EDES

SAFE FOOD IN ACP
A PROGRAMME FUNDED BY THE EU

HANDBOOK 12.6

TOPIC 12
Official Controls

6

Surveillance and control plans in food of animal origin

COLEACP

The handbooks are tools designed for civil servants in charge of restructuring the food safety system, and for all operators involved in drawing up the food safety policy and organising official controls (qualified civil servants, heads of laboratories, heads of departments in official organisations, those in charge of official controls, trainers, technicians, researchers, experts or company executives). They aim to provide an overview of the main points of a specific subject. All of the topics addressed by EDES during the training sessions are covered in separate handbooks.

The handbooks have been designed and drawn up by the EDES Training Unit in cooperation with the Consortium members.

Ecole Nationale des Services Vétérinaires

fera The Food and Environment Research Agency

France Vétérinaire International

Ministère de l'Agriculture et de l'Agroalimentaire

Natural Resources Institute

anses French agency for food, environmental and occupational health safety

DTU Food National Food Institute

cirad

EDES is a European cooperation programme managed by COLEACP. COLEACP is an international network promoting sustainable horticultural trade. It is funded by the European Union and was implemented at the request of the ACP (African, Caribbean and Pacific) Group of States. EDES aims to promote food safety in African, Caribbean and Pacific countries. EDES operates in all sectors in response to a request filed at national level by any public or private stakeholder involved in the food safety process.

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SURVEILLANCE AND CONTROL PLANS IN FOOD OF ANIMAL ORIGIN

Content

1. Introduction

Food-borne disease remains a real and formidable problem in both developed and developing countries, causing great human suffering and significant economic losses. Up to one third of the population of developed countries may be affected by food-borne diseases each year, and the problem is likely to be even more widespread in developing countries, where food and water-borne diarrhoeal diseases kill an estimated 2.2 million people each year, most of them children. Chemical hazards in foods occasionally cause acute illnesses, and some food additives, residues of pesticides and veterinary drugs, and environmental contaminants may pose risks of long-term adverse effects on public health.

Food safety is an issue of increasing concern worldwide and prioritisation of food safety as an essential public health function was advocated recently by the World Health Assembly. Better monitoring and surveillance demonstrates that the main burden of food-borne disease is due to microbiological pathogens of animal origin and this has important implications at both the international and the national level.

The possibility of chemical residues in food is also causing growing anxiety amongst consumers. The contamination of food by chemical hazards is a worldwide public health concern and is a leading cause of trade problems internationally. Contamination may occur through environmental pollution of the air, water and soil, such as the case with toxic metals, PCBs and dioxins, or through the intentional use of various chemicals, such as pesticides, animal drugs and other agrochemicals.

2. Food-borne hazards

Hazards in food of animal origin can be categorised as biological, chemical or physical.

2.1. Biological hazards

The table below provides examples of biological hazards.

Bacteria	*Salmonella*, *Campylobacter*, verotoxigenic *E. coli*, *Yersinia*, *Mycobacterium bovis*, *Brucella melitensis*
Bacterial toxins	Staphylococcal toxins
Viruses	Norovirus
Parasites	*Trichinella*, *Taenia*, *Toxoplasma*
Prions	BSE/Variant CJD

Most biological hazards in food of animal origin are zoonotic – agents that are naturally transmissible between animals and humans. The nature of measures that are applied to the control of zoonotic disease agents is dependent on their epidemiology and mode of transmission between animals and man. Zoonotic agents can be grouped under the following headings:

- agents that cause disease in both animals and humans e.g. *M. bovis*, *Brucella melitensis.*
  M. bovis causes lesions of tuberculosis in animals and is transmissible by the food-borne route e.g. milk to cause tuberculosis in humans;
- agents that cause disease in humans but do not cause clinical disease in animals e.g. *Campylobacter*, verotoxigenic *E. coli.*
  Campylobacter is carried asymptomatically in the intestines of poultry and other animals, is transmitted to humans on contaminated food and causes enteric diseases in humans;
- agents that are not transmissible through the consumption of food of animal origin e.g. fascioliasis. Fascioliasis causes disease in cattle and sheep by the migration of larvae through the liver and the presence of mature flukes in the bile ducts. Fascioliasis is a common finding at meat inspection in temperate countries. Humans can become infested with fluke, but transmission is by the ingestion of larvae on plant materials; the consumption of meat or other products from animals infested with fluke presents no direct hazard to human health.

A further differentiation of biological food-borne hazards is between those that multiply in or on food of animal origin, such as *Campylobacter* and *Salmonella*, and those that do not multiply e.g. tapeworm cysts.

Antimicrobial resistance is becoming a cause of major concern worldwide. There is debate about the relative importance in the development of resistance of the use of antimicrobials in humans and animal, but there is no doubt that the use of an antimicrobial agent in any species exerts selection pressure for resistance. The use of antimicrobials in animals can present a hazard for human health through the development of resistance in zoonotic organisms pathogenic to man, or the selection of commensal organisms with transmissible resistance factors; both types of organism can then be passed to humans through contaminated food.

2.2. Chemical hazards

Animals can be exposed to a wide range of chemicals, either intentionally or unintentionally, which may be present in their products and tissues and pose a hazard to human health through the consumption of animal products or meat.

Types of chemical hazards in animal production include:

- Naturally occurring contaminants from the environment (e.g. heavy metals)
- Naturally occurring feed contaminants (e.g. mycotoxins)
- Industrial contaminants (e.g. dioxins)
- Pesticides and other agrochemicals
- Residues of veterinary medicines
- Radionuclides.

Food can also contain chemicals introduced during the harvest or post-harvest phase of the food chain e.g. processing chemicals (including cleaning agents), food contact materials, food additives.

Chemicals may also be added to food for fraudulent reasons. A notable example of this is the addition of melamine to milk to increase the apparent protein content[1].

2.3. Physical hazards

Examples of physical hazards in food of animal origin include broken injection needles, shot used to shoot wild animals, metal parts and fragments from processing equipments.

2.4. Codex Alimentarius Commission (CAC)

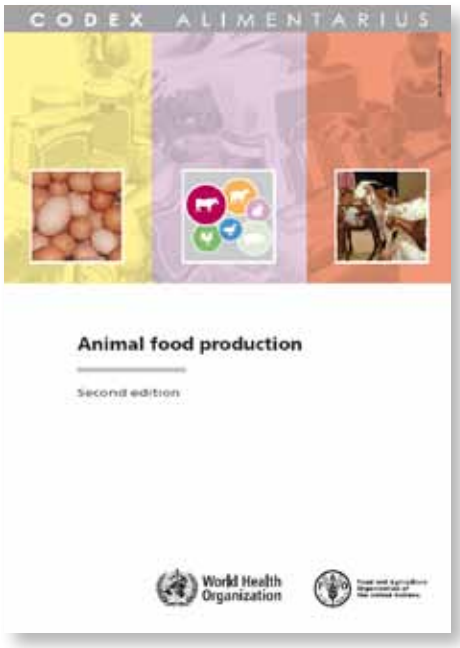
Most international trade, including trade in food and trade between the EU and other countries, is governed by the World Trade Association (WTO) Agreement on Sanitary and Phytosanitary Measures (SPS Agreement). The SPS Agreement requires trade to be based on international standards; in the case of food the international standard is the Codex Alimentarius Commission.

The Codex Alimentarius Commission, established by FAO and WHO in 1963 develops harmonised international food standards, guidelines and codes of practice to protect the health of the consumers and ensure fair trade practices in the food trade. The Commission also promotes coordination of all food standards work undertaken by international governmental and non-governmental organizations.

Codex Alimentarius Commission (CAC) elaborates standards and related texts for both safety and suitability aspects of food control. CAC has primarily addressed biological hazards in food by developing general hygiene provisions e.g. codes of practice for different food commodities, as well as addressing chemical hazards by establishing maximum limits and codes of practice for the reduction of levels of chemical hazards.

1 Emerging food safety risks: Melamine-tainted milk in China
http://www.irgc.org/IMG/pdf/Emerging_risks_Melamine.pdf

CAC codes are published under general themes:



Sources:
ftp://ftp.fao.org/codex/Publications/Booklets/Hygiene/FoodHygiene_2009e.pdf
ftp://ftp.fao.org/codex/Publications/Booklets/Animal/Animal_Food_Prod_EN.pdf

and for specific commodities:


CODE OF HYGIENIC PRACTICE FOR MEAT


CODE OF HYGIENIC PRACTICE FOR EGGS AND EGG PRODUCTS
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Sources:
http://www.codexalimentarius.org/download/standards/10196/CXP_058e.pdf
http://www.codexalimentarius.org/download/standards/73/CXP_015e.pdf

CAC guides and standards can be found on its website: http://www.codexalimentarius.org/codex-home/en/.

3. Principles of food safety

Historically, food control systems were based on sampling and testing of end products but this is now recognised as ineffective in controlling the range of food-borne hazards of concern now. There is international consensus that the modern approach to food safety controls is to apply preventative measures throughout the production chain to minimise the occurrence of food safety problems. This approach is enshrined in the SPS Agreement and CAC texts, and comprises three main principles:

- Food safety controls should be based on an assessment of risk.
- Control measures should be applied throughout the food production chain.
- Food producers have responsibility for the safe production of food.

3.1. Risk-based food safety controls

Approaches to food safety have evolved internationally in recent years away from traditional controls based on good practices and end-product testing towards a preventative approach that aims to eliminate or control food safety hazards at source. This approach has led to the development of systems based on the analysis of risks posed by the presence of hazards in food. Internationally, risk-based systems have been driven by the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (the "SPS Agreement"). This Agreement requires signatory countries to ensure that their sanitary and phytosanitary measures are based on an assessment of the risks to human, animal or plant life or health, taking into account risk assessment techniques developed by relevant international organizations. Risk assessment is the scientific component of risk analysis and should be functionally separated from risk management, which draws upon the outcome of risk assessment to consider and select strategies and policy options for food safety, to avoid interference from economic, political or other interests.

3.2. The food production chain

An important component of the risk-based approach is its application to the entire food production chain, from 'production to consumption'. Food safety can be best delivered by an integrated approach that covers the entire production chain and identifies the most effective points in the chain where interventions can be applied to eliminate or reduce food safety hazards.

For food of animal origin, the production chain can be divided into three main categories: pre-harvest – live animal level in primary production on farm; harvest e.g. slaughter and processing at the abattoir; post-harvest – further processing of products e.g. production of meat and milk products.

The control of many food-borne microbiological hazards and most chemical hazards requires preventative actions to be taken at the pre-harvest level in primary production – on the farm.

3.3. Responsibilities for food safety

The traditional approach, where food operators were primarily held responsible for food quality while regulatory agencies were charged with assuring food safety, has been replaced by more sophisticated systems that give food operators, including primary producers, responsibility for the safety of the foods they place on the market.

The internationally recognised method for food business operators to fulfil their responsibilities, and the method recommended by CAC in its general tests on food safety, is the application of food safety management systems based on the principles of Hazard Analysis Critical Control Point (HACCP).

The role of government authorities and inspection services is to analyse scientific information as a basis to develop appropriate food safety standards (both processing and end product standards) and verification inspections to ensure that the control systems used by food operators are appropriate, validated, effective and operated in such a way that the standards are met. In the event of non-compliance, regulatory agencies are responsible to ensure that appropriate corrective actions are taken and sanctions are applied.

4. Food safety risk analysis

Risk analysis must occur in a context and, to be done effectively, requires a formal process. In a typical instance, a food safety problem or issue is identified and risk managers initiate a risk management process, which they then see through to completion. This is best accomplished within a systematic, consistent and readily-understood framework in which scientific knowledge on risk and evaluations of other factors relevant to public health protection are used to select and implement appropriate control measures. The responsibilities of risk managers during this process also include commissioning a risk assessment when one is needed, and making sure that risk communication occurs wherever necessary.

Listed below are some of the factors that should be considered when addressing a food safety risk analysis:

- Initial statement of the food safety issue
- Description of the hazard and food(s) involved
- How and where the hazard enters the food supply
- Which foods expose consumers to the hazard and how much of those foods are consumed by various populations
- Frequency, distribution and levels of occurrence of the hazard in foods
- Identification of possible risks from the available scientific literature
- Nature of values at risk (human health, economic, cultural, etc.)
- Distribution of the risk (who produces, benefits from, and/or bears the risk)
- Characteristics of the commodity/hazard that might affect the availability and feasibility of risk management options
- Current risk management practices relevant to the issue, including any regulatory standards in place
- Public perceptions of the possible risks
- Information about possible risk management (control) measures
- Preliminary indication of questions that a risk assessment could (and could not) be expected to answer
- Preliminary identification of important scientific data gaps that may prevent or limit a risk assessment
- Implications of risk management in terms of international agreements (e.g. SPS Agreement).

At the national level risk analysis is used to develop an estimate of the risks to human health and safety, to identify and implement appropriate measures to control the risks, and to communicate with stakeholders about the risks and measures applied. It can be used to support and improve the development of standards, as well as to address food safety issues that result from emerging hazards or breakdowns in food control systems. It provides food safety regulators with the information and evidence they need for effective decision-making, contributing to better food safety outcomes and improvements in public health. Regardless of the institutional context, the discipline of risk analysis offers a tool that all food safety authorities can use to make significant gains in food safety.

Risk analysis can be used to obtain information and evidence on the level of risk of a certain contaminant in the food supply helping governments to decide which, if any, actions should be taken in response (e.g. setting or revising a maximum limit for that contaminant, increasing testing frequency, review of labelling requirements, provision of advice to a specific population subgroup, issuing a product recall and/or a ban on imports of the product in question). Furthermore, the process of conducting a risk analysis enables authorities to identify the various points of control along the food chain at which measures could be applied, to weigh up the costs and benefits of these different options, and to determine the most effective one(s). As such, it offers a framework to consider the likely impact of the possible measures (including on particular groups such as a food industry subsector) and contributes towards enhanced utilization of public resources by focusing on the highest food safety risks.

Risk analysis is comprised of three components: risk management, risk assessment and risk communication. Each of these components has been applied in essentially all countries for a long time, even before they came to be called by these names. In recent years the three components have been formalized, refined and integrated into a unified discipline, developed at both the national and international levels, and now known as "risk analysis".

Risk analysis represents a structured decision-making process with three distinct but closely connected components: risk assessment, risk management and risk communication. In the course of a typical food safety risk analysis, almost constant interactions occur between risk managers and risk assessors within an environment characterized by risk communication. Risk analysis is most effective when all three components are successfully integrated by the risk managers directing the process.

The three main components of risk analysis have been defined by Codex as follows:

- **Risk assessment:** a scientifically based process consisting of the following steps: i) hazard identification; ii) hazard characterization; iii) exposure assessment; and iv) risk characterization.
- **Risk management:** the process, distinct from risk assessment, of weighing policy alternatives in consultation with all interested parties, considering risk assessment and other factors relevant for the health protection of consumers and for the promotion of fair trade practices, and, if needed, selecting appropriate prevention and control options.
- **Risk communication:** the interactive exchange of information and opinions throughout the risk analysis process concerning risk, risk-related factors and risk perceptions, among risk assessors, risk managers, consumers, industry, the academic community and other interested parties, including the explanation of risk assessment findings and the basis of risk management decisions.

Risk assessment is considered to be the "science-based" component of risk analysis, while risk management is the component in which scientific information and other factors, such as economic, social, cultural and ethical considerations, are integrated and weighed in choosing the preferred risk management options. In fact, risk assessment may also involve judgments and choices that are not entirely scientific, and risk managers need a sound understanding of scientific approaches used by risk assessors. The interactions and overlaps of science and non-scientific values at various stages in risk analysis will be explored in more detail in subsequent chapters concerned with risk management and risk assessment.

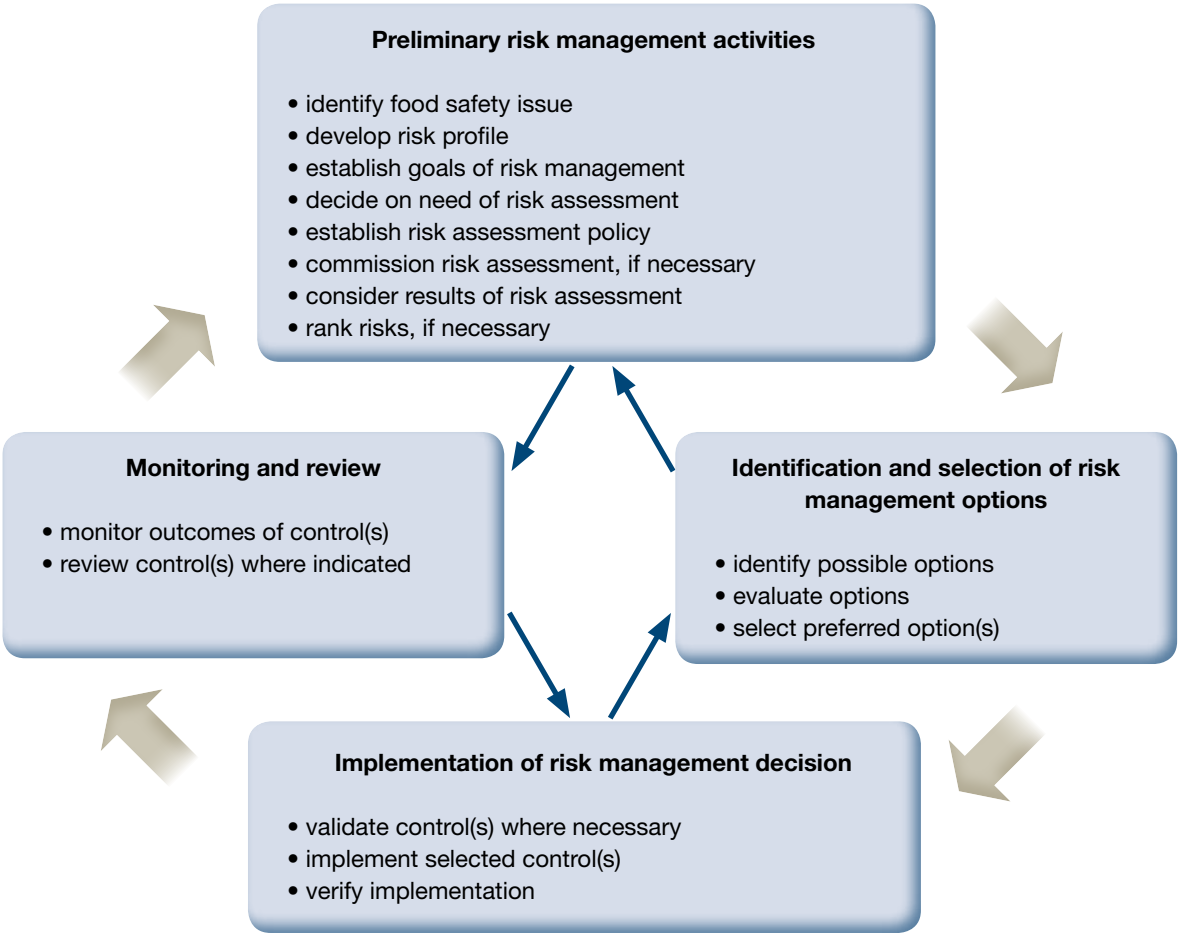
National food safety authorities are generally responsible for carrying out risk analysis in its entirety. Some governments have their own institutions and infrastructure for conducting risk assessments, choosing among risk management options, implementing and enforcing decisions, and monitoring and reviewing the impacts of decisions. Other countries may have fewer resources available to carry out risk analysis tasks. In such cases, and even where governments have their own capacities, components of risk analysis carried out at the international level can be very usefully applied in the national context.

International risk assessments done by the Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment (JEMRA[2]) or the Joint FAO/WHO Meeting on Pesticide Residues (JMPR[3]), for instance, can be partially or fully applied at the national level depending on particular circumstances. Similarly, international guidance on risk management for a particular hazard can identify an array of potential control options for national risk managers to consider in their own food control setting.

Risk management consists of identifying and evaluating a variety of possible options for managing (e.g. controlling, preventing, reducing, eliminating or in some other manner mitigating) the risk. Effective communication is a prerequisite for success, as information from and opinions of affected stakeholders, particularly industry and consumers, are valuable inputs to the decision-making process. Weighing the results of the risk assessment as well as any economic, legal, ethical, environmental, social and political factors associated with the risk-mitigating measures that might be implemented can be a complex task. Economic evaluation of possible risk management interventions enables risk managers to examine the health impacts and feasibility of a proposed intervention relative to its cost. An open and participatory process helps ensure that the final decision is understood and widely supported by those affected by it.

2 http://www.fao.org/food/food-safety-quality/scientific-advice/jemra/en/
3 http://www.who.int/foodsafety/chem/jmpr/publications/en/index.html

A generic process for carrying out risk management is presented in the diagram below.



Source: Food safety risk analysis. A guide for national food safety authorities ftp://ftp.fao.org/docrep/fao/009/a0822e/a0822e00.pdf

Further detailed information about food safety risk analysis can be found in CAC and FAO texts[4].

4 http://www.codexalimentarius.org/standards/list-of-standards/en/ ftp://ftp.fao.org/docrep/fao/009/a0822e/a0822e00.pdf

5. Pre-harvest food safety controls

5.1. General controls

Many food safety hazards of food of animal origin can be controlled by the application of good practices in the pre-harvest production phase – live animals on farm.

5.1.1. Animal identification and traceability

Animal identification and traceability systems are essential tools for addressing food safety and to support management of animals. These tools may significantly improve the effectiveness of activities such as: the management of disease outbreaks and food safety incidents, vaccination programmes, herd/flock husbandry, surveillance, early response and notification systems, animal movement controls, inspection, certification, fair practices in trade and the utilisation of veterinary drugs, feed and pesticides at farm level.

There are various factors which may determine the system chosen for animal identification and animal traceability. Factors such as the outcomes of the risk assessment, the animal and public health situation (including zoonoses) and related programmes, animal population parameters (such as species and breeds, numbers and distribution), types of production, animal movement patterns, available technologies, trade in animals and animal products, cost/benefit analysis and other economic, geographical and environmental considerations, and cultural aspects, should be taken into account when designing the system.

5.1.2. Biosecurity

Biosecurity is a general term used to describe a number of basic approaches that may be used to protect animals from both zoonotic disease agents and animal pathogens that cause exotic and endemic diseases.

Biosecurity measures include:

- Reducