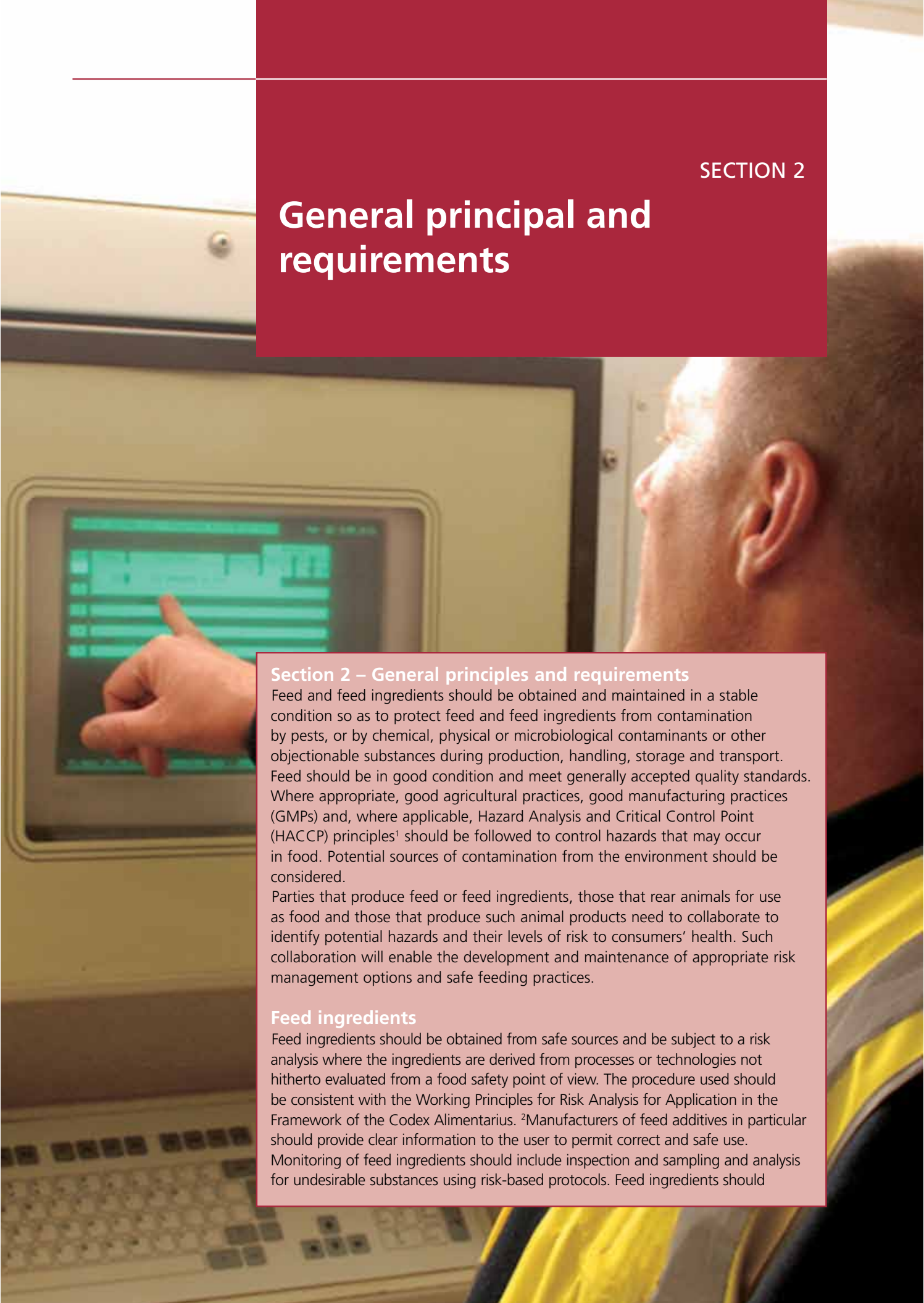
SECTION 2

General principal and requirements



Section 2 – General principles and requirements

Feed and feed ingredients should be obtained and maintained in a stable condition so as to protect feed and feed ingredients from contamination by pests, or by chemical, physical or microbiological contaminants or other objectionable substances during production, handling, storage and transport. Feed should be in good condition and meet generally accepted quality standards. Where appropriate, good agricultural practices, good manufacturing practices (GMPs) and, where applicable, Hazard Analysis and Critical Control Point (HACCP) principles[1] should be followed to control hazards that may occur in food. Potential sources of contamination from the environment should be considered.

