manufacturer establishes this date on the basis of simulation tests that reproduce daily reality as closely as possible. The time it takes for a change to occur either in the appearance, smell, colour taste, or in the microbiological properties of the product, will determine the storage period. In order to determine the date of minimum durability or the “best before” date, a safety margin is first factored in. This safety margin is calculated in one of two ways:

- Either the manufacturer reduces the storage period established through experiment (by a third party, for example);
- Or he carries out the simulation test under less favourable storage conditions and takes this period as the date of durability (for example at a temperature above 10°C for products that should be kept at below 7°C).

The information supplied to the consumer therefore includes, depending upon the product, a “best before” date or a date of minimum durability as well as the recommended storage conditions for the product. This date is valid for as long as the packaging remains intact. Once the packaging has been opened, the lifetime of the product will depend upon the temperature at which it is conserved.

5.4 Responsibilities of the carrier and the distributor

The transport and distribution sectors provide the link between the manufacturer and the consumer. The supply chain is long, highly diversified and includes the storage, transportation and sale
of products. One of the distinctive features of mass distribution is the diversity of the products available at a given point of sale and/or transported together.

Like the producer, at all stages in the supply (storage, transport and retailing) the carrier and the distributor must comply with safety procedures which provide the consumer with a guarantee that the products he receives are safe and that all risks to health have been kept to a minimum. They must also comply with hygiene regulations. In addition, the distributor must ensure that the mandatory information is given on packaging, that the packaging has not been damaged during transport, etc. He is therefore responsible for the products he supplies to the consumer.

Cold, colder, as cold as you can get ...

Each actor is an important link in the cold chain. All actors must take action to avoid an increase in temperature above that specified by the producer or the legislation. The chain between the production of food and its sale to the consumer must not be broken at any time.

Proper stock management

As mentioned above, the storage of food products in the shop (point of sale) is a delicate matter. Sales counters must meet certain requirements with regard to the products they contain. Frozen products must be stored in a freezer whose temperature is controlled, refrigerated products must be stored in a refrigerated counter, and dry foods may be stored at room temperature. The rotation system is based on the “first in, first out” principle, i.e. what has must stored first must be sold first. Restocked products are always placed at the back. It is also for hygiene reasons that “self-service” counters for loose, non-prepackaged foods are covered by regulations.

The retailing of harmful products is banned under all circumstances. The definition of “harmful product” set out in the legislation covers both food infected with germs and damaged preserves.

What happens to products once they reach their use-by date?

Products whose date of minimum durability has expired or is about to expire should be withdrawn from the shelves in order not to erode consumer confidence. In contrast, highly perishable foods, once they have reached the last date for consumption, must be withdrawn from sale and in some cases may even have to be destroyed.

When highly perishable foods are close to the last date for consumption, they are often sold at discounted prices, a practice known to retailers as “quick sales”. Quite often such products are routed into the humanitarian aid system, through food banks, charities, etc. However, this system too must comply with legal regulations. Other fresh products that have reached their use-by date are transferred to a central location where they are collected by specialised firms to be converted into animal feed.

5.5 The customer is king

The Act on business practices and on information and consumer protection sets out the basic rights of consumers. These basic principles are explained in various other Acts. In order to make an informed choice as consumers, we need to have certain information at our disposal and in particular who can help us in the event of a problem. We do not expect to be supplied with a food product that is harmful.
If this were to happen, however, take your complaint first to the retailer or the manufacturer. If questions still remain, contact the public authorities or one of the various consumer organisations.

6. THE RESPONSIBILITIES OF CONSUMERS

Careless handling of food products may lead to their contamination. At best, the consumer should simply throw the product away, which would be a waste of both money and energy; at worst, the consumer runs the risk of infection or food poisoning.

Consumers forget far too rapidly that food products cannot be kept forever. They do not always pay attention to the date of minimum durability. They will never say no to an attractive discount offered because the product’s date of minimum durability has expired. They assume that the manufacturer is not taking a risk and that the latter will have allowed for a wide safety margin when determining the use-by date.

