

**Food Safety and Standards Authority of India  
Expert Group on Milk and Milk Products**

**Base Working Paper on  
Strategy and Action Plan for Ensuring Safety of Milk and  
Milk Products**

**Prepared by**

**National Dairy Development Board  
Anand**

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# **Food Safety and Standards Authority of India Expert Group on Milk and Milk Products**

## **Base Working Paper on Strategy and Action Plan for Ensuring Safety of Milk and Milk Products**

### **1. Introduction**

The Food Safety and Standards Authority of India (FSSAI) constituted an Expert Group on Milk and Milk Products with the responsibility of drawing up an action plan and strategy for ensuring safety and quality of milk and milk products. Six terms of reference were specified for the work of the Group to be completed within 3 months. The Group included 7 members representing research institutions and dairy industry, with the CEO, FSSAI as its Chairman, NDDB as coordinator and a representative of the Department of Animal Husbandry, Dairying and Fisheries, Government of India, as joint coordinator.

In its first meeting held on 12 December 2008, the Group assigned its different members to prepare working paper on different items of the Terms of Reference. NDDB was given the responsibility of preparing a base paper on the 'Strategy and action plan for ensuring safety of milk and milk products.'

This base working paper on the strategy and action plan for ensuring safety of milk and milk products covers 3 goals:

- Assessment of food legislation at national level – preparation of a country profile,
- Preparation and implementation of national food safety programme, and
- Evaluation of food safety activities.

To accomplish each goal, objectives have been outlined and to achieve those objectives, where appropriate, the actions required have been suggested.

The focus of the paper is on milk and milk products, but it can be seen that most of the suggestions apply to other food groups also.

## **2. Goal 1: Assessment of Food Safety Legislations at National Level: Preparation of a Country Profile**

### **2.1 Objective 1: Data on production of milk and milk products and consumption: Indian dairy situation**

#### **Production**

Indian dairying is characterized by very small - most producers own 1 to 3 milch animals - and largely a rural-based activity. Animal productivity is comparatively low. Dairying is based on family labour, crop residues and natural grasses and is mostly a supplementary source of income to producers. Thus, around 750 lakh rural families are engaged in dairying activities related to milk production, accounting for about 98% of the milk production. Only about 2% of the milk production is in urban areas.

During the last 30 years since the launch of Operation Flood in 1970, the milk production in the country has increased from about 220 lakh tonnes in 1970-71 to an estimated 1048 lakh tonnes in 2007-08 (Table 1). India's milk production has grown at around 4% annually in the recent years, which far exceeds the global average of about 1%. This sustained increase in the domestic milk production increased the country's per capita availability of milk. The per capita availability of milk which decreased during the pre-Operation Flood period, not only kept the pace with growing population but increased from 112 g in 1968-69 to around 252 g in 2007-08.

India became the largest milk producer country in the world with 754 lakh tonnes in 1998-99, and has maintained the position since then with an estimated 1048 lakh tonnes in 2007-08.

The major milk producing states in the country are Uttar Pradesh, Punjab, Rajasthan, Madhya Pradesh, Maharashtra, Gujarat, Andhra Pradesh and Haryana, which account for about 70% of milk produced in the country.

Table 1: India's milk production and per capita availability

| <b>Year</b> | <b>Milk production, lakh tonne</b> | <b>Per capita availability, g/day</b> |
|-------------|------------------------------------|---------------------------------------|
| 1950-51     | 170                                | 124                                   |
| 1968-69     | 212                                | 112                                   |
| 1998-99     | 754                                | 213                                   |
| 2000-01     | 806                                | 220                                   |
| 2005-06     | 971                                | 241                                   |
| 2007-08     | 1048 (estimated)                   | 252                                   |

(Source: Department of Animal Husbandry and Dairying)

## **Consumption**

Of the milk produced in the villages, about half is consumed by rural households in the villages and the balance half is traded. Of the milk traded, over 50 per cent of milk is in the form of liquid milk, another around 35 percent in the form of traditional products and the remaining 15 per cent is accounted for by butter, milk powders and other western type manufactured products.

The milk is consumed not only as liquid milk but a large portion of the milk is consumed as milk-based products, like *rasgulla*, *peda*, *kalakand*, *barfi*, *ghee*, *paneer* etc., which are very popular among masses.

Milk is an important food for households - both in rural and urban areas, even though consumption levels vary across income classes and regions. The household demand for milk and milk products is projected to be around 1800 lakh tonnes in 2021-2022.

## **Systems and structure of dairy industry**

The estimated milk production in the year 2007-2008 was 1048 lakh tonnes. Of the total milk produced, about 50 % is retained by the producers for domestic consumption leaving about 50 % as the marketable surplus.

The dairy industry handling the marketable surplus of the milk can be broadly divided into the organized sector and the unorganized sector.

The organized dairy sector refers to the dairy units registered under the Milk and Milk Products Order, 1992, rev. 2002 (MMPO). These dairies have each capacity of handling over 10,000 litres of milk per day. These organized dairies are under co-operative, private or other (like government dairies) sector. As per the Annual Report 2007-08 of the Department of Animal Husbandry, Dairying and Fisheries, Government of India, there were 818 MMPO registered units with a combined processing capacity of 953 lakh litres a day as on 31 March 2007. Many of these are however not functional. These dairy plants are supplied milk by over 1 lakh collection centres.

The organized dairy sector has a good share in milk products market. But the products manufactured are mostly western-type in nature like table butter, cheese and different types of milk powders. Even though the organized sector has entered the market of indigenous milk products like *ghee*, *shrikhand* and *paneer*, these markets are mostly controlled by un-organized sector. The organized sector, especially co-operative dairy sector, disposes large portion of milk as processed liquid milk and only surplus is converted into products.

The unorganized dairy sector comprises numerous, small and/or seasonal milk producers/traders (popularly known as '*halwai*') that are not registered



under the MMPO. They handle 10,000 litres of milk per day or less. They are involved in selling raw liquid milk, boiled liquid milk as well as manufacturing and selling mainly indigenous milk products like *peda*, *barfi*, *rasgulla*, *khoa*, *paneer*, *ghee* etc., usually at the local level, but have a major share in these milk products. There are no official records on number of such unorganized dairy units.

The organized dairy sector procures around 30% of the marketable surplus (around 15% of national milk production) while the unorganized sector handles about 70% of the marketable milk. In the organized dairy sector, the co-operative and government dairies account for about 60% share while private dairies' share is about 40%.

The organized dairy sector has been paying increasing attention, though not adequate, on improving quality of products. Enforcement of rules is also concentrated mostly on this sector, while the unorganized dairy sector largely remains unattended. As a result business operators in the unorganized sector pay little importance to quality, except some reputed sweetmeat shop owners who maintain relatively good quality standards.

## **2.2 Objective 2: Milk and milk products imports and exports including safety and quality problems**

### **Exports and imports of milk and milk products**

India is self sufficient in its milk production to meet its domestic requirements, and generally has no requirement of import or export of milk products. However some exports and imports of milk products do take place. For last several years India has been a net exporter (Table 2).

Table 2: India's export and import of major dairy products

| <b>Exports (Rs crore)</b>             | <b>2006-07</b> | <b>2007- 08</b> | <b>2008 (Apr-Oct)</b> |
|---------------------------------------|----------------|-----------------|-----------------------|
| Skimmed milk powder                   | 268.66         | 449.04          | 279.81                |
| Whole milk powder                     | 12.41          | 23.69           | 52.14                 |
| Other milk powders                    | 60.45          | 94.47           | 80.83                 |
| Butter, butter-oil, ghee              | 46.99          | 131.05          | 174.08                |
| All dairy products + casein & lactose | 647.07         | 1375.85         | 905.29                |
| <b>Imports (Rs crore)</b>             |                |                 |                       |
| Skimmed milk powder                   |                | 2.68            | 1.15                  |
| Butter, butter-oil, ghee              | 64.06          | 8.61            | 4.63                  |
| All dairy products + casein & lactose | 176.23         | 166.22          | 110.64                |

Source: DGCIS

Exports of milk and milk products from India are likely to grow over the next decade, which would include various kinds of milk powders, and milk protein and butterfat products. Imports of bulk commodities are likely to vary, with higher amounts during certain years when there is a shortage in local availability on account of climatic conditions. While the import demand for consumer items would grow, volumes are likely to be limited to the aggregate consumption of high income households.

### **Problems in export and import of milk and milk products**

Some major problems related to food safety and quality in milk products export and import are outlined below.

#### Exports

- Some importing countries have more stringent standards based on As-Low-As-Reasonably-Achievable (ALARA) principle for parameters where Codex has specified a risk based standard, e.g. EU ML on aflatoxin M<sub>1</sub> in milk.
- Insistence by some importing countries on infrastructural measures to meet requirements, e.g. use of milking machine to maintain hygiene.
- Implementation of new regulations by importing countries without adequate notice period.
- Rapid alert system of the importing country not based on a systematic approach, generating unfounded fears about the exported products in the importing country.

#### Imports

- Emerging food safety threats, like melamine in baby foods and other dairy products from China.
- Presence of non-permitted food additives in imported foods.
- Inappropriate / inadequate labelling on the packages of imported foods.
- Labelling in foreign languages only.

### **2.3 Objective 3: Current food legislations and enforcement procedures**

Food legislation is recognized as an important pre-requisite for protection of the consumer's health and facilitating free and fair trade. Other concerns addressed by the food legislation include development of quality assurance system and the ultimate development of the industry itself. There are several legislations in the country that are intended to regulate the safety and quality of foods, both domestically produced and imported. These are:

## **Prevention of Food Adulteration (PFA) Act and Rules**

The PFA standards, which are mandatory, prescribe minimum compositional standards, standard for levels of residues of chemical contaminants and various other provisions. Enclosure 1 provides PFA and Codex standards for various chemical contaminants in milk. The PFA Rules also mandates application of the standards of the Bureau of Indian Standards (BIS) for milk powders, evaporated and condensed milks.