Parties that produce feed or feed ingredients, those that rear animals for use as food and those that produce such animal products need to collaborate to identify potential hazards and their levels of risk to consumers' health. Such collaboration will enable the development and maintenance of appropriate risk management options and safe feeding practices.

Feed ingredients

Feed ingredients should be obtained from safe sources and be subject to a risk analysis where the ingredients are derived from processes or technologies not hitherto evaluated from a food safety point of view. The procedure used should be consistent with the Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius. [2]Manufacturers of feed additives in particular should provide clear information to the user to permit correct and safe use. Monitoring of feed ingredients should include inspection and sampling and analysis for undesirable substances using risk-based protocols. Feed ingredients should

meet acceptable and, if applicable, statutory standards for levels of pathogens, mycotoxins, pesticides and undesirable substances that may give rise to consumers' health hazards.

Labelling

Labelling should be clear and informative as to how the user should handle, store and use feed and feed ingredients. Labelling should be consistent with any statutory requirements and should describe the feed and provide instructions for use. Labelling or the accompanying documents should contain, where appropriate:

- information about the species or category of animals for which the feed is intended;
- the purpose for which the feed is intended;
- a list of feed ingredients, including appropriate reference to additives, in descending order of proportion;
- contact information of manufacturer or registrant;
- registration number if available;
- directions and precautions for use;
- lot identification;
- manufacturing date;
- "use before" or expiry date.

This sub-section does not apply to labelling of feed and feed ingredients derived from modern biotechnology.[3]

Traceability/product tracing and record keeping of feed and feed ingredients

Traceability/product tracing of feed and feed ingredients, including additives, should be enabled by proper record keeping for timely and effective withdrawal or recall of products if known or probable adverse effects on consumers' health are identified. Records should be maintained and readily available regarding the production, distribution and use of feed and feed ingredients to facilitate the prompt trace-back of feed and feed ingredients to the immediate previous source and trace-forward to the next subsequent recipients if known or probable adverse effects on consumers' health are identified.[4]

Special conditions applicable to emergency situations

Operators should, as soon as reasonable, inform the competent authorities in the country if they consider that a feed or feed ingredient does not satisfy the feed safety requirements established in this Code. The information should be as detailed as possible and should at least contain a description of the nature of the problem, a description of the feed or feed ingredients, the species for which it is intended, the lot identifier, the name of the manufacturer and the place of origin. The competent authorities and operators should immediately take effective measures to ensure that those feed or feed ingredients do not pose any danger to consumers' health.

As soon as it becomes likely that a particular feed or feed ingredient is to be traded internationally and may pose a danger to consumers' health, the competent authorities of the exporting countries should notify, at least, the competent authorities of the relevant importing countries. The notification should be as detailed as possible and should at least contain the particulars indicated in the previous paragraph.

Inspection and control procedures

Feed and feed ingredients manufacturers and other relevant parts of industry should practice self-regulation/auto-control to secure compliance with required standards for production, storage and transport. It will also be necessary for risk-based official regulatory programmes to be established to check that feed and feed ingredients are produced, distributed and used in such a way that foods of animal origin for human consumption are both safe and suitable. Inspection and control procedures should be used to verify that feed and feed ingredients meet requirements in order to protect consumers against food-borne hazards. [5]Inspection systems should be designed and operated on the basis of objective risk assessment appropriate to the circumstances.[6]Preferably the risk assessment methodology employed should be consistent with internationally accepted approaches. Risk assessment should be based on current available scientific evidence.

Monitoring of feed and feed ingredients, whether by industry or official inspection bodies, should include inspection and sampling and analysis to detect unacceptable levels of undesirable substances.

Health hazards associated with animal feed

All feed and feed ingredients should meet minimum safety standards. It is essential that levels of undesirable substances are sufficiently low in feed and feed ingredients that their concentration in food for human consumption is consistently below the level of concern. Codex Maximum Residue Limits and Extraneous Maximum Residue Levels set for feed should be applied. Maximum residue limits set for food, such as those established by the Codex Alimentarius Commission, may be useful in determining minimum safety standards for feed.

Feed additives and veterinary drugs used in medicated feed

Feed additives and veterinary drugs used in medicated feed should be assessed for safety and used under stated conditions of use as pre-approved by the competent authorities.

Veterinary drugs used in medicated feed should comply with the provisions of the Codex Recommended International Code of Practice for the Control of the Use of Veterinary Drugs.[7]

Borderlines between feed additives and veterinary drugs used in medicated feed may be set to avoid misuse.

Feed additives should be received, handled and stored to maintain their integrity and to minimise misuse or unsafe contamination. Feed containing them should be used in strict accordance with clearly defined instructions for use.