The higher the temperature in the place where the product is stored, the faster bacteria will multiply. Even in the refrigerator there are bacteria that will manage to proliferate. This does not mean to say that the kitchen should be as sterile as an operating theatre or that the consumer should wear rubber gloves before handling food products. The consumer must simply remain vigilant and conserve and handle food products correctly to prevent bacteria from growing unchecked.

Food product safety -- what is the right approach?

The leaflet published by the CRIOC contains a series of recommendations for consumers regarding the precautions they should take when:

- Buying food;
- Transporting food;
- Storing food;
- Preparing food;
- Consuming food.

7. Labelling regulations

The label is becoming an increasingly important item. Consumers need to have certain information in order to make an informed choice and they can find this information on the label. Maintaining a balanced diet is no easy matter and the label will not always make this task any easier because it is not always evident what the information it gives actually means.

It should be noted that EU legislators have established the right of consumers to be given information on prepacked food products in a directive translated into Belgian law in 1980s. Since then there have been several amendments to this legislation.

What does the label say?

There following information is compulsory on the labelling of foodstuffs:
• The **name** under which the product is sold: the consumer must know what type of product it is.
• The list of **ingredients** in descending order of weight; the label will shortly have to specify the quantity as well;
• The **date of minimum durability (or the durability limit)**;
• Where applicable, **special storage conditions or conditions of use**;
• The name and address of the **manufacturer, packer or seller**;
• **Instructions of use** when it would be impossible to make appropriate use of the foodstuff in the absence of such instructions;
• The **place of origin** in cases where the omission of such information might be misleading to the consumer;
• The **net weight**, i.e. the quantity of product without the packaging;
• The **actual alcoholic strength** of beverages containing more than 1.2 per cent by volume of alcohol;
• The **lot number**, i.e. an indication of the portion of the production run from which the product has been taken, unless the date mark includes at least the day and the month.

*In addition, the label must comply with very stringent regulations*

All the information must be marked legibly and indelibly on the label which must be placed in a visible position on the product.

It is compulsory under Belgian legislation on business practices for the mandatory information on the label to be given in at least the language of the region in which products are placed on sale. Furthermore, other legislation specifies what is permissible and what is not permissible with regard to the advertising of food products.

It is not necessary to specify the price on the product. However, the consumer must be able to readily calculate or determine the **quantity** of good he is receiving for the price paid. It is for this reason that regulations on price labelling are so voluminous. For some products the price must be indicated by retail unit (by weight).

*There are always questions to be asked …*

All prepacked food products must bear a label providing the consumer with information that is as accurate as possible.

It is in the interests of the consumer to read this label carefully because it provides him with a great deal of information regarding the product and thus allows him to make purchases as responsibly as possible. In addition, much of this information can help to avoid problems. Both the consumer and all the other parties involved in the food chain must comply with the instructions given on the label.

In addition to the mandatory information on labels, there is also other information given on products. Some information, such as the nutritional value, is not compulsory. However, if the latter is specified it must be stated in accordance with rules drawn up for this purpose.

The voluntary provision of information regarding the nutritional value gives the following information with regard to food products: energy value, proteins, carbohydrates, fats, vitamins, minerals
and oligo-elements, etc. This information allows the consumer to make an informed choice of food products.

There is considerable debate over the requests by consumers for information and on the way in which such information should be given to him.

Some producers have set up a free telephone number to answer questions, others hand out leaflets, some have web-sites on the Internet, etc.

All food products must at least bear the name and address of the manufacturer.
FRANCE (ENGLISH VERSION)

In the 1970s French consumers wanted cheap food, and in the 1980s they were looking for “fast” food. By the 1990s the focus had shifted to health, in particular a balanced diet. Today, after the “mad cow” crisis and dioxin in chicken, there is now a crisis of confidence among consumers who are questioning the origin and safety of the food they are eating. The emergence of new technologies, and a longer food chain because rural areas are so remote, have compounded the problem. Whereas technology had until recently brought about steady advances in agro-food production and the health standards of food products (pasteurisation, better refrigeration procedures, etc.), it is now raising doubts about the wholesomeness of produce from modern crop and livestock farming. Novel foods are also at issue and the arrival of foods containing transgenic animal or plant products on the market is raising further problems. French consumers attach great importance to food; they want it to comply with safety standards, but they also want it to remain authentic, particularly when it is a local speciality or made with special know-how.

Some consumers also complain about not having all the relevant information on the composition or origin of foodstuffs. Today GM crops may offer many advantages, e.g. higher yields, better resistance to disease or protection against viruses, while in the livestock sector the emergence of GMOs is said to improve performance and disease-resistance. Yet the information available to consumers about products that may contain GMOs is still so inadequate that questions are bound to arise. Other possible risks are gene dissemination, the introduction of genes resistant to antibiotics, or gene flow due to crossing with other species, and those risks are hard to assess. In France, no product is allowed onto the market before special measures have been taken by the Ministry of Agriculture and Fisheries [once it has consulted the Technical Standing Committee on Plant Breeding (CTPS) which checks features such as plant stability, the Biomolecular Engineering Commission (CGB) which studies the impact of the relevant GMOs on man and the environment, or the Genetic Engineering Commission (CGG)]. Precautions include the labelling of products in line with the EU “novel food” Regulation for any product containing GMOs, and the obligation to apply to the European Commission for authorisation to place on the market any product containing a transgenic plant.

Consumers have not always received in-depth information on health safety when dealing with food and may be responsible for family outbreaks of food-poisoning if they fail to handle it correctly. At the same time, consumers have an increasingly lower acceptability threshold regarding health risks from food, although outbreaks of collective food-poisoning, usually due to Salmonella, pose relatively few major public health problems. To meet these expectations and operate within the precautionary principle, increasingly sophisticated microbiological testing techniques are leading public health officials to demand lower and lower contamination levels. Government policy should accordingly focus on better information, transparent manufacturing/distribution processes, and product traceability.

The agricultural sector for its part has always seen its main objective as being to improve what people eat, i.e. to produce more better-quality food at an acceptable cost, paying increasing attention to the

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1. The original French version is presented from pages 73 to 82.
need to protect consumer health and safety and the environment. Farmers are committed to meeting consumer expectations by adapting their practices (rational, more sustainable agriculture), constantly upgrading traceability systems, negotiating increasingly detailed specifications with industry as part of the drive for integrated production, and monitoring the health standards of their products.

However, farmers are concerned about the many questions raised by the role of livestock farming in food safety (the impact of the “feed” factor in Transmissible Spongiform Subacute Encephalopathies, the effects of growth promoters on meat and milk, and in particular their implications for human health, animal health and welfare) and those raised by crop production (produce that may contain pesticide or fertiliser residues, etc., the impact of groundwater contamination on the natural environment, and the use of increasingly high-performance processing methods).

While industry faces different issues, its interest still lies in ensuring that consumers have confidence in its products. Food safety is a determining factor in the purchase of a product, along with price. Establishing and using quality systems to guarantee food safety (hazard analysis, identifying and controlling critical points) has been, and still is, a fundamental step towards more control over health safety. In many cases, however, the consumer’s idea of food safety is far removed from the way farmers and industry see it, and from what it actually is.

1. From defining food safety to enforcing compliance

While food safety can be defined as the state in which the product presents the lowest acceptable (and detectable) level of risk, we still have to identify what food safety risks actually are. Several factors may put food safety and hygiene at risk, including the presence of pathogens (notably bacteria and prion viruses) or their metabolites (toxins, etc.); agents that are resistant to antibiotics, undesirable substances (heavy metals, pesticides, radionuclides, cleaning products, etc.); or the introduction of new technologies and poor food hygiene (e.g. improper conservation, interaction between food and packaging).