The Directorate General of Health Services, Ministry of Health and Family Welfare elaborates food standards under the PFA Act and Rules with the help of a Central Committee for Food Standards (CCFS) and its various sub-committees. The Act and Rules are enforced by the Local Health Authorities and Custom Authorities with the help of Central Food Laboratories and State Food Laboratories. The local food authorities monitor the quality of foods, especially with reference to adulteration and composition.

The Food Safety and Standards Act has recently come into effect in part replacing the PFA Act. The Milk and Milk Products Order has also come under the Food Act by name Milk and Milk Products Regulations. Under the Food Act the Food Safety and Standards Authority has been set up to administer the Food Act. Presently it is the transition phase of transferring the functions, responsibilities and authorities from the Directorate General of Health Services, Ministry of Health and Family Welfare to the Food Authority.

Some of the important aspects that need to be suitably addressed are as follows:

- \* The standard for levels of residues of chemical contaminants in milk need to be reviewed and revised, where appropriate, based on risk assessment/Codex standards. Currently there is no maximum level for any of the veterinary drugs in milk. This needs to be suitably addressed.
- \* The laboratory infrastructure facilities are inadequate. These need to be strengthened.
- \* Inspections and monitoring of product quality and safety are inadequate. The overall effectiveness of implementation of the provisions of the PFA Rules is far from satisfactory. This needs to be improved substantially.

These have been included in Objectives 2 and 3 of the Goal 2.

## **Milk and Milk Products Order (MMPO)**

It includes provisions like rules for production, hygienic conditions, packing, labelling, marketing, penalty etc. The Order provides emphasis on quality and food safety aspects of milk and milk products with a clear focus on the

hygienic production and processing of milk and milk products manufactured in a dairy establishment.

Department of Animal Husbandry and Dairying, Ministry of Agriculture administers the MMPO. Any dairy or premises, handling more than 10,000 litres of milk per day has to obtain the registration from appropriate registering authority. The registration process under the Order has been decentralized by designating State authorities to register dairies with a milk handling capacity up to 2 lakh litres per day. The registering authorities organize inspection of dairy plants through experts' teams for verification of implementation of approved guidelines with respect to hygiene and sanitation. Units handling 10,000 litres of milk per day or less are also subject to inspection to ascertain the hygiene and food safety conditions within such establishments.

The MMPO is now to be administered by the FSSAI as Milk and Milk Products Regulation. When the MMPO is reviewed by the FSSAI, it is necessary that the present MMPO is not repealed but is modified: the hygiene requirements mentioned in the Order should be further strengthened suitably and not diluted.

***Actions required:***

Following are some of the aspects needing corrective action:

- \* Registered and actually installed capacities mismatch: The MMPO provides information on processing capacity of the registered units. There are considerable gaps and inaccuracies in such information.
  - Many of such registered units have not come into existence and many others have different installed capacities than the registered ones. Therefore, the actual installed capacity is not known.
  - The capacities of all the registered units, including chilling centres are provided as processing capacity. This results in inaccurate information on registered processing capacity. Further, it is not known how much is the registered processing capacity and chilling capacity separately.
  
- \* Irregular inspections: As per the MMPO, the registered units should be inspected at least once in a year for complying with the requirements. The MMPO authorities have entrusted the task of inspection to the Export Inspection Council of India (EICI) and the National Productivity Council (NPC) – each registered unit to be inspected by them alternately.

However, the annual inspections of the registered units are highly irregular and inadequate. While the EICI does carry out inspection of some dairy plants, inspection by the NPC is carried out infrequently.

The provision for inspection is that the registered unit should request for the inspection. However, most of the units do not make request for inspection and hence no inspection is carried out of such units. The irregularity of the inspection of the registered units results in reduced attention on the part of the dairy plants/chilling centres management in maintaining good hygienic conditions in the units.

- \* Absence of data on milk procurement and product manufacture: All MMPO registered plants are required to provide 6-monthly information on the quantity of milk procured and processed, and products manufactured. It is understood that this information is being provided by most of the plants to the Central / State MMPO Authorities. However, such information is not compiled and the consolidated data on the above important parameters is not available.
- \* Uncertainty about certification of new product manufactured: As per the requirement of the Registration Certificate, all the products manufactured are required to be informed to the MMPO Authority. This therefore applies to any new product added subsequently. The information provided by the MMPO Authorities however does not indicate if this is being followed. Thus MMPO does not have any information on several new milk products being manufactured, and their quality, by the registered units.

### **Bureau of Indian Standards**

The Bureau of Indian Standards (BIS) has formulated and revised standards and guidelines for various dairy products and processes. Emphasis is also laid on hygienic requirements in food processing establishments. Some of the BIS Standards are specific to hygiene and safety requirements for milk products.

The use of BIS standards is voluntary. However, some dairy related standards, like those for milk powders, evaporated and condensed milks are mandatory as per the provisions of PFA Rules.

The BIS also operates a product certification scheme that allows the licensees to use the ISI mark on their product packages. The licensees are required to follow a defined scheme of testing and inspection, and manufacture product that conform to the appropriate BIS standards.

### **Agricultural Produce (Grading and Marking) Act 1937 (amended in 1986)**

Better known as 'AGMARK', the Act provides quality standards for grading, packing and marking of agricultural and animal husbandry products including ghee and butter. The quality parameters for products cover mainly compositional characteristics and adulteration aspects. No microbiological

standards are prescribed for the dairy products covered under Act. The standards are enforced by the Directorate of Marketing and Inspection, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India.

A voluntary product certification scheme under the Act allows the licensees to use the AGMARK logo on their products. The licensees are required to follow a defined scheme of testing and inspection, and manufacture product that conform to the appropriate AGMARK standards. The results of analyses are to be shared with the AGMARK authorities. In addition, the licensees are required to send sample to AGMRAK laboratories at a predetermined frequency.

### **Export (Quality Control and Inspection) Act (1963)**

The Rules under this Act provide for Good Hygienic Practices and Good Manufacturing practices to be implemented by the dairy businesses intending to export their products. It also operates a residue monitoring plan for chemical contaminants in milk. The relevant national / international standards for chemical contaminants and adulterants should be met for raw milk collected for further processing.

Registration of food manufacturing plants with the Export Inspection Council (EIC) of India, that administers this Act, has been made mandatory for undertaking the exports. The registration is valid for a period of two year and needs to be renewed accordingly.

EIC, with the help of Export Inspection Agencies (EIAs), arranges inspection of food plants to verify the implementation of approved guidelines by the plants manufacturing foods for export. Under the Act the dairy establishments need to maintain records on various parameters as per the rules related to hygiene and food safety, and forward the same to EIC on regular basis.

There are however cases of rejection of our products by the importers.

#### ***Actions required:***

- \* There is therefore a need for effective implementation of the rules and to strengthen the monitoring system.

## **Livestock Importation Act**

A notification issued under this Act by Ministry of Agriculture makes it mandatory to obtain an import permit from the Ministry before actually importing some livestock products that include milk and milk products also. The ministry issues the permit only after conducting a detailed import risk analysis. The import permit issued by the Ministry lays down the specific conditions that will have to be fulfilled in respect of the consignment including quarantine checks on arrival at the designated entry points. To prevent entry of any diseases through import of livestock and livestock products, four Animal Quarantine and Certification Stations (AQCSs) have been functioning for quarantine, health check and certification of animals for export / import.

However, the operation of the system needs improvement, as several exotic diseases enter into the country from time to time. Cases have been reported of imports of sub-standard products. Therefore, the system needs to be made more effective.

### ***Actions required:***

- \* The operation of the system needs improvement. There should be a well defined system for checking of products entering the country at entry point, which should be implemented by the customs authority efficiently.
- \* There should be a mechanism of monitoring the effective operation of the above system, and where required, corrective action should be taken.

## **2.4 Objective 4: Epidemiological information: Incidences of food-borne diseases, food contamination monitoring, and coordination between related government agencies**

Unfortunately there is no national system for monitoring of contaminants levels in foods or for regular surveillance of food-borne diseases in the country. Incidences of food poisoning are occasionally reported in the media (television and newspapers).

Contamination of milk with pesticide residues, veterinary drugs and heavy metals is being / has been surveyed independently by the Indian Council of Medical Research, National Dairy Development Board, Export Inspection Council of India and Agriculture Research Institutions as per their requirements. Their results are often not published. Some consumer organizations have also surveyed contamination in milk from some specific locations occasionally. Some individual organizations do publish data based on their surveys, often limited in scope and size, on contaminants levels in milk and milk products. But published information of such surveys is

limited, and some times present questionable data. It is unfortunate that reliable published information on levels of different important chemical contaminants in foods, and their trends, is generally lacking.

It is necessary to pay an urgent attention to this very important function.

***Actions required:***

- \* There should be a coordinated system of continuously monitoring the food-borne diseases and contamination in milk and milk products (and other foods). The responsibility of monitoring should be clearly delegated to appropriate agency/agencies.

The data so obtained would indicate if a product is being manufactured meeting the required standards, or actions are required to be taken to improve manufacturing practices and systems.

- \* The data generated from monitoring should be periodically analysed and used for risk assessment, which can then form the basis for risk management decisions by the Food Safety and Standards Authority (FSSAI). This would result in realistic and science based standards. If required, regional diets {similar to Global Environment Monitoring System (GEMS-coordinated by UN Environment Programme) diets} in the country should also be established and adjusted as the consumption patterns change. This can be delegated to a separate agency.

## **2.5 Objective 5: Extension and advisory services to the dairy sector by government and non-government organizations**

Several governmental and non-governmental organizations offer extension and advisory services to the dairy industry on food quality and safety. A brief account of such activities is provided below:

### **Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India**

The Department is operating a centrally sponsored scheme 'Strengthening Infrastructure for Quality & Clean Milk Production' during the 10th Plan with an outlay of Rs.30.00 crores. The scheme has the main objective of improving the quality of raw milk produced at the village level in the country. Under the scheme, there is a provision for training of farmers on good milking practices. The scheme is being implemented on 100% grant in aid basis to the State Governments/Union Territories for components viz. training of farmer members, detergents, stainless utensils, strengthening of existing laboratory facilities, etc. The pattern of funding for setting up of milk chilling facilities at



the village level in the form of bulk milk coolers is in the ratio of 75:25 between Government of India and respective dairy cooperative society/union. For the 11<sup>th</sup> Plan period a total sum of Rs. 100 crore has been proposed under this programme.

### **Ministry of Food Processing Industries, Government of India**

The Ministry of Food Processing Industries has been supporting a range of initiatives for the growth of food processing industry, including dairy industry. These schemes are:

- Scheme for quality assurance, Codex standard and research & development;
- Scheme for infrastructure development;
- Scheme for technology up-gradation, establishment and modernization of food processing facilities;
- Scheme for human resource development; and
- Scheme for strengthening of institutions.

In addition to the above, for the 11<sup>th</sup> Five year plan, the Ministry also has included a Scheme for Up-gradation of Quality of Street Foods.

### **National Dairy Development Board (NDDB)**

The National Dairy Development Board promotes, finances and supports producer-owned and controlled organizations. Under its Perspective Plan 2010, the Quality Assurance (QA) programme of the NDDB for cooperative dairy sector covers good hygienic practices from production level till milk reaches the consumer. Under the programme, NDDB provides financial assistance to cooperatives at low interest rates as well as grants for implementation of good hygienic practices (GHPs) and to improve the quality of milk. 43,000 village cooperatives in 175 cooperative milk producers' unions have been covered so far under the QA programme.

NDDB has also established a Centre for Analysis and Learning in Livestock and Food whose mandate is to offer services on analysis of milk products and other food products for various safety and quality parameters, and carrying out relevant research as required.

### **Agricultural and Processed Food Products Export Development Authority (APEDA)**

The APEDA carries out the following extension and advisory activities in the area of food safety:

- Fixing of standards and specifications for the scheduled products for the purpose of exports
- Provides financial assistance for measures taken to improve product safety and quality, such as implementation of HACCP system.
- Assessment and recognition of laboratories based on the availability of requisite instrumentation and the criteria laid down by APEDA. The registered exporters of food products can utilize the services of these recognized laboratories for sampling, testing, residue monitoring, etc. and obtain test certificates for exports of specified products.
- Recognition of HACCP implementation and certification agencies for effective service to the APEDA registered exporters.

### **Other schemes**

Beside the above, financial assistance is also provided for improving quality by District Rural Development Agency (DRDA), Technology Information, Forecasting & Assessment Council (TIFAC), *Swaranjayanti Gram Swarajgar Yojana* (SGSY) and similar rural development schemes of central and state governments.

## **2.6 Objective 6: Public education and participation**

The level of public education and participation in ensuring food safety is generally on the basis of the age old practices that have been handed over down the generations in the families. A systematic effort in this direction is lacking. The government departments have recently started advertisement campaigns on television to enlighten the Indian consumer on food safety and related aspects, which, of course, is far from adequate.

There are a few consumer associations that are also involved in the process of national food standard elaboration but their contribution is superficial and not effective due to lack of mission and scientific support in their interventions.

The industry efforts to educate consumers on food safety are limited to label information on appropriate use of their products.

Action therefore needs to be initiated to devise mechanism, such as through media, for proper, adequate and continual education of consumer on food safety.

### **3. Goal 2: Preparation and Implementation of National Food Safety Programme**

#### **3.1 Objective 1: Formulation of national food safety policy and plan of action**

##### **Food Safety Policy**

To ensure sustained consumer confidence that the food is safe and of the claimed quality through generation of awareness on responsibility towards food safety in all the stakeholders; availability of science – based standards elaborated through a transparent process involving all the stakeholders; and regulation of various activities in the food trade, that impact safety and other quality attributes of the food, under an integrated and well coordinated national food safety system.’

##### **Objectives**

The above policy is supported by the following objectives:

- Development / revision relevant food safety legislation, based on the current science and identified risks, which is commensurate with the best international standards and generic, enabling innovation and applicable to both standardized and non-standardized foods, through a transparent process involving all the stakeholders.
- Effective coordination of the integrated food control system and strengthening the capabilities of its basic elements - administration, inspectorate and analytical capability.
- Establishment of a Food Safety Emergency Response System that can respond to food safety emergencies rapidly and effectively.
- Promotion of voluntary management systems for food safety assurance in all the segments of the food chain in the specific food sectors.
- Development and organization appropriate training programmes for food handlers, inspectors and analysts in food safety assessment relevant to their activities.
- Enhanced inputs into research, food-borne disease surveillance and data collection as well as creating increased scientific capacity.
- Promotion of consumer education.
- Periodic review of the national food safety system

### **3.2 Objective 2: Development / revision of food legislation; harmonization with international requirements**

The main Indian Food Laws relevant to milk and milk products are the Prevention of Food Adulteration (PFA) Act and Rules and MMPO (now MMRP). While the FSS Act has replaced the PFA Act, the PFA Rules continue to be in force till new standards are specified under the FSS Act. There are several important aspects of these rules, as were outlined earlier, that need to be suitably addressed. Further, it needs to be reviewed whether there is any useful purpose of having, in addition to mandatory PFA food standards, separate BIS and Agmark standards for milk products, enforced by BIS and Directorate of Marketing and Inspection, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, respectively (both under Central Government). In view of these, following actions are required to be taken.

#### **Actions required:**

##### *PFA/Food Standards Rules*

- \* The standard for levels of residues of chemical contaminants in milk need to be reviewed and revised, where appropriate, based on risk assessment/Codex standards. Currently there is no maximum level for any of the veterinary drugs in milk. This needs to be suitably addressed.
- \* Presently microbiological standards cannot be applied to the proprietary products. A suitable mechanism needs to be developed to cover these products also under microbiological standards.
- \* Review the need and purpose of having separate BIS and Agmark standards for milk products, and consider merging them with PFA standards.
- \* There are no guidelines or codes of good practice for minimizing contamination in PFA rules. These (refer to Objective 5) need to be included in the rules suitably.
- \* Develop and implement a traceability system (refer to Objective 5).
- \* The rules do not include provisions on specific sampling methodology and preservation of samples meant for microbiological analysis and methods of analysis. These need to be appropriately included.
- \* The FSS Act and PFA rules do not cover milk at primary production level and hence do not include any provisions for safety related issues at that level. A mechanism needs to be devised to initially provide advisory

standards/codes of practices for primary level. These need to be made mandatory in a given time.

- \* The laboratory infrastructure facilities are inadequate. These need to be strengthened.
- \* Inspections of dairy processing plants and monitoring of product quality and safety are highly inadequate.
- \* The overall effectiveness of implementation of the PFA Rules is far from satisfactory. A very critical need is to implement Food Laws effectively.

#### *MMPO (MMPR)*

- \* An effective system needs to be developed to ensure that only functional units are registered after satisfactory inspection and the data on registration should reflect the actually installed capacities, which should be kept updated.
- \* There should be a system of effective random inspection of units to ensure that the required sanitary measures and other requirements are complied with.
- \* Periodical returns by the units. There should be an effective system of collecting periodical returns on milk collection and production, stock etc related data from the registered units by the FSSAI, and to compile and analyze them regularly and timely. If required, this latter task can be outsourced.

### **3.3 Objective 3: Strengthening food control systems – integrated system: Administration, inspectorate and analytical capabilities**

The current structure of food control system is an integrated system with the basic components of administration (FSSAI) and inspectorate (State Food Safety Authorities) with the analytical laboratories (Central and State Food Laboratories) assisting them. The main functions required to be carried out efficiently by them are outlined below.

FSSAI: Formulation of policy, risk assessment and management, development of standards, regulations and guidelines; coordination of food control activities, monitoring system performance, auditing; monitoring food contamination, food-borne disease surveillance.

State Food Safety Authorities: Inspection and enforcement; information, education and training.

However, the coordination at the administration level and implementation at the inspectorate level are not effective. The analytical capabilities, in terms of proficiency and accountability, are also not commensurate with the current requirements. This has resulted in a weak food control system.

Integrated food control system requires determination to achieve effective collaboration and coordination between the agencies involved in food control across the whole food chain. The FSS Act envisages an integrated system for food control and can be effective only if the above indicated issues are suitably addressed.

The role of the FSSAI is to establish national food control goals, and put into effect the strategic and operational activities necessary to achieve those goals. Some other important functions may include developing consumer education and community outreach initiatives and promoting their implementation; supporting research and development; and establishing quality assurance schemes for industry and supporting their implementation.

The FSSAI should address the entire food chain, and should take necessary actions to move resources to high priority areas and to address important sources of risk. Enforcement of rules is concentrated mostly in the organized sector, while the unorganized dairy sector largely remains unattended. As a result business operators in the unorganized sector pay little importance to quality, except some reputed sweetmeat shop owners who maintain relatively good quality standards.