Antibiotics should not be used in feed for growth promoting purposes in the absence of a public health safety assessment.[8]

Feed and feed ingredients

Feed and feed ingredients should only be produced, marketed, stored and used if they are safe and suitable, and, when used as intended, should not represent in any way an unacceptable risk to consumers' health. In particular, feed and feed ingredients contaminated with unacceptable levels of undesirable substances should be clearly identified as unsuitable for animal feed and not be marketed or used.

Feed and feed ingredients should not be presented or marketed in a manner liable to mislead the user.

Undesirable substances

The presence in feed and feed ingredients of undesirable substances such as industrial and environmental contaminants, pesticides, radionuclides, persistent organic pollutants, pathogenic agents and toxins such as mycotoxins should be identified, controlled and minimised. Animal products that could be a source of the Bovine Spongiform Encephalopathy (BSE) agent[9] should not be used for feeding directly to, or for feed manufacturing for, ruminants. Control measures applied to reduce unacceptable level of undesirable substances should be assessed in terms of their impact on food safety.

The risks of each undesirable substance to consumers' health should be assessed and such assessment may lead to the setting of maximum limits for feed and feed ingredients or the prohibition of certain materials from animal feeding.

Source: Code of practice on good animal feeding (CAC/RCP 54–2004).

1 *Hazard Analysis and Critical Control Point, as defined in the Annex to the Recommended International Code of Practice on General Principles of Food Hygiene (CAC/RCP 1-1969).*

2 *Procedural Manual of the Codex Alimentarius Commission.*

3 *Whether and how to label animal feed and feed ingredients derived from modern biotechnology awaits developments on food labelling, being considered by the Codex Committee on Food Labelling.*

4 *Development of detailed measures on traceability/product tracing should take into the account: Principles for Traceability/Product Tracing as a tool within a Food Inspection and Certification System (CAC-GL 60-2006).*

5 *Principles for Food Import and Export Inspection and Certification (CAC/GL 20-1995).*

6 *Guidelines for the Design, Operation, Assessment and Accreditation of Food Import and Export Inspection and Certification Systems (CAC/GL 26-1997).*

7 *CAC/RCP 38-1993.*

8 *WHO. 2000. Global Principles for the Containment of Antimicrobial Resistance in Animals Intended for Food, June 2000, Geneva, Switzerland.*

9 *Joint WHO/FAO/OIE Technical Consultation on BSE: public health, animal health and trade, OIE Headquarters, Paris, 11–14 June 2001.*

INTRODUCTION

The use of suitable, safe and good quality feed and feed ingredients is of paramount importance to livestock produc\tion. Safe feed is an essential element to reduce and prevent food safety hazards entering the food chain.

The presence in feed of food safety hazards that can lead to public health problems should be prevented or minimised. Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP) and, if applicable, Hazard Analysis and Critical Control Point (HACCP) are important instruments to control hazards in the feed production process.

The introduction of the food chain approach, which recognizes that responsibility for the supply of safe, healthy and nutritious food is shared along the entire food chain, has served to highlight the importance of feed safety. The food chain, thus, comprises every step from primary production to final consumption. Stakeholders include farmers, fishermen, slaughterhouse operators, feed ingredient producers, feed producers and processors, food processors, transport operators, distributors (wholesale and retail) and consumers, as well as governments responsible for protecting public health.

BOX 1

Ingredients that should not be used in animal feeding

Animals should not be given feed and feed ingredients that:

- Are recognized as likely to introduce zoonotic agents (including transmissible spongiform encephalophaties – TSEs) to the slaughter population; or
- Contain chemical substances (e.g. veterinary drugs, pesticides) or contaminants that could result in residues in meat at levels that make the product unsafe for consumption

Source: Codex Code of Hygienic Practice for Meat (CAC/RCP 58-2005)

Feed ingredients should be produced using procedures that minimize potential contaminants, promote appropriate product safety, quality and integrity and me***et al***l applicable standards for use (See Boxes 1, 2 and 3). They should be of merchantable quality, comply with appropriate statutory standards for contaminants and relevant regulations.

All parties involved in feed and animal production should ensure that safe and good quality feed and feed ingredients are produced and used in food production animal, thus reducing the risk to human health. There is a need for collaboration between all parties involved in the food production chain, including those in a position to provide veterinary clinical and epidemiological information, to establish the linkage between any identified or potential hazards and the level of risk. Such information is essential for the development and maintenance of appropriate risk management options and safe feeding practices.