Socially acceptable levels of risk must therefore be defined, although it must be said that scientists find them hard to evaluate in quantitative terms. The risks must also be ranked by policymakers or industrial decisionmakers, but a pro-active approach should be taken to contamination rather than merely remedying any cases of it after the event. This initial stage is known as risk evaluation. The second is risk management, a responsibility that lies with government. It involves determining which measures are needed to control and monitor risk, where possible operating within the precautionary principle. Both stages rely heavily on the agricultural knowledge system to provide answers to all these issues, so that consumers can have every confidence in the food they eat.

In France, responsibility for risk control lies with three government departments that work closely together. The first is the Direction Générale de l’Alimentation or Directorate-General for Food (DGAL) in the Ministry of Agriculture and Fisheries. The second is the Direction Générale de la Concurrence, de la Consommation et de la Répression des Fraudes (DGCCRF), which covers competition, consumer affairs and fraud and is part of the Ministry of the Economy, Finance and Industry. The third is the Direction Générale de la Santé (DGS), the Directorate-General for Health, part of the State Secretariat for Health. Based on the “new approach” (Directive 93/43/EEC) implemented by the EU, as well as international constraints such as the World Trade Organisation (WTO) rules and compliance with the Codex Alimentarius, the DGAL’s mandate includes formulating rules on the safety and standards of agricultural and food products, compliance with good farming practice aimed at protecting the environment (plant protection), and the promotion of quality in all its forms. Reporting to the Departmental Director for Agriculture and Forestry, the task of effectively implementing controls, in particular monitoring schemes (for heavy metals, pesticides and radioactivity), and centralising information
in each département falls to the Directions des Services Vétérinaires (veterinary service directorates, or DSVs), and more specifically their technical staff, i.e. veterinary inspectors and veterinary service technicians.

2. Benefits of training for those involved in food safety

Following the introduction of new veterinary education pathways, now divided into three cycles, specialised training courses have been set up, offering students a wider range of openings. The Conseil National de la Spécialisation Vétérinaire or National Council for Veterinary Education, a tripartite body (government/teaching/research fellows and professionals) established under the Specialisation Decree of 7 December 1992, recommended that food-safety courses be offered on subjects such as “veterinary public health”, “food hygiene and technology”, “health and quality management in the dairy industry”, “health and quality management in pig production”, and “health and quality management in poultry and rabbit production”. For these specialities, an initial year of training was introduced, leading to a Certificate of Higher Veterinary Studies (CEAV). Most future veterinary inspectors intending to work in public health are trained at the Lyon veterinary school (ENSV) for two years if recruited internally (during their final year at veterinary school) or for one year if recruited externally with work experience. On completion of the course, these future civil servants follow the CEAV course in veterinary public health which gives them both a basic scientific grounding and the special skills required to exercise their public service mission, i.e. an overarching view of the agricultural and food industries from producer to consumer, a good grasp of the rationale behind regulations and the general national and international arrangements for drawing them up, and in-depth knowledge of their own rights and responsibilities within the system.

Veterinary service technicians are selected at post-secondary level by an entrance examination to the Institut de Formation du Ministère de l’Agriculture (Ministry of Agriculture Training Institute, or INFOMA) in Lyon and follow a two-year theoretical and practical course, combined with work experience. They are trained to carry out technical duties, under the supervision of veterinary inspectors, and take part in the inspection and monitoring work carried out by veterinary services, particularly in the field of health or quality inspections involving live animals and animal or animal-related foodstuffs.

There are also schools of higher education for agricultural and food industry specialists, in particular the Ecole Nationale Supérieure des Industries Agricoles et Alimentaires (ENSIA) and the Ecole Nationale des Techniques des Industries Agricoles et Alimentaires (ENITIAA), which every year produce some 250 graduates to work in food safety management, mostly in industry and in quality assurance and research. A recent campaign to evaluate and approve three-year training courses at these schools has led to a “quality award” for some ten courses covering the subject of food safety.

3. Highly active government policy

This shift in training provision has come about following a lengthy series of discussions. As early as 1994, a report by French Senator Pierre Laffitte on higher agriculture and veterinary education identified new directions for education and research in institutions reporting to the Ministry of Agriculture and Fisheries, the purpose being to bring them more into line with economic, social and professional issues, particularly those relating to the quality, hygiene and safety of foodstuffs. His recommendations have featured in recent debates on teaching methods, research and institutions.