There are several activities, not under the control of the FSSAI, that affect production of safe food: substances of concern in effluents released by different industry sectors, use of pesticides in agriculture, use of veterinary drugs and their withdrawal periods; **quality of feed and regulation of cattle feed plants**; creating and controlling animal disease-free zones. These are controlled by different government departments and agencies. It is very important that the Food Authority coordinate closely with them on these activities so that these are controlled effectively to help produce safe milk and milk products.

Food inspection must verify that all foods are produced, handled, processed, packed, labelled, stored and distributed in compliance with legislation and regulations. This function should be exercised by the State Food Safety Authorities. Special emphasis needs to be given on inspection of operations in unorganized sector, and concerted efforts are required to be made to control adulteration. Currently such actions are unfortunately lacking, and the unorganized dairy sector largely remains unattended from enforcement of rules. As a result most business operators in the unorganized sector pay little importance to quality.

Appropriate analytical capacity to monitor quality and safety of food supply is essential for effectiveness of the food control programme. The recognized and accredited laboratories and the referral food laboratory should possess capability to analyze basic composition of food, presence of adulterants, and food contaminants of concern. The management structure and operational procedures of these laboratories should conform to internationally recognized guidelines provided in ISO: 17025-2005 standard, detailing General Requirements for the Competence of Calibration and Testing Laboratories. Consideration must also be given to the participation of official food laboratories in Proficiency Testing Schemes which are analytical quality assurance programmes to ensure consistent laboratory performance. The location and number of laboratories required be decided on the basis of an economic appraisal and specific needs. In view of the costs, the under utilization of the laboratories should be avoided.

***Actions required:***

*Food safety policy, legislation*

- i) FSSAI should finalize food safety policy and plan of action for safety and quality of milk and milk products as outlined in this report and implement the plan.
- ii) FSSAI should regularly evaluate and revise, if necessary, food safety and quality legislation. Presently action should be initiated to review standards as outlined in 'Actions required' of Objective 2.
- iii) FSSAI should develop a system to coordinate food control activities with the State Food Safety Authorities effectively, to regularly monitor and audit system performance (including performance of State Food Safety Authorities).
- iv) FSSAI should participate in Codex meetings effectively.

*Enforcement*

- v) A system and plan of frequency of food inspection activities should be developed and implemented. The frequency of food inspection activities should be prioritized according to risk: with comparatively high-risk milk products (like milk baby foods, milk, ice-cream) being given the priority. Special emphasis must be given on monitoring operations in unorganized sector and adulteration. Currently such actions are unfortunately lacking.
- vi) More emphasis should be laid on regulatory assessment with the objective of obtaining evidence that the principles of food safety systems,

e.g. HACCP, and good practices have been correctly and effectively applied and maintained.

- vii) FSSAI / State Food Safety Authorities should prepare and disseminate a code of practice for inspectors and as well prepare materials for and train inspectors in the code of practice, modern inspection techniques and sampling procedures in accordance with Codex.
- viii) FSSAI / State Food Safety Authorities should identify the appropriate minimum curriculum needed for inspectors to be either considered competent to undertake their regulatory role.
- ix) FSSAI / State Food Safety Authorities should establish, for inspectors, training suitable for their responsibilities.
- x) FSSAI / State Food Safety Authorities should consider employing adequate number of inspectors to provide adequate coverage of areas. The government should make available at least the minimum resources necessary to assure the safety of milk products.
- xi) FSSAI / State Food Safety Authorities should establish an effective management information system to enhance the flow of information regarding food inspection activities.
- xii) FSSAI / State Food Safety Authorities should consider various approaches for the mobilization of resources to strengthen inspection capabilities, such as licencing and analysis fees and the realization of fines.

#### *Official food laboratories*

- xiii) The official central and state food laboratories should have the capacity to carry out those microbiological, chemical and physical tests necessary to detect and quantify, where possible, the hazards most likely to affect the health of the nation's population. It is necessary to review the current status of these laboratories with reference to their required capabilities and adequacy in number. Then, if required, these should be suitably strengthened.
- xiv) The central food laboratories should function as key quality assurance centres, evaluating and training state, district and municipal laboratories.

#### *Coordination with other agencies*

- xv) Coordination with agencies whose work influences food safety directly or indirectly: The Food Safety Authority needs to maintain a close



coordination with such government agencies whose actions have a bearing on safety of foods indirectly, e.g. Pollution Control Boards (for proper limits of substances of concern in effluents, and effective enforcement); Central Insecticide Board and Registration Committee, Ministry of Agriculture, Government of India (for matters related to pesticide registration etc.); Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Government of India (for matters related to veterinary drugs such as withdrawal periods; **quality of feed and regulation of cattle feed plants**; disease-free zones) etc.

*Food-borne disease surveillance, monitoring food contamination*

- xvi) FSSAI should develop systems for monitoring food contamination and food-borne disease surveillance as suggested in this report.
- xvii) FSSAI should conduct routine monitoring of milk products supplies to identify and assess trends in regard to food contamination. The Food Authority may also consider participation in the WHO Food Contamination Monitoring Programme to take advantage of the quality assurance and control services provided. In undertaking such programmes, FSSAI should apply a methodology consistent with that recommended by the Codex Alimentarius Commission.

### **3.4 Objective 4: Identify and respond to food safety emergencies rapidly and effectively**

An effective food safety emergency system is critical in protecting the consumers from health hazards in cases of food safety emergencies. Food safety emergencies are often difficult to identify, in part because critical information may be in different hands and its significance may not be easily recognized. Also the manufacturer concerned may not take prompt action by itself, as happened in China recently in case of melamine adulteration. Enhanced detection and investigation capabilities and increased sharing of information offer the best prospects of identifying food-borne illness outbreaks as early as possible. Once identified, the FSSAI/State Food Safety Authorities must act swiftly to direct, and oversee, the concerned manufacturer/other responsible stakeholders to locate and recall food that caused the illness.

A tentative outline for an emergency response system is provided below:

A food safety emergency is identified by local health departments or food control laboratories or other agencies and the implicated food / lot of food is identified



Inform the Food Safety and Standards Authority (FSSAI) immediately



FSSAI to issue immediate 'actions to be taken' list to the relevant associated government departments



- Direct the concerned manufacturer / other related agencies for recall.
- Recall implicated lots of foods / stop sales of implicated food; stop imports if an imported food is implicated
- Initiate actions to trace the cause of food safety emergency. This may need assistance of hospitals, food safety experts, scientific institutions. The concerned manufacturer / other related agencies have major responsibility.
- Advise consumers on the extent of risk, measures taken by the Authority, measures to be taken by the consumers (television, radio, cable operators, internet)

Continue monitoring the implicated food, at an enhanced frequency, if necessary



Periodically review the situation depending upon the nature of the food (staple diet item or a supplementary food product), type of food safety emergency (microbiological, chemical, physical; cutting across the lots or lot specific) and the extent of risk involved



- Withdraw advisory if the risk is mitigated; further advice to industry and consumer, if necessary

Establish whether the emergency resulted due to any gaps in the food safety legislation and/or communication gaps between the agencies linked to the food safety programme; affect amendments to legislation, if gaps are identified, to prevent recurrence; improve linkages and communication



Maintain a record of such emergencies faced

- Product
- Type of hazard and health effects observed
- Actions taken and their result
- Duration of emergency

An effective food safety emergency system would require rapid access to information about food safety surveillance, hazards, outbreaks actions, enforcement and other food safety emergency activities through active outreach efforts. This requires capacity to transmit information and adapt messages rapidly and to provide communication tools and training programmes to appropriate people and institutions to help prevent or minimize public health threats. This flow of information must occur in open, rapid way to ensure public's trust in the food safety system.

***Actions required:***

- \* Discuss the above suggested system within the FSSAI and with the State Food Safety Authorities, and put it in operation.
- \* Develop a system for rapid access by concerned officials of FSSAI and State Food Safety Authorities, product manufacturers, retailers and consumers to information about food safety surveillance, hazards, outbreaks actions, enforcement and other food safety emergency activities.
- \* Impart training to the responsible officials of the FSSAI and the State Food Safety Authorities on the operation of the system and information flow.
- \* Have the processing plants identify their senior officers who could be contacted when required. These contact officers should be in a position to take/get fast decisions on recall and other actions required. These officers should also be educated on the system details through workshops.
- \* Other institutions like hotels, food retailers; and consumer should also be educated on the system and their role in preventing or minimizing public health threats. This can be done through mass media.

**3.5 Objective 5: Promotion of voluntary good practices / management systems for food safety assurance in food sectors**

Implementation of good / best practices in milk chain will contribute considerably in ensuring production of safe milk and milk products. International organizations such as Codex Alimentarius Commission and national agencies have developed / are developing documents on such practices. These practices should be considered by the food authority suitably for adoption / adaptation. Some of the important codes of practices which have been developed or are being developed are outlined below:

## **Good Agricultural Practices (Crop-based and Livestock-based)**

Guidelines on Good Agricultural Practices have been developed separately focusing crop / plant production and livestock products. These guidelines have been developed by global GLOBALGAP (formerly EUREGAP).

Bureau of Indian Standards is also developing similar guidelines: National Agriculture Code (Indiagap): Good Agricultural Practice – Code of Practice. These are likely to be finalized shortly.

## **Guidelines on Good Hygienic Practices**

Guidelines on Good Hygienic Practices have been developed by several organizations and either cover part of the milk chain or the entire milk chain. Codex has developed ‘Recommended International Practice – General Principles of Food Hygiene’ for the entire food chain. The specific code for milk and milk products developed by Codex is ‘Code of Hygienic Practice for Milk and Milk Products’. This is complimentary to the General Principles of Food Hygiene Code.