The Codex Alimentarius Code of Practice on Good Animal Feeding contains a set of principles which aim at ensuring that feed and feed ingredients are obtained, produced, processed, stored, transported, distributed and used in a way that they do not represent a danger to human health.

This section provides clarification elements to the principles and requirements of the Code.

FEED INGREDIENTS

Quality and safety of feed ingredients are essential for the production of safe and quality feed, which are critical to the production of safe and quality animal food products, such as meat, milk, eggs, etc.

The safety of feed ingredients should be assessed prior to their use in animal feeding. The assessment of feed and feed ingredients

BOX 2

Prevent introducing health hazards (milk and milk products)

With consideration given to the end use of the milk, forage and feed for lactating animals should not introduce, directly or indirectly, contaminants into milk in amounts that present an unacceptable health risk to the consumer or adversely affect the suitability of milk and milk products

It has been shown that improper procurement, manufacturing and handling of animal feed can result in the introduction of chemical hazards such as pesticides residues, mycotoxins and of other contaminants which can affect the safety and suitability of milk or milk products.

Source: Codex Code of Hygiene Practice for Milk and Milk Products (CAC/RCP 57-2004)

should be based on the Codex Principles for Risk Analysis[5]. The risk assessment of microbiological and chemical hazards in feed and feed ingredients should be developed considering relevant Codex texts such as: the Principles and Guidelines for the Conduct of Microbiological Risk Assessment[6]; the Risk Analysis Principles applied by the Codex Committee on Pesticide Residues; the Risk Analysis Principles applied by the Codex Committee on Residues of Veterinary Drugs in Foods; and the Risk Analysis Principles applied by the Codex Committee on

BOX 3

Prevent introducing health hazards (eggs and eggs products)

Feed for the laying and/or breeding flock should not introduce, directly or indirectly, microbiological or chemical contaminants into eggs that present an unacceptable health risk to the consumer or adversely affect the suitability of eggs and egg products.

The improper procurement, manufacturing and handling of animal feed may result in the introduction of pathogens and spoilage organisms to the breeding and laying flock and the introduction of chemical hazards, such as pesticides residues and other contaminants, which can affect the safety and suitability of eggs and egg products.

Producers should take care where appropriate, during production, transportation, preparation, processing, procurement, storage, and delivery of feed to reduce the likehood of introducing hazards into the production system.

- To minimize the risk associated with hazards in the feed, good purchasing practices for feed and feed ingredients should be employed. This may include using vendor assurances, contractual agreements and/or purchasing batches of feed that have had microbiological and chemical analysis and are accompanied by certificates of analysis.
- Feed should be managed so that it does not become mouldy or contaminated from waste including faeces.
- As feed can be a source of contamination, heat or other treatment of feed to reduce or eliminate pathogens including Salmonella should be considered.
- When the egg producer processes their own feed, information should be kept about its composition, the origin of the ingredients, relevant processing parameters and where practicable, the results of any analyses of the finished feed.
- The owner should keep a record of relevant information concerning feed.

Source: Codex Code of Hygiene Practice for Eggs and Egg Products (CAC/RCP 15-1976)

BOX 4

Rationale of traceability/product tracing

The application of a traceability/product tracing tool by a competent authority should improve the effectiveness and/or efficiency of the actions that may be necessary regarding its measures or requirements within its food inspection and certification system.

Traceability/product tracing is a tool that when applied in a food safety context does not in itself improve food safety outcomes unless it is combined with appropriate measures and requirements. It can contribute to the effectiveness and/or efficiency of associated food safety measures[1].

Traceability/product tracing is a tool that when applied in a food inspection and certification system can contribute to the protection of consumers against deceptive marketing practices and facilitation of trade on the basis of accurate product description[2].

In every case a traceability/product tracing tool should be justified within the context of the food inspection and certification system and the purpose, objectives and specifications of the traceability/product tracing tool clearly described. The scope and extent of application of the tool should also be consistent with the described need.

Source: Codex Principles for Traceability/Product Tracing as a tool within a Food Inspection and Certifications System (CAC/GL 60-2006)

[1]For example, by providing information on suppliers or customers involved in potential food safety issues so enabling targeted product recall/withdrawal.

[2]For example, by reinforcing confidence in the authenticity of the product and the accuracy of information provided on the products (e.g. country of origin, organic farming, religious concerns such as kosher or halal). Box 4

Food Additives and the Codex Committee on Contaminants in Foods[7].

Information should be provided in order to ensure that feed and feed ingredients are appropriately used and stored thus avoiding the introduction of food hazards in the food chain. Feed ingredients users should be sure that ingredients they purchased for feed are free from contamination which would not ordinarily be removed by processing.

Product information allows for:

- the minimization of losses through the establishment of efficient recall procedures;
- better quality and process control due to availability of information on raw materials;
- unnecessary repetition of measurements in two or more successive steps;
- possibility of correlating product data with raw material characteristics and processing data;
- better planning to optimize the use of raw material for each product type;
- avoidance of uneconomic mixing of high and low quality raw materials;
- ease of information retrieval in quality management audits.

Ingredient specification is of great importance for the conducting of the quality and safety assurance programme. Specifications are the basis for the agreements with suppliers, for the formulation of feeds, for the hazard analysis and the controls derived thereafter.

Purchasers should evaluate suppliers based on their ability to supply products in accordance with pre-established specifications. Purchasing specifications should be established to clearly define the product or service to be ordered and may utilize official ingredient definitions.

Suppliers can be evaluated through supplier visits, supplier certification, purchase contracts, monitoring of the ingredient supplied and a combination thereof.

Worldwide, there are many different systems used by the feed industry to assure the safety and quality of the various feed ingredients. Some countries have negative lists, lists of ingredients that can be used under limitations, exclusion lists for ingredients and their amounts, positive lists that include ingredients that can be used according to limitations or intended uses.

Ongoing sampling of feed ingredients should be carried out to be certain that quality and safety standards are met. Testing for any suspected contaminants, plus a constant effort at good housekeeping, will minimize health problems attributable to animal feeding. Any feed ingredient suspected of possible contamination should not be used in the production of animal feed, unless through proper sampling and testing, it is found to be appropriate for the species and class of animal it is intended.

BOX 5

Design of traceability/product tracing

The traceability/product tracing tool may apply to all or specified stages of the food chain (from production[1] to distribution), as appropriate to the objectives of the food inspection and certification system.

The traceability/product tracing tool should be able to identify at any specified stage of the food chain (from production to distribution) from where the food came (one step back) and to where the food went (one step forward), as appropriate to the objectives of the food inspection and certification system.

The objectives, scope and related procedures of a food inspection and certification system that includes a traceability/product tracing tool should be transparent and made available to competent authorities of the exporting country upon request.

Source: Codex Principles for Traceability/Product Tracing as a tool within a Food Inspection and Certifications System (CAC/GL 60-2006)

[1]Production can be interpreted in such a broad manner as to cover food producing animals, feed, fertilizers, pesticides, veterinary drugs and any input of plant or animal origin, etc. if relevant for the specific applications of traceability/product tracing to food.

[5] FAO/WHO. Codex Alimentarius Comission Procedural Manual, Rome (ftp://ftp.fao.org/codex/Publications/ProcManuals/Manual_16e.pdf).

[6] FAO/WHO. 2001. Principles and guidelines for the conduct of microbiological risk assessment. Food and Nutrition/Codex Alimentarius – Joint FAO/WHO Food Standards Programme, Rome. (http://www.codexalimentarius.net/download/standards/357/CXG_030e.pdf).

[7] FAO/WHO. Codex Alimentarius principles for risk analysis (Procedural Manual of the Codex Alimentarius Commission). Joint FAO/WHO Food Standards Programme. Rome.

LABELING

Product labeling should provide the users with all necessary information to properly handle, store and use the feed and feed ingredients, in order to prevent health hazards entering the food chain. It is important that users are adequately trained to fully understand and appropriately use labeling information.

Information on feed ingredients and purpose enable users to meet animals' dietary requirements according to their productive and physiological needs.

Labeling information on species and categories of animals for which the feed is intended is necessary because the risk to human health may change when certain feed or feed ingredients are fed to different species or categories of animal (e.g. mammalian proteins when fed to ruminants).

Insufficient product information, and/or inadequate knowledge of general feed and food hygiene, can lead products to being mishandled at later stages in the food chain. Such misleading can result in feed contamination or products becoming unsuitable for consumption, even where adequate hygiene control measures have been taken earlier in the feed chain.

All labeling information on source of feed and feed ingredients (e.g. manufacturers, lot identification, manufacturing date, etc.) are essential for record keeping, traceability/product tracing and products recall, as necessary. These information may also help effective stock rotation. Correct labeling will assure correct information to be supplied to working inventories, packaging and other records.

Medicated feed labeling will require specific information on the active drug ingredients, species and class of animals for which the feed is intended, purpose or indications of use, warning and caution statements. Warning statements include the withdrawal times and other statements related to protection of human health. Caution statements are related to animal safety or drug stability and misuse of the medicated feed.

TRACEABILITY/PRODUCT TRACING AND RECORD KEEPING OF FEED AND FEED INGREDIENTS

Traceability/product tracing is a tool that may be applied in a feed and food chain, when and as appropriate, to contribute to the protection of human health against food borne hazards and deceptive marketing practices, and the facilitation of trade on the basis of accurate product description. (Boxes 4 and 5)

Traceability/product tracing ensures it is possible to identify at any stage of the feed and food chain, where the product (feed or food) came from and to where it has gone. This would allow the creation of a set of historical data to trace a product throughout the production chain.

Traceability/product tracing is enabled by appropriate record keeping procedures that show the path of a particular product or ingredient from suppliers into the business, through all intermediate steps which process and combine ingredients into new products and through the supply chain to customers.

Traceability/product tracing is based on the ability to identify a specific product at any point of the feed and food chain. Throughout the feed and food chain, new identities are constantly created as ingredients are combined in recipes, goods are bulked up for delivery, and/or large batches split to a number of destinations. Traceability requires that the batch can be identified and that this identification gives the links to the product history. Additional information may be carried e.g. information on processing efficiencies to be calculated for manufacturing systems, information concerning ingredient quality or origin. The amount and type of information can be extended as required by the system, and it may be carried for only part of, or throughout the whole food chain.

Traceability/product tracing may be used in investigation of non conformities and in support of a withdrawal or recall of products, when necessary.

SPECIAL CONDITIONS APPLICABLE TO EMERGENCY SITUATIONS

When a feed emergency arises, timely communication of the nature and extent of the safety problem to all relevant parties is essential to minimize potential adverse public health effects. Experience has shown that information about feed and food safety emergencies must be integrated in a single system in order to ensure food safety. Such system should have criteria for the identification of emergency situations.

The competent authorities should identify the source of the hazard (e.g. contamination) and, once the source is identified, take appropriate measures where possible, to reduce or eliminate the source. In emergency situations, traceabi-

lity/product tracing is an important tool for the prompt identification of the source of hazards (Box 6).

INSPECTION AND CONTROL PROCEDURES

The production of safe and quality feed and feed ingredients is a shared responsibility of feed operators and competent authorities. Feed safety and quality rely on effective control procedures and feed inspection programmes, implemented by both feed operators and competent authorities. The confidence of feed users, in the quality and safety of their supply, and ultimately of consumers in the quality and safety of the food, depends in part on their perception as to the effectiveness of control measures.

Self-control programmes assist feed operators to comply with applicable regulatory standards and other requirements (e.g. specifications defined by the manufacturer or purchasers). Self-control programmes should encompass incoming feed, finished feed and intermediates. Self control programmes may include: physical inspections, sampling procedures, chemical and microbiological analyses, actions in case of non compliance, responsibilities of the staff involved in the production and feed safety control, etc. (Box 7).

Competent authorities are responsible to carry out regulatory feed inspection to verify compliance with statutory requirements. Surveillance inspections are conducted to determine whether a firm is substantially in compliance with the regulations. Compliance inspections are conducted to evaluate a firm's compliance with the provisions of the regulations and to document inspectional observations supporting possible enforcement action. Utilizing a scientific- and

BOX 6

Principles for the Exchange of Information in Food Safety Emergency Situations

In the event that a feed or food emergency is identified, the exchange of information should take into account:

- Its nature and extent, where possible, described clearly and completely by the relevant competent authorities;
- The exchange of information on safety emergencies to be conducted between official contact points designated by the competent authorities;
- The information to all known affected and potentially affected countries without delay by the country that detected the safety emergency situation, whether it is an importing or exporting country;
- The sharing of information by competent authorities detecting a food safety emergency to enable all affected and potentially affected countries to make informed risk management and/or risk communication decisions;
- The availability and provision of clear, relevant, factual and timely information to all stakeholders to the extent possible;
- Flow of the information that should be transparent and continue during all phases of the emergency situation to enable continuous evaluation and development of the emergency response.

Source: Codex Principles and Guidelines for the Exchange of Information in Food Safety Emergency Situations (CAC/GL 19-1995)

BOX 7

Quality assurance

The voluntary utilization of quality assurance by food businesses should also be encouraged in order to achieve greater confidence in the quality of products obtained. If safety and/or quality assurance tools are used by food businesses, the official inspection and certification systems should take them into account in particular through the adaptation of their control methodologies.

Governments do, however, retain the fundamental responsibility to ensure by official inspection and certification1 the conformity of foodstuffs to requirements.

The degree to which industry effectively utilizes quality assurance procedures can influence the methods and procedures by which government services verify that requirements have been met, where official authorities consider such procedures to be relevant to their requirements.

Source: Codex Guidelines for the Design, Operation, Assessment and Accreditation of Food Import and Export Inspection and Certification Systems (CAC/GL 26-1997)

[1] For the purpose of these guidelines, "inspection and certification" means "inspection and/or certification.

BOX 8

Inspection and risk analysis

Consistent and transparent application of risk analysis will facilitate international trade by increasing confidence in the food safety and in the inspection systems of trading partners. It will also enable inspection resources to be targeted effectively on hazards to public health arising at any stage of the food production and distribution chain.

The principles of Hazard Analysis Critical Control Point (HACCP) developed by the Codex Committee on Food Hygiene[1] provide a systematic basis for the identification and control of hazards so as to ensure the safety of food. The use of a HACCP approach by food businesses should be recognized by governments as a fundamental tool for improving the safety of foodstuffs.

Source: Codex Guidelines for the Design, Operation, Assessment and Accreditation of Food Import and Export Inspection and Certification Systems (CAC/GL 26-1997)

[1]Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application, Annex to the Recommended International Code of Practice - General Principles of Food Hygiene (CAC/RCP 1 -1969).

risk-based approach will improve the ability to prioritize and allocate inspection resources by targeting firms, facilities, products and processes posing the greatest risks to animal or human health (Box 8).

The frequency and intensity of controls by inspection systems should be designed to take account of risk and the reliability of controls already carried out by those handling the products including producers, manufacturers, importers, exporters and distributors.

The nature and frequency of inspection, sampling and testing should be based on the risk to human health and safety presented by the product, its origins and the history of conformance to requirements and other relevant information. Control should be designed to account for factors such as: the risk to human health posed by the product; the likelihood of non-compliance with requirements; history of conformity of producers, processors, manufacturers, exporters, importers and distributors.

Laboratory testing is an important part of any quality control and quality assurance programme. This is the process of measuring specific components of a feed or ingredient sample to assure that it meets quality specifications. Tests involve measurements of biological, chemical, and physical properties to assess the quality of a product in comparison to a predetermined standard.

Health hazards associated with animal feed

Food safety hazards associated with animal feed can be biological, chemical, or physical. Each hazard is associated with particular sources and routes of contamination and exposure. Hazards may be introduced with source materials or via carryover or contamination of products during handling, storage and transportation. The presence of a hazard may also result from accidental or deliberate (e.g. fraud or bioterrorism) human intervention. Examples of hazards in foods that can be linked to feed and have long been recognized include: mycotoxins, unacceptable residues levels of veterinary drugs and agriculture and industrial chemicals (e.g. dioxins) and pathogens (e.g. the causative agent of bovine spongiform encephalopathy).

Feed additives and veterinary drugs used in medicated feed

Medicated feed is any mixture of a veterinary drug(s) and feed(s) which is ready prepared for marketing and intended to be fed to animals without further processing, because of its curative or preventive properties or other properties as a medicinal product. Premix for medicated feeds (medicated premixtures) are veterinary drugs prepared in advance with a view to the subsequent manufacture of medicated feeds.

Veterinary drugs may be a potential risk for food safety and should be used according to good practice in the use of veterinary drugs (Box 9).

Antimicrobial drugs are powerful tools for the management of infectious diseases in animals and humans. It is essential that all countries put in place the appropriate systems to ensure that veterinary antimicrobial drugs are manufactured, marketed, distributed, prescribed and used responsibly, and that these systems are adequately audited (Box 11).

Codex maximum residue limits (MRLs) for veterinary drugs in food can be found in the Codex on-line database on MRLs for veterinary drugs on

Codex website: http://www.codexalimentarius.net/mrls/vetdrugs/jsp/vetd_q-e.jsp.

Feed additives are used in feed for different purposes, e.g. to increase the digestibility; to improve the organoleptic and physical characteristics; to improve palatability; to extend shelf-life; to prevent deterioration; to affect the characteristic of certain products of animal origin (e.g. salmoned trouts and egg yolk colour); etc. Certain substances, such as microorganisms, enzymes, vitamins, etc. may be classified as feed additives according to their purpose of use and methods of administration.

Feed additives should be assessed for safety and produced and used according to relevant regulations and manufacturing instructions.

Feed and feed ingredients

Feed, feed ingredients and forage may be the source of contamination for food producing animals. Chemical and biological substances, that can be intentionally or unintentionally incorporated into feed in different stages of the feed production chain and fed to the animals, may result in hazards in foods of animal origin.

To prevent hazardous effects due to contamination or deterioration, feed and feed ingredients should be obtained from reliable sources, preserved in stable conditions and appropriately handled. When produced or received, feed and feed ingredients should be in good condition and comply with relevant safety and quality standards. It is important that all levels of undesirable substances are sufficiently low in feed and feed ingredients so that their concentration in food for human consumption is consistently below the level of concern.

Where food-borne hazards originate in feed, they should be adequately controlled. Quality assurance is applicable to all stages of production to ensure the safety of the consumer. Manufacturers should provide adequate information to enable the quality and safety of feed to be maintained after delivery.

Controls throughout the all production process to identify potential associated hazards to human health should be carried out. These controls should protect incoming and finished feed from contamination. Feed and feed ingredients contaminated with unacceptable levels of undesirable substances

BOX 9

Good Practice in the Use of Veterinary Drugs (GPVD) is the official recommended or authorized usage including withdrawal periods, approved by national authorities, of veterinary drugs under practical conditions.

Source: Codex Alimentarius Commission – Procedural Manual

Residues of veterinary drugs can be present in feed when ingredients of animal origin (terrestrial and aquatic) are used, and may be found in food products as a result of the carry over of veterinary drugs in feed during feed production.

Competent authorities should control the use of veterinary drugs and verify that appropriate practices are being applied and effective measures are in place within the veterinary drugs distribution and feed and food production systems in order to provide effective protection of human health and to facilitate food trade.

Producers should only use veterinary drugs which have been approved for use in food producing animals. Non-approved veterinary drugs should not be used. Veterinary drugs should be used in accordance with the officially approved/recognized instructions (Box 10).

BOX 10

Codex maximum limit for residues of veterinary drugs (MRLVD) is the maximum concentration of residue resulting from the use of a veterinary drug (expressed in mg/kg or µg/kg on a fresh weight basis) that is recommended by the Codex Alimentarius Commission to be legally permitted or recognized as acceptable in or on a food.

It is based on the type and amount of residue considered to be without any toxicological hazard for human health as expressed by the Acceptable Daily Intake (ADI), or on the basis of a temporary ADI that utilizes an additional safety factor. It also takes into account other relevant public health risks as well as food technological aspects.

When establishing an MRL, consideration is also given to residues that occur in food of plant origin and/or the environment. Furthermore, the MRL may be reduced to be consistent with good practices in the use of veterinary drugs and to the extent that practical analytical methods are available.

Source: Codex Alimentarius Commission – Procedural Manual

BOX 11

Responsible use of veterinary antimicrobial drugs in food-producing animals

The responsible use of veterinary antimicrobial drugs in food-producing animals:

- is controlled by the veterinary profession or other parties with the required expertise.
- is part of good veterinary and good animal husbandry practice and takes into consideration disease prevention practices such as the use of vaccination and improvements in husbandry conditions.
- aims to limit the use of veterinary antimicrobial drugs according to their approved and intended uses, and takes into consideration on-farm sampling and testing of isolates from food-producing animals during their production, where appropriate, and makes adjustments to treatment when problems become evident.
- should be based on the results of resistance surveillance and monitoring (microbial cultures and antimicrobial sensitivity testing), as well as clinical experience.
- does not include the use for growth promotion of veterinary antimicrobial drugs that belong to or are able to cause cross resistance to classes of antimicrobial agents used (or submitted for approval) in humans in the absence of a risk analysis. This risk analysis should:
  - be undertaken by the appropriate national regulatory authority;
  - be based on adequate scientific evidence;.
  - focus on the potential to impact resistance to antimicrobials used in human medicine.
- is aimed at all the relevant parties, such as:
  - regulatory and scientific authorities;
  - the veterinary pharmaceutical industry;
  - distributors and others handling veterinary antimicrobial drugs;
  - veterinarians, pharmacists and producers of food-producing animals.

Source: Codex Code of Practice to Minimize and Contain Antimicrobial Resistance (CAC/RCP 61-2005)

should be clearly identified as unsuitable for animal feed and not be marketed or used.

Intake points, processing equipments, conveying systems and storage facilities should be designed and operated to minimize the possibility of contamination.

Undesirable substances

Undesirable substances include, among others, pathogens, mycotoxins, pesticides, agricultural and industrial chemicals, heavy metals and radionuclides. Undesirable substances that may be present in feed and feed ingredients should be identified, controlled and minimized. Undesirable substance should be reduced to acceptable levels that do not cause harmful or undesirable effects. The methods for determining residues of undesirable substances are becoming increasingly sophisticated, so that even quantities of residues which are negligible for animal and human health can be detected.