Another example of emphasis on the quality, hygiene and safety of food was the contract drawn up with the Ile-de-France (Paris) regional authorities for 1993-1999 to group in a single location all the work on this subject being done by a group of institutions: the Alfort veterinary school (ENVA), the
From the establishment of a new food safety agency…

Upstream it is vital to ensure that risk assessment provides policymakers with continuous input and optimises the quality of collective French expertise on the health safety of food. To this end the French government introduced Act No. 98-535 of 1 July 1998, which reinforces the monitoring and inspection of the health quality of produce for human consumption and amends national arrangements on “health watch”.

The Act established four institutions:

- **Institut de Veille Sanitaire** (health watch institute, or IVS) which records human morbidity and mortality as part of the general drive to monitor health. IVS has a special unit to warn government of urgent risks to health.

- **Agence Française de Sécurité Sanitaire des Produits de Santé** (AFSSPS), the agency for health product safety, formerly the **Agence du Médicament** (drug agency), whose scope has been broadened to cover implants, prostheses, blood products and cosmetics;

- **Agence Française de Sécurité Sanitaire des Aliments** (AFSSA), the food safety agency which monitors, draws attention to and assesses food risks;

- **Comité National de Sécurité Sanitaire**, the national committee on health safety that liaises between all the links in the health safety chain.

Order No. 99-242 of 26 March 1999 specifies how AFSSA will be organised and run, once IVS and AFSSPS are in place. AFSSA, as a government institution reporting to three ministries (health, agriculture and consumer affairs) will be France’s agency for assessing health and nutritional risks in food. Furthermore, because AFSSA has taken over CNEVA, the former national centre for veterinary and feed studies, it will provide the Ministry of Agriculture and Fisheries, and other interested ministries, with the scientific and technical support required to devise, implement and evaluate measures in the areas of animal health, veterinary pharmaceuticals and animal welfare, together with their impact on the hygiene and safety of foods and feeds. The agency will propose any measure deemed appropriate to protect public health and will publish its opinions and recommendations, including those given on cases submitted by consumer associations. Risk levels for food are a particularly delicate subject, and the government will set them on the basis of figures provided by AFSSA.

It will be mandatory to consult AFSSA on draft legislative or regulatory arrangements falling within its remit, and on control and monitoring programmes implemented by government services. In this regard it will suggest priorities, draw up recommendations, and apply for special inspections or enquiries. It will conduct scientific and technical research programmes, alone or with the help of public or private institutions specialising in research, development and education, in areas such as animal health, animal welfare and their impact on public health, as well as food safety. It will have scope to authorise the marketing of veterinary pharmaceuticals as part of the mandate of ANMV, now part of the Agency. Finally AFSSA will have an advisory role on issues falling within its remit since it has its own expert committees now that it has incorporated a number of previously separate bodies (e.g. the **Observatoire des consommations alimentaires**, a food consumption monitoring unit, and the **Centre National d’Etudes et de**
Recommandations sur la Nutrition et l’Alimentation, or national centre for research and recommendations on nutrition and food).

Internal structuring of AFSSA is currently under way. However, the scientific and technical research and support formerly carried out for the government by CNEVA and more specifically its Department of Food Hygiene, Quality and Safety took a dual approach based on preventing contamination but also on seeking and identifying contaminants (usually following outbreaks of collective food poisoning), by cross-checking “industries” (poultry and pig-rearing, milk, fish, meat) with “finished products” (poultry- and pigmeat, milk and dairy products, fishery products, catering and cooked foods). Modern diagnostic techniques have been developed, including molecular biology, immunological and physico-chemical methods to assess quality or detect environmental contaminants in human food (microbial toxins, radionuclides, pesticides, heavy metals). CNEVA used to focus on products of animal origin, but AFSSA has seen its remit extended to cover all foodstuffs.

While AFSSA was set up mainly to base its risk assessment work on the competencies of CNEVA, it still needs to call upon other bodies with a research mandate, such as INRA (national institute for agricultural research). Over the past fifteen years the government has not only set up AFSSA but strongly encouraged research in the agro-food sector. This has generated new incentive-based programmes, run jointly by the Ministries of Research and Agriculture, as well as support from the Agence Nationale de Valorisation de la Recherche (research development agency) for corporate innovation, and a clearer institutional set-up for government research in France.

…to interministerial research programmes

A series of programmes has been launched in this area, namely Food 2000 (1986-1988), Food for 2000-2 (1988-1992), Food for Tomorrow (1993-1997), and the most recent Food-Quality-Safety (1998-2002). The Projects selected for the first four programmes have been awarded a total of FF 150 million in support, while expenditure for the programmes as a whole totalled FF 400 million. Topics heading the list of calls for tender have included health safety and rapid microbiological testing, aspects of consumer and market research, and the diffusion of innovation. For the duration of the Food-Quality-Safety programme, an annual sum of FF 20 million has been made available for high-priority projects, relating to the chosen topic and featuring close collaboration between industry, government research, higher education and development players.

Significant headway has also been made with the programme called Usine Ultra-propre (“ultra-clean plant”), run in partnership between the association UNIR (set up by nine industrial groups) and government authorities (Ministries of Research, Industry and Agriculture). With a budget of FF 108 million, it conducted 30 research programmes over a period of five years beginning in 1990 and provided solutions to prevent the microbiological contamination of food during the manufacturing process. The programme’s findings are currently being validated on pilot or full scale industrial production lines. To date there have been thirteen applications to register patents (plus three pending) and three “Soleau envelopes” (simplified French procedure to protect inventions). The ultimate aim is to provide consumers with products of irreproachable quality, thanks to absolute control over hygiene, without destroying their taste and nutritional properties, while at the same time proposing the most appropriate industrial solutions.

In 1996 a more specific research programme on Spongiform Encephalopathies was launched involving several ministries (Research, Agriculture and Health) and institutions (AFSSA, CEA, CNRS, INRA, INSERM). The research focuses on aspects of food safety to provide concrete solutions to problems such as how to ensure maximum traceability for specific animal organs, and how to remove the
spinal cord from cattle and sheep under optimal safety conditions for both workers and consumers; it is being carried out in co-ordination with industry and development partners.

4. Undisputed contribution by government research

The work supported by these interministerial programmes is one of the French system’s major assets, helping to consolidate corporate research and development and its linkages with government research. The mission and policy thrust of government research institutions are defined by the institutions themselves (by their scientific and administrative boards) in close collaboration with their ministries. Furthermore, the mandates of all of these institutions are validated and streamlined in meetings of the Interministerial Committees for Scientific and Technical Research (CIRST), chaired by the Prime Minister. A point worth noting is that even stronger moves to bring higher education and research closer together have led to the establishment of a large number of mixed research units (UMRs) to replace the former associated research units, demonstrating the determination of higher education and other institutions to work together on common topics.

With regard to the food safety theme at INRA, work on human nutrition was stepped up in 1989 in the department of nutrition, food, and food safety. In 1997 a new scientific directorate for human nutrition and food safety was set up to meet two requirements, i.e. to reinforce the institution’s work in these areas and meet public expectations, while responding to concerns on the part of the administrative and political authorities. Current research is accordingly focusing on toxicity mechanisms, genesis, bioavailability and the metabolism of potential toxins, as well as chemical hazards. Another field of research is taking a positive approach to food safety, viewing food as a way of providing organisms with protection against potentially toxic compounds, through the presence of non-food compounds.

In partnership with higher education research is being conducted, for instance, into the risks stemming from the presence of xenobiotics in food (one project with the Alfort veterinary school is on cadmium in the food chain,) and to optimise technology as a means of stabilising egg products for better food safety control (in partnership with ENSAR, the national school for higher agricultural studies in Rennes).

CEMAGREF, the national centre for farm machinery, agricultural engineering, water and forestry also puts food safety research high on its list of priorities, particularly the control of food chilling processes and refrigeration procedures. Its work focuses on the development of refrigeration and freezing techniques and on adapting equipment to control temperatures in an environmentally friendly way. Other studies take an approach based on risk analysis, modelling and the development of decision-making tools to make production safer, e.g. in the case of prions.

IFREMER, the French institute of fishery research, deals with food as a priority, addressing hygiene and safety, methods of detection and contamination of shellfish by pathogenic micro-organisms (viruses and bacteria), chemical contamination and algae toxins, but also potential risks to consumers and the purifying role of bivalve molluscs. In this field, the institute has formal collaboration arrangements with ENITIAA (school of agricultural and food engineering) in the field of food science and more specifically microbial interaction in fishery products.

5. Development input to food safety issues

While the more basic scientific work is crucial to optimal risk assessment, applied research and development is also vital if the findings are to be taken on board, disseminated and utilised. This is the
idea behind the role and mandates of the Technical Agricultural Institutes and Centres (ICTAs), which have an “industry” focus and form the Association for Agricultural Technical Co-ordination (ACTA). The same applies to their counterparts in the agro-food industry, whose Technical Institutes and Centres are known as ICTIAs, have a thematic focus and form the Co-ordinating Association for the Agro-food Industry (ACTIA).

ACTA’s four-year Scientific and Technical Masterplan (POST) for the period 1997-2000 placed special emphasis on the need to conduct research into adapting agricultural products to meet social demand. This theme, covering ideas such as food standards and safety, has led to several co-funded initiatives with the Association’s own Institutes and Centres (ICTAs), financed by the Civil Budget for Research and Technological Development (BCRD). Some interesting work has focused, for instance, on tracing and controlling at production level salmonella contamination in cow’s milk, and on ways of controlling the health standards of farm cheeses made with raw milk now that new regulations have been introduced. Discussions leading up to the fourth POST Masterplan were held in partnership with ACTA’s Scientific and Technical Policy Committee (COST), whose members are either professionals, development players, or scientists from institutions with a mandate for research and administration. Discussions for the fifth Masterplan (2001-2004) suggest that this theme will remain high on the list of priorities.

ACTIA has a large number of initiatives addressing food safety, ranging from studies on the impact of freezing and defrosting on microbial flora in different food matrices to the safety of plant products marketed by the agro-food industry, including the development of a means of studying the behaviour of pathogenic flora and work on the impact of technological choices. ICTIAs are in direct contact with their partners in the agro-food industry, and can therefore very rapidly identify the crucial issues to be resolved.

This does much to foster dialogue between the two associations (ACTA and ACTIA) and is generating projects, again funded by the BCRD, on “producer to consumer” topics of mutual interest. These projects are undergoing joint analysis by the COST committees of both associations and are also generating synergy with researchers players upstream and in the field. This dialogue between ACTA and ACTIA has also led to the joint publication of a practical guide to traceability for agriculture and the agro-food industry, which is serving as a basis for work by a task force set up in 1999 by AFNOR, the French standards association.

*From network-building…*

Other ways of pooling skills, such as building formal or informal networks, have often led to advances in these areas, which have in turn generated policy synergies and boosted findings. ACTIA has such networks, well-established or just emerging, in areas such as sensorial evaluation, plant and processes, nutrition, traceability and food safety. New institutional networks are currently being given formal recognition, particularly in the field of microbiology forecasting, to step the amount of work being done, as there is such demand from industry. The network is intended to bring enterprises and government research laboratories into contact with one another and with ACTIA and some of its centres. It would be funded jointly by the Ministry of Agriculture and Fisheries and the Ministry of Education, Research and Technology.

This partnership approach existed already in the *Groupements d’Intérêt Scientifique* (scientific interest groups, or GIS). The status of these agreement-based groups, intended to help define and/or resolve scientific issues, was flexible enough to enable skills to be pooled in some areas. Examples include the Alfort GIS, focusing on food quality, safety and hygiene, and the RIA GIS specialising in agro-food research.
Set up in 1993 with the support of the Ministries of Agriculture and Research, the RIA GIS brings together eleven partners (five institutions with a mandate for research and six engineering schools reporting to those ministries). Its purpose is to achieve a closer match between research policy and the needs of the agro-food industry. The GIS organises opportunities for dialogue between its members on strategy and programme definition and implementation, and may also encourage the mobilisation of other institutions by bringing French industry, government research and higher education closer together.

... to priority-ranking

In one of its initial studies, the RIA GIS identified two crucial needs, i.e. hazard reduction and optimal risk assessment and management. Hazard reduction covers aspects such as microbiological forecasting and microbial ecology, and scientific requirements for building and operating ultra-clean facilities. Optimising risk assessment and management covers safety thresholds for xenobiotics in food and drink, traceability methods, and rapid methods to test for micro-organisms, contaminants and the origin of raw materials (e.g. to identify transgenic products).

An agreement between the RIA GIS, ACTIA and the National Association of Agro-food Industries (ANIA) has managed to pinpoint, using nation-wide research, some key areas in which scientific work is required to guarantee food safety. In toxicology, the priority areas are now biotransformation and bioavailability, long-term hazard assessment, in particular the newer hazards (raw materials, processes, packaging, etc.), and allergies (threshold doses, detection). Testing methods, using screening techniques to detect trace elements and multiple residues, need to be developed for better identification and enforcement of risk thresholds. In the field of hygiene, the priorities are still the study of physiology and microbial ecology using a complex, dual approach (host-related effects in relation to the matrix-related dose), microbiological forecasting and the equivalence of safety technologies.

More specifically with regard to farming upstream, the health safety of agricultural raw materials involves the appropriate use of traceability. Work is also needed on plant pharmaceutical residues, heavy metals (sludge, fertiliser, geochemicals), oestrogen-mimicking substances and mycotoxins (ecology, physiology, host-related pathogenicity), as a means of obtaining information with which to measure and help to set risk thresholds but also to provide advice on optimising crop and livestock practices.

Scientific and technical prioritisation by the research community is an absolutely vital step if future work is to be redirected, particularly for the ministerial tendering process or the supervision of institutions by government. In this regard, funds can be targeted to projects in line with the intended policy thrust. One point not to be overlooked, however, is that scientists need to address consumers’ food concerns and societal issues in general. They will need more insight into consumer expectations and consumption patterns, in particular to identify those most at risk, analyse the “organic farming” phenomenon, restore the image of food safety in the minds of consumers, and tackle the gap between what production actually involves (industrial processes, risk, etc.) and the idealised picture that consumers have of farm produce. This fully warrants the wide range of research into food in the human and social sciences and the building of bridges between those sciences and the technological, neuro-physiological and biological approaches (health and safety). One illustration of how societal issues can be taken on board is the “citizens’ conference” held in June 1998. This took the form of a public debate, bringing together experts and laymen to identify more closely the many issues stemming from the use of GMOs in farming and food.

Vital information flows between producers, distributors and consumers will require the intervention of communication experts who have sufficient technical knowledge of the products and can convey in simple language the scientific and technical knowledge that consumers require about agricultural
products. Once the risks have been assessed and decisions taken as to how to manage them, the relevant information will have to be passed on, and this is where AFFSA, France’s new food safety agency, comes in. It will be important to promote transparency, as well as avoiding food scares, which are often out of all proportion with the potential hazards. Here, ethics plays an essential role and should make it possible to optimise risk management.

All these factors go to show that the agricultural knowledge system as a whole is helping to meet an optimal food safety objective that is one of France’s priorities. This is confirmed in the farm policy goals set by the draft Outline Agricultural Act: “the production of a diverse range of high-quality agricultural food and non-food goods that meet the needs of national, European Union and international markets, comply with safety requirements, the needs of agro-food industries and businesses and consumer demand, and contribute to global food security”. 