Bureau of Indian Standards is also developing a document entitled ‘Indian Standard – Food Safety Management – requirements for Good Hygienic Practices.’ This document is expected to be finalized shortly.

## **Good Manufacturing Practice**

The Codex standards on ‘General Principles of Food Hygiene’ and ‘Code of Hygienic Practice for Milk and Milk Products’ also include good manufacturing practices for dairy processing plants. BIS is also considering a draft standard on ‘Good Manufacturing Practice – requirements for organizations in the food processing sector’ which should be finalized in near future.

The British Retail Consortium (BRC), a trade association representing the whole range of retailers in UK has developed a standard titled ‘British Retail Consortium Global Standard – Food’. The standard is designed for use by food manufacturers and is acceptable to all major UK and Scandinavian retailers.

## **Good Food Retail Management Practices**

BIS is preparing a standard, namely ‘Indian Standard – Food Retail Management – Basic requirement’. The draft standard is under discussion and is likely to be approved shortly.

## **Food Quality and Safety Management Systems**

Guidelines on food safety and management systems have been developed by different international and national organizations. An important food safety system is the Hazard Analysis and Critical Control System (HACCP System) which has been adopted / endorsed by the Codex as a part of the International Code of Practice – General Principles of Food Hygiene. Based on the HACCP System several national organizations have developed their standards. Some of these are:

- International Food Standard (IFS) by the German Retail Association, *Hauptverband des Deutschen Einzelhandels (HDE)*
- Safe Quality Food (SQF) Programme by the Food Marketing Institute of the USA
- Dutch HACCP designed by the Dutch National Board of Experts.

The BIS also has a standard based on HACCP, namely 'Indian Standard IS: 15000 Food Hygiene - Hazard Analysis and Critical Control Point (HACCP) - System and Guidelines for Its Application.'

Another BIS standard, which is a joint IS / ISO standard, is: Indian Standard IS / ISO 22000: 2005 Food Safety Management Systems - Requirements for any Organization in the Food. This standard is based on combining the HACCP and ISO 9001 standards.

### **Food Product Traceability**

Recent problems related to food safety, such as mad cow disease, have prompted many governments to initiate implementing food traceability systems. Traceability / product tracing is the ability to follow the movement of food through specified stages of production, processing and distribution, as required. Traceability is one element of any quality/safety control systems. Product traceability also enables efficient recall in case of the products' contamination. Moreover, it helps to determine the origin of a food safety problem, comply with legal requirements and meet the consumers' expectations for the safety and quality of purchased food products.

The traceability system enables manufactures to link the raw ingredients from suppliers to a batch of products and further down to the retailer. Traceability systems collate and provide relevant information which include: details of receipt of raw material (name, address of supplier, quantity, batch number, if any, date of transaction etc); details of raw ingredients used in each product batch; details of backward and forward product tracking; details of production flow; process parameters for each product.

Depending upon the volume of data required to be recorded, the traceability system could be either paper-based or computer-based.

Several international organizations and countries have developed traceability systems for various applications. Some of the important ones are as follows:

- Codex Principles for Traceability / Product Tracing as a Tool within the Food Inspection and Certification Systems. These principles cover context, rationale, design and application of traceability as a tool for use by a competent authority within the food safety and certification system.
- The US Food and Drug Administration Bio-terrorism Act. This US Act covers most food and pet food products and applies to manufacturing, processing, transportation, distribution, receiving and holding or importing companies. This Act includes one-step forward and one-step backward trace back requirements.
- European Union Regulation No.178 and Guidance on the Implementation of its different Articles including Article on Traceability. The Regulation includes one-step forward and one-step backward trace back systems, and generally is similar to the US FDA Bio-terrorism Act requirements. It requires that the records must be maintained for 5 years. The Regulation covers human and pet foods and animal feeds. The retailers are not covered under the Regulation.
- ISO 22005: 2007 Traceability. This ISO Standard includes principles for traceability and specifies the basic requirements for the design and implementation of a traceability system for food and feed. The standard can be applied by an organization at any step in the food and feed chain.

### **Codex Codes of Practices for Controlling Contaminants in Milk**

Codex has developed several Codes of Practices for controlling different chemical contaminants in foods, which are relevant to milk and milk products also. These are:

- i) Control of the Use of Veterinary Drugs
- ii) Reduction of Aflatoxin B<sub>1</sub> in Raw Materials and Supplemental Feeding-stuffs for Milk-Producing Animals
- iii) Source Directed Measures to Reduce Contamination of Foods with Chemicals
- iv) Code of Practice for the Prevention and Reduction of Lead Contamination in Foods
- v) Code of Practice for the Prevention and Reduction of Dioxin and Dioxin-like PCB Contamination in Food and Feeds

Educating the relevant stakeholders on these Codes/Best Practices is very important. Some action was taken earlier on this. Sensitization / training

programmes on implementation of food safety systems (GHP, GMP and HACCP) for dairy personnel were conducted, under the Food Safety Programme of the Ministry of Health and Family Welfare, in the years 2003 and 2006. More than 200 dairy personnel from 43 dairy plants and four State Dairy Cooperative Federations had participated in the four types of specifically designed programmes for the Chief executive officers, Technical Personnel, Plant Operators and Milk Collection Personnel.

***Actions required:***

- 1) The Food Authority may review and consider adoption / adaptation of the above Codes of Practices / Standards as appropriate and devise a mechanism in the Food Act / PFA Rules to include them as advisory texts.
- 2) The FSSAI and the State Food Authorities need to promote the application of these Codes / Best Practices in the milk chain suitably. Suitable training programmes covering these best practices need to be organized for the relevant stakeholders continually covering the maximum participation. For this, help and cooperation can be sought from the related institutions / organizations like NDRI, NDDB etc.
- 3) FSSAI should have a system of regular monitoring of effective application of these Good Practices. This can be done by the State Food Safety Authorities during their inspections.

**3.6 Objective 6: Development and organization of training programmes for food handlers, inspectors and analysts in food safety assessment commensurate with their activities**

The professional food handlers – those working in food-processing and manufacturing industry, and food catering (hotels, restaurants and street food stalls) should possess necessary expertise and skills in order to comply with the food safety regulations. Training is integral to supporting food safety throughout the food chain in order to assist the food handlers in their efforts to keep the food safe. The food sector should initiate training of professional food handlers in principles of food hygiene commensurate with their work activities that should relate to the nature of food and its ability to sustain growth and survival of pathogenic microorganisms, and risks of contamination during handling. Training should also focus on the principles of Good Agricultural Practices (GAP) and Good Manufacturing Practices (GMP); Practices for controlling different chemical contaminants in foods and the principles and application of quality assurance system based on HACCP.

The domestic food handlers, such as mothers and other persons responsible for family food preparation should also be educated on basic food safety principles. There are unique food safety problems associated with the

preparation of weaning foods, that may be contaminated with pathogens and the risk of infant diarrhoea and associated malnutrition. The knowledge, attitudes and practices of household care-providers largely determines nutritional status of the household. Educating school children and the appropriate government sector personnel involved in food handling also deserves special attention. Appropriate education programmes should be jointly supported, designed, developed and implemented by health workers, food safety authorities and consumer groups.

Appropriate education programmes are also needed for all the personnel involved in official food control system to ensure they are aware of the requirements and problems associated with production and regulation of a safe food supply. Such training programmes should be designed and developed jointly by the government and the food industry. Once finalized, such programmes should be implemented by the FSSAI through relevant agencies/institutions like NDDB, NDRI, NPC etc.

The frequency of training should be decided based on the requirement of the trainees and developments in the food safety concepts. Emerging food safety problems can also be a determinant in deciding the frequency of training.

***Actions required:***

*Professional food handlers:*

- As elaborated in ‘Actions required’ under the Objective 5 above.
- For small dairy processors/retailers (such as *halwayee*), training based on GHP/HACCP principles should be undertaken. Where feasible, essential services such as electricity, potable water and waste disposal be made available to enhance food safety.
- The FSSAI and the State Food Authorities should employ tools like healthy cities, healthy schools and healthy market places, to emphasise food safety in both urban and rural areas.
- FSSAI should make every effort to provide a maximum inspection capability to address the small dairy processors/retailers and street vendors.

*Domestic food handlers:*

- Organization of national seminars to raise awareness of the importance of food safety;



- Education and extension programme by health workers in collaboration with food safety authorities;
- Training of trainers who are involved in the education of health workers and primary school teachers in food safety;
- Utilization of mass media for dissemination of information on health issues and food safety;
- Incorporation of principles of food safety in school curricula;
- FSSAI should encourage consumer associations to employ approaches to enhance consumer interaction with government and industry such as consumer exhibitions.

*Inspectors and analysts:*

- Training on introduction of codes of good practices and food safety systems (such as HACCP) to the Food Safety Officers;
- Training of Food Safety Officers in principles of auditing and verification of food safety programmes/codes of good practices.
- The Food Safety Officers should also be adequately trained in sampling of foods, and handling and preservation of the food samples;
- Training of food control laboratory personnel in principles of laboratory management to comply with the ISO / IEC Guide 25; and in microbiological, chemical and physical analyses of foods.

### **3.7 Objective 7: Enhanced inputs into food-borne disease surveillance, data collection, and research, as well as creating increased scientific capacity**

Availability of information necessary for supporting food safety issues as well as to plan, implement and assess disease control activities, a national epidemiological service with the capacity to establish surveillance and investigation procedures is essential. The information on food-borne disease can be collected through food-borne disease surveillance. The relevant agencies should collect information on disease outbreaks and keep surveillance to review possibilities of contamination of any part of the food supply within their jurisdiction. Such information should be forwarded to the FSSAI periodically. The FSSAI can have the data evaluated and can institute epidemiological investigation to highlight possible causes of the reported outbreaks of the diseases. Where necessary, the FSSAI should also

commission and coordinate research to strengthen the outcomes of epidemiological investigations. Such service in the country however is not very effective at present.

Research is an important component of a national food safety programme. Information on the extent and costs of food-borne diseases, their causes and sources of contamination is essential for increasing government, industry and community commitment to the programme. Such research is also required if food safety activities are to be properly focused through sound scientific risk assessment. Such research needs to be timely, relevant to decision-makers and should be communicated effectively. Presently there is a gap between the research requirements for food safety and the research being actually undertaken by the concerned institutions.

The FSSAI should develop a strategic plan to collect and evaluate information on food-borne disease and hazards associated with the food chain.

Evaluation of the information generated from epidemiological investigation and surveillance of food-borne disease should generate objective and sound scientific advice on the food-related problems. The Scientific Committee and the Scientific Panels could review and analyze the information, at a predetermined frequency, and provide such advice to the Food Authority. The scientific capacity of the FSSAI would be quite strong once the Central Advisory Committee, the Scientific Committee and the Scientific Panels are formed and start functioning.

The FSSAI would also need to organize a system of providing necessary analytical data to JECFA/JEMRA/JMPR against the call for data for the risk assessment work of Codex.

***Actions required:***

*Food-borne disease surveillance:*

- i) FSSAI should establish a central epidemiological surveillance unit with the capacity to address food-borne diseases and provide it the necessary human and financial resources. Considering that due to the size of the country, the central unit alone may not be able to provide the appropriate level of response, FSSAI should consider and plan the establishment of a regional network of centres in the longer term.
- ii) The central unit should identify the most appropriate approach to food-borne disease surveillance (laboratory- and epidemiologically-based) and outbreak investigation. National expertise may be used to achieve this.

*Research:*

- i) FSSAI should consider undertaking a national review of research priorities. Such a review may involve all relevant parties (universities, premier dairy institutions, industry and consumers.
- ii) FSSAI should strengthen, through partnership, national research capacity.
- iii) FSSAI should facilitate the integration of research outcomes into food safety policy and programme development, implementation, monitoring and evaluation.
- iv) FSSAI may consider a regional approach to research into food safety issues of common concern to other countries in the region. To initiate this, initially the regional and national priorities in food safety need to be reviewed. This can be done by collaborating with an appropriate international organization.
- v) FSSAI should identify the institutes/laboratories to collect and forward, through FSSAI, the necessary analytical data to JECFA/JEMRA/JMPR against the call for such data for the risk assessment work of Codex.

*Increased scientific capacity:*

- \* The Central Advisory Committee, the Scientific Committee and the Scientific Panels should be formed and made functional speedily.

### **3.8 Objective 8: Promotion of consumer education**

Proper consumer education on food safety and quality can go a long way to improve food quality and safety. However consumer awareness in the country is poor. Great efforts are required to educate the public on food safety.

Consumer should specifically be educated on need to observe the necessary storage conditions as declared on the labels and the importance of the shelf life of the products (packed and after opening). Creation of awareness on general principles of personal hygiene and food hygiene can also be useful. To this end the FSSAI, relevant ministries, industry, NGOs, Consumer Organizations etc. can jointly work to develop certain education material. Nationwide public information / education campaign to disseminate critical food safety messages in multiple formats and languages targeted towards both local and national audiences can be useful in generating mass awareness on food safety and related practices.

The consumers should also be made aware of the ways to obtain and interpret, and importance of, the consumer advisories issued by the FSSAI and the State Food Authorities from time to time.

Use of mass contact media like television, radio, cable operators, internet etc. should be made to generate such public awareness. There could also be food safety camps organized at local levels in rural areas.

***Actions required:***

As elaborated in 'Actions required' under Objective 6 above.

**3.9 Objective 9: Setting a management review process to evaluate the activities**

Management review of the scheduled activities should be carried out at a predetermined frequency to monitor the progress of the planning and implementation of the food safety programme. A quarterly review during planning stage and a half yearly review during the implementation appears to be appropriate. The review should focus on the following aspects:

- Progress of activities against the intermediate targets
- Major roadblocks encountered and actions needed to overcome them
- Any new issues to be addressed
- Review of targets in view of the ground situation

***Action required:***

\* Develop and implement the review system as indicated above.

**4. Goal 3: Evaluation of food safety activities**

**4.1 Objective 1: Food safety policies and goal**

**4.2 Objective 2: The strategy in place to affect these policies**

The national food safety system and its activities should be evaluated after a pre-determined time frame to determine its effectiveness as envisaged and its capability to address the emerging food safety concerns.

An evaluation process could initially focus on food safety policies and goals, the strategy in place to affect these policies, or the public agencies and services that implement food safety policies and strategies. Factors that are important when assessing a food safety programme, or one or more of its components, are outlined in the Table 5. The provision of safe food is a multi-sectoral undertaking, and therefore the question of linkages between a number of programmes must be taken into consideration.

Table 3 Criteria for evaluation of National Food Safety Programme

| <b>Criteria</b> | <b>Definition</b>   | <b>Application</b>  |
|-----------------|---|---|
| Effectiveness   | The degree of attainment of predetermined objectives  | Increase in number of food premises inspected   |
| Impact          | The overall effect on health and related socioeconomic development  | What is the overall effect on health and related socioeconomic development? Has there been a decrease in food-borne diseases or related socioeconomic crisis        |
| Efficiency      | The relationship between the results obtained and the resources expended  | What is the relationship between the results obtained and resources spent? Value for money.   |
| Progress        | The comparison of actual with scheduled activities to ensure that operations are proceeding as planned and as scheduled                 | Has the programme proceeded as planned? Have the milestones been achieved?  |
| Adequacy        | Determining whether sufficient attention has been paid to certain previously determined courses of action                               | Has the programme adequately covered all the target audiences, has sufficient attention been paid the vulnerable groups, e.g. infants, the elderly, pregnant women? |
| Relevance       | The rationale for adopting policies and strategies in terms of their response to health needs as well as social and economic activities | Are the initial policies still relevant? Is there a need for change? Are activities performed relevant to the specific problems faced by the country?               |

(Source: Food Safety Issues -Guidelines for Strengthening a National Food Safety Programme, World Health Organization)

Results of the evaluation need to be interpreted objectively, taking all variables into consideration. When evaluations are conducted sensitively, with extensive consultation of all involved, results can contribute to positive developments in terms of policy, programme strengthening, or institutional

functioning. Follow-up activities emanating from the evaluation should be clearly defined and actions for specific persons or groups identified.

***Action required:***

\* Develop and implement the evaluation system as indicated above.

## Standards for Contaminants in Milk and Milk Products in Codex and PFA Rules

(Note: Blank cells indicate that limit does not exist.)

### A. Maximum residue limits (MRLs) for pesticides

| S. no. | Pesticide           | MRL in milk mg/kg, (mg/kg=ppm)  |        |       |  |
|--------|---------------------|---------------------------------|--------|-------|--|
|        |                     | Codex                           |        | PFA   |  |
|        |                     | Limit                           | Remark | Limit | Remark   |
| 1.     | 2, 4- D             | 0.01                            |        | 0.05  | MMP  |
| 2.     | Abamectin           | 0.005, Cattle & goat milks      |        |       |  |
| 3.     | Acephate            | 0.02                            |        |       |  |
| 4.     | Aldicarb            | 0.01                            | *      |       |  |
| 5.     | Aldrin and dieldrin | 0.006                           | F      | 0.15  | FAT BASIS, MMP, applies to aldrin and dieldrin singly or in combination, expressed ad dieldrin |
| 6.     | Aminopyralid        | 0.02                            |        |       |  |
| 7.     | Amitraz             | 0.01                            | V, *   |       |  |
| 8.     | Bentazone           | 0.05                            | *      |       |  |
| 9.     | Bifenazate          | 0.01, Milks                     | *      |       |  |
|        |                     | 0.05, Milk fats                 |        |       |  |
| 10.    | Bifenthrin          | 0.05, Cattle milk               | *      |       |  |
| 11.    | Bitertanol          | 0.05                            | *      |       |  |
| 12.    | Carbaryl            | 0.05                            |        |       |  |
| 13.    | Carbendazim         | 0.05                            | *      | 0.10  | FAT BASIS, MMP   |
| 14.    | Carbofuran          | 0.05                            | *      | 0.05  | FAT BASIS, MMP, Sum of carbofuran and 3-hydroxy carbofuran expressed as carbofuran             |
| 15.    | Carbosulfan         | 0.03                            | *      |       |  |
| 16.    | Chlordane           | 0.002                           | F      | 0.05  | FAT BASIS, MMP, Cis- and trans-chlordane   |
| 17.    | Chlormeqaut         | 0.5, Cattle, goat & sheep milks |        |       |  |
| 18.    | Chlorpropham        | 0.0005, Cattle milk             | F, *   |       |  |
| 19.    | Chlorpyrifos        | 0.02, Cattle, goat &            |        | 0.01  | FAT BASIS, MMP   |

| S. no. | Pesticide                                     | MRL in milk mg/kg, (mg/kg=ppm)   |           |       |   |
|--------|---|----------------------------------|-----------|-------|---|
|        |   | Codex                            |           | PFA   |   |
|        |   | Limit                            | Remark    | Limit | Remark  |
|        |   | sheep milks                      |           |       |   |
| 20.    | Chlorpyrifos-methyl                           | 0.01                             | *         |       |   |
| 21.    | Clethodim                                     | 0.05                             | *         |       |   |
| 22.    | Clofentezine                                  | 0.05                             | *         |       |   |
| 23.    | Cyfluthrin and beta-cyfluthrin                | 0.04                             | F         |       |   |
| 24.    | Cyhexatin                                     | 0.05                             | V, *, MMP |       |   |
| 25.    | Cypermethrin (including alpha – cypermethrin) | 0.05                             | F, V      | 0.01  | FAT BASIS, MMP, Sum of isomers  |
| 26.    | Cyprodinil                                    | 0.0004                           | *         |       |   |
| 27.    | Cyromazine                                    | 0.01                             |           |       |   |
| 28.    | DDT   | 0.02                             | F         | 1.25  | FAT BASIS, MMP, Applies to DDT, DDD and DDE, singly or in combination |
| 29.    | Deltamethrin                                  | 0.05                             | F         |       |   |
| 30.    | Diazinon                                      | 0.02                             | F, V      |       |   |
| 31.    | Dichlorvos                                    | 0.02                             | *         |       |   |
| 32.    | Dicofol                                       | 0.10                             | F         |       |   |
| 33.    | Difenoconazole                                | 0.005                            | *         |       |   |
| 34.    | Diflubenzuron                                 | 0.02                             | F, *      |       |   |
| 35.    | Dimethenamid – P                              | 0.01                             | *         |       |   |
| 36.    | Dimethoate                                    | 0.05, Cattle, goat & sheep milks | *         |       |   |
| 37.    | Dimethomorph                                  | 0.01                             | *         |       |   |
| 38.    | Dimetipin                                     | 0.01                             | *         |       |   |
| 39.    | Diphenylamine                                 | 0.0004, Cattle milk              | F, *      |       |   |
| 40.    | Diquat  | 0.01                             | *         |       |   |
| 41.    | Disulfoton                                    | 0.01, Cattle, goat & sheep milks |           |       |   |
| 42.    | Dithiocarbamate                               | 0.05                             | *         |       |   |
| 43.    | Endosulfan                                    | 0.01, Milks<br>0.1, Milk fats    |           |       |   |
| 44.    | Ethephon                                      | 0.05, Cattle, goat & sheep milks | *         |       |   |
| 45.    | Ethoprophos                                   | 0.01                             | *         |       |   |
| 46.    | Famoxadone                                    | 0.03                             | F         |       |   |
| 47.    | Fenamiphos                                    | 0.005                            | *         |       |   |
| 48.    | Fenbuconazole                                 | 0.05, Cattle milk                | *         |       |   |
| 49.    | Fenbutatin oxide                              | 0.05                             | *         |       |   |



| S. no. | Pesticide                                  | MRL in milk mg/kg, (mg/kg=ppm) |        |       |   |
|--------|--|--------------------------------|--------|-------|---|
|        |  | Codex                          |        | PFA   |   |
|        |  | Limit                          | Remark | Limit | Remark  |
| 50.    | Fenhexamid                                 | 0.01                           | F, *   |       |   |
| 51.    | Fenitrothion                               | 0.01                           | *      | 0.05  | FAT BASIS, MMP  |
| 52.    | Fenpropathrin                              | 0.10, Cattle milk              | F      |       |   |
| 53.    | Fenpropimorph                              | 0.01                           |        |       |   |
| 54.    | Fenpyroximate                              | 0.005, Cattle milk             | F, *   |       |   |
| 55.    | Fenvalerate                                | 0.10                           | F      | 0.01  | FAT BASIS, MMP  |
| 56.    | Fipronil                                   | 0.02, Cattle milk              |        |       |   |
| 57.    | Fludioxonil                                | 0.01                           |        |       |   |
| 58.    | Flumethrin                                 | 0.05, Cattle milk              | F, V   |       |   |
| 59.    | Flusilazole                                | 0.05                           | F      |       |   |
| 60.    | Flutolanil                                 | 0.05                           | *      |       |   |
| 61.    | Glufosinate ammonium                       | 0.02                           | *      |       |   |
| 62.    | Glyphosate                                 | 0.05                           | *      |       |   |
| 63.    | Heptachlor                                 | 0.006                          | F      | 0.15  | FAT BASIS, MMP, Applies to heptachlor and its epoxide expressed as heptachlor |
| 64.    | Hexachlorocyclohexane (gamma i.e. lindane) | 0.01                           | *      | 0.01  |   |
|        |  |                                |        | 0.20  | FAT BASIS, MP   |
| 65.    | Imidacloprid                               | 0.02                           | *      |       |   |
| 66.    | Indoxacarb                                 | 0.1, Milks                     |        |       |   |
|        |  | 2.0, Milk fats                 |        |       |   |
| 67.    | Kresoxim-methyl                            | 0.01                           | *      |       |   |
| 68.    | Methamidophos                              | 0.02                           |        |       |   |
| 69.    | Methidathion                               | 0.001                          |        |       |   |
| 70.    | Methomyl                                   | 0.02                           | *      |       |   |
| 71.    | Methoprene                                 | 0.10                           | F      |       |   |
| 72.    | Methoxyfenozide                            | 0.01                           |        |       |   |
| 73.    | Myclobutanil                               | 0.01 , Cattle milk             | *      |       |   |
| 74.    | Novaluron                                  | 0.40, Milks                    |        |       |   |
|        |  | 7.0, Milk fat                  |        |       |   |
| 75.    | Oxamyl                                     | 0.02                           | *      |       |   |
| 76.    | Oxydemeton-methyl                          | 0.01                           | *      |       |   |
| 77.    | Paraquat                                   | 0.005                          | *      | 0.01  | Paraquat Dichloride expressed as paraquat cations                             |
| 78.    | Penconazole                                | 0.01 , Cattle milk             | *      |       |   |
| 79.    | Permethrin                                 | 0.10                           | F      |       |   |
| 80.    | Phorate                                    | 0.01                           | *      | 0.05  | FAT BASIS, MMP, Sum of phorate, its   |

| S. no.                        | Pesticide          | MRL in milk mg/kg, (mg/kg=ppm)                 |        |       |   |
|-------------------------------|--------------------|--|--------|-------|---|
|                               |                    | Codex  |        | PFA   |   |
|                               |                    | Limit  | Remark | Limit | Remark  |
|                               |                    |  |        |       | oxygen analogue and their sulphoxide and sulphones expressed as phorate       |
| 81.                           | Piperonyl butoxide | 0.20, Cattle milk                              | F      |       |   |
|                               |                    | 0.05, Milk excl. cattle milk                   | F      |       |   |
| 82.                           | Pirimicarb         | 0.01   | *      |       |   |
| 83.                           | Pirimiphos-methyl  | 0.01   |        | 0.05  | FAT BASIS, MMP  |
| 84.                           | Prochloraz         | 0.05   | *      |       |   |
| 85.                           | Profenofos         | 0.01   | *      |       |   |
| 86.                           | Propamocarb        | 0.01   | *      |       |   |
| 87.                           | Propargite         | 0.10   | F, *   |       |   |
| 88.                           | Propiconazole      | 0.01   | *      |       |   |
| 89.                           | Pyraclostrobin     | 0.03   |        |       |   |
| 90.                           | Pyrimethanil       | 0.01   |        |       |   |
| 91.                           | Quinoxifen         | 0.01, Milks                                    |        |       |   |
|                               |                    | 0.2, Milk fats                                 |        |       |   |
| 92.                           | Spinosad           | 1, Cattle milk                                 | V      |       |   |
|                               |                    | 5, Cattle milk fat                             |        |       |   |
| 93.                           | Tebuconazole       | 0.01 , Cattle milk                             | *      |       |   |
| 94.                           | Tebufenozide       | 0.01   | *      |       |   |
| 95.                           | Terbufos           | 0.01   | *      |       |   |
| 96.                           | Thiabendazole      | 0.2, Cattle milk, Also used as veterinary drug |        |       |   |
| 97.                           | Thiacloprid        | 0.05   |        |       |   |
| 98.                           | Triadimefon        | 0.01   | *      |       |   |
| 99.                           | Triadimenol        | 0.01   | *, F   |       |   |
| 100.                          | Trifloxystrobin    | 0.02   | *      |       |   |
| 101.                          | Vinclozolin        | 0.05 , Cattle milk                             | *      |       |   |
| <b>Additional MRLs in PFA</b> |                    |  |        |       |   |
| 1.                            | Benomyl            |  |        | 0.10  | FAT BASIS, MMP  |
| 2.                            | Chlorfenvinphos    |  |        | 0.20  | FAT BASIS, MMP, Applies to alpha and beta isomers                             |
| 3.                            | Edifenfos          |  |        | 0.01  | FAT BASIS, MMP  |
| 4.                            | Ethion             |  |        | 0.50  | FAT BASIS, MMP, Applies to ethion and its oxygen analogue expressed as ethion |

| S. no. | Pesticide                           | MRL in milk mg/kg, (mg/kg=ppm) |        |       |  |
|--------|-------------------------------------|--------------------------------|--------|-------|--|
|        |                                     | Codex                          |        | PFA   |  |
|        |                                     | Limit                          | Remark | Limit | Remark   |
| 5.     | Fenthion                            |                                |        | 0.05  | FAT BASIS, MMP, Sum of fenthion, its oxygen analogue and their sulphoxides, and sulphones, expressed as fenthion |
| 6.     | Hexachlorocyclohexane (HCH) (alpha) |                                |        | 0.05  |  |
| 7.     | Hexachlorocyclohexane (beta)        |                                |        | 0.02  |  |
| 8.     | Hexachlorocyclohexane (delta)       |                                |        | 0.02  |  |
| 9.     | Monocrotophos                       |                                |        | 0.02  | MMP  |
| 10.    | Phenthoate                          |                                |        | 0.01  | FAT BASIS, MMP   |
| 11.    | Trichlorfon                         |                                |        | 0.05  |  |

\* = at or about the limit of determination      MMP = for milk and milk products  
F = residue is fat soluble<sup>a</sup>      MP = for milk products  
V = MRL accommodates external animal treatment

(<sup>a</sup> In Codex for a milk product with a fat content less than 2 %, the MRLs applied should be half those specifies in milk. The MRL for the milk products with a fat content of 2 % or more should be 25 times the maximum residue limit specified for milk, expressed on a fat basis.)

### B. Maximum residue limits (MRLs) for veterinary drugs

| S. no. | Veterinary Drug                   | MRL in milk, µg/kg (µg/kg = ppb)                      |     |
|--------|-----------------------------------|---|-----|
|        |                                   | Codex   | PFA |
| 1.     | Albendazole                       | 100 <sup>L</sup>                                      |     |
| 2.     | Benzympenicillin                  | 4 <sup>L</sup> , Cattle milk                          |     |
| 3.     | Ceftiofur                         | 100 <sup>L</sup> , Cattle milk                        |     |
| 4.     | Chlortetracycline                 | 100 <sup>L</sup> , Cattle and sheep milk              |     |
| 5.     | Clenbuterol                       | 0.05 <sup>L</sup> , Cattle milk                       |     |
| 6.     | Colistin                          | 50, Cattle milk, Sheep milk                           |     |
| 7.     | Cyfluthrin                        | 40 <sup>L</sup> , Cattle milk, Used also as pesticide |     |
| 8.     | Cyhalothrin                       | 30, Cattle milk, Used also as pesticide               |     |
| 9.     | Cypermethrin & alpha-cypermethrin | 100, Cattle milk                                      |     |

| S. no.                                | Veterinary Drug           | MRL in milk, µg/kg (µg/kg = ppb)   |                        |
|---------------------------------------|---------------------------|--|------------------------|
|                                       |                           | Codex  | PFA                    |
| 10.                                   | Deltamethrin              | 30, Used also as pesticide   |                        |
| 11.                                   | Dihydrostreptomycin       | 200, Cattle and sheep milk   |                        |
| 12.                                   | Diminazene                | 150 <sup>L</sup> , Cattle milk   |                        |
| 13.                                   | Doramectin                | 15, Cattle milk  |                        |
| 14.                                   | Eprinomectin              | 20 <sup>L</sup> , Cattle milk  |                        |
| 15.                                   | Febantel                  | 100 <sup>L</sup> , Cattle and sheep milk   |                        |
| 16.                                   | Gentamicin                | 200 <sup>L</sup> , Cattle milk   |                        |
| 17.                                   | Imidocarb                 | 50, Cattle milk  |                        |
| 18.                                   | Isometamidium             | 100 <sup>L</sup> , Cattle milk   |                        |
| 19.                                   | Ivermectin                | 10, Cattle milk  |                        |
| 20.                                   | Lincomycin                | 150, Cattle milk   |                        |
| 21.                                   | Neomycin                  | 1500, Cattle milk  |                        |
| 22.                                   | Pirlimycin                | 200*, Cattle milk  |                        |
| 23.                                   | Spectinomycin             | 200 <sup>L</sup> , Cattle milk   |                        |
| 24.                                   | Spiramycin                | 200 <sup>L</sup> , Cattle milk   |                        |
| 25.                                   | Sulfadimidine             | 25 <sup>L</sup> , Cattle milk  |                        |
| 26.                                   | Thiabendazole             | 100 <sup>L</sup> , Cattle and goat milks,<br>Covers residues from feed<br>containing residues resulted from<br>agricultural use, Used also as<br>pesticide |                        |
| 27.                                   | Tilmicosin                | 50 <sup>L</sup> , Sheep milk , Temporary   |                        |
| 28.                                   | Trichlorfon               | 50, Cattle milk, Used also as<br>pesticide   | Specified as pesticide |
| <b>Veterinary Drugs with synonyms</b> |                           |  |                        |
| 1.                                    | Fenbendazole              | Included in Febantel   |                        |
| 2.                                    | Metrifonate               | Included in Trichlorfon  |                        |
| 3.                                    | Oxfendazole               | Included in Febantel   |                        |
| 4.                                    | Oxytetracycline           | Included in Chlortetracycline  |                        |
| 5.                                    | Procaine benzylpenicillin | Included in Benzylpenicillin   |                        |
| 6.                                    | Streptomycin              | Included in Dihydrostreptomycin  |                        |
| 7.                                    | Tetracycline              | Included in Chlortetracycline  |                        |

<sup>L</sup> Expressed in µg/l

\* JECFA evaluated the effect of pirlimycin residues on starter cultures and for this reason recommended an MRL of 100 µg/kg of milk. Codex Members may therefore adapt national/regional MRLs in order to address this technological aspect for trade of fresh liquid milk intended for processing using starter culture.

### C. Maximum level (ML) for toxic metals

| Metal          | ML, mg/kg (mg/kg=ppm) |   |                          |  |
|----------------|-----------------------|---|--------------------------|--|
|                | Codex                 |   | PFA                      |  |
|                | Limit                 | Remark  | Limit                    | Remark   |
| Arsenic        |                       |   | 0.1                      | For milks  |
|                |                       |   | 1.1                      | For milk Products  |
|                |                       |   | 0.05                     | For infant milk substitutes and infant foods               |
|                |                       |   | 0.5                      | For ice cream, iced lollies and similar frozen confections |
| Cadmium        |                       |   | 1.5                      | Applies for milk product also                              |
|                |                       |   | 0.1                      | For infant milk substitutes and infant foods               |
| Copper         |                       |   | 30                       | Applies for milk product also                              |
|                |                       |   | 15 but not less than 2.8 | For infant foods & infant milk substitutes and             |
| Lead           | 0.02                  | Concentration factor applies for partially and wholly dehydrated milks<br><br>Applies also to secondary milk products* as consumed and ready to use infant formulae | 2.5                      | Applies for milk product also                              |
|                |                       |   | 0.2                      | For infant foods & infant milk substitutes and             |
|                |                       |   | 1.0                      | For ice cream, iced lollies and similar frozen confections |
| Mercury        |                       |   | 1.0                      | Applies for milk product also                              |
| Methyl-mercury |                       |   | 0.25                     | Applies for milk product also                              |
| Tin            | 150                   | Canned milk beverages   | 250                      | Applies for milk product also                              |
|                | 250                   | Canned milk products other than canned milk beverages   | 5.0                      | For infant milk substitutes and infant foods               |
| Zinc           |                       |   | 50                       | Applies for milk product also                              |
|                |                       |   | 50 but not less than 25  | For infant foods & infant milk substitutes and             |

\* Product which have undergone simple processing such as removal or part removal of certain ingredients e.g. water, milk fat etc.

#### D. Maximum level (ML) of crop contaminant

| Contaminant              | MRL in milk, µg/kg (µg/kg = ppb) |     |
|--------------------------|----------------------------------|-----|
|                          | Codex                            | PFA |
| Aflatoxin                |                                  | 30* |
| Aflatoxin M <sub>1</sub> | 0.5                              | 0.5 |

\* In all articles of food

#### E. Maximum level (ML) of naturally occurring toxic contaminants

| Contaminant      | ML, mg/kg (mg/kg=ppm) |      |
|------------------|-----------------------|------|
|                  | Codex                 | PFA* |
| Agaric acid      |                       | 100  |
| Hydrocyanic acid |                       | 5    |
| Hypericine       |                       | 1    |
| Saffrole         |                       | 10   |

\* In all articles of food

#### F. Guideline level of toxic contaminants in food

| Contaminant            | mg/kg (mg/kg=ppm) |     |
|------------------------|-------------------|-----|
|                        | Codex             | PFA |
| Vinyl chloride monomer | 0.01              |     |
| Acrylonitrile          | 0.02              |     |

#### G. Guideline level of radionuclides in foods (after reconstitution or as prepared for consumption, that is, not for dried or concentrated foods) which have been contaminated following a nuclear or radiological emergency including accidents and malevolent actions

| Contaminant<br>(Contribution to summed as grouped)   | Bq /kg<br>(One becquerel - Bq - is the activity of a quantity of radioactive material in which one nucleus decays per second) |     |
|--|---|-----|
|  | Codex   | PFA |
| <sup>241</sup> Am, <sup>238</sup> Pu, <sup>239</sup> Pu, <sup>240</sup> Pu   | 1*  |     |
|  | 10 #  |     |
| <sup>90</sup> Sr, <sup>106</sup> Ru, <sup>129</sup> I, <sup>131</sup> I, <sup>235</sup> U  | 100   |     |
| <sup>134</sup> Cs, <sup>137</sup> Cs, <sup>35</sup> S (Represents value of organically bound sulphur), <sup>60</sup> Co, <sup>89</sup> Sr, <sup>103</sup> Ru, <sup>144</sup> Ce, <sup>192</sup> Ir | 1000  |     |
| <sup>3</sup> H (Represents value of organically bound tritium), <sup>14</sup> C, <sup>99</sup> Tc  | 1000 *  |     |
|  | 10000 #   |     |

\* For foods other than infant foods

# For infant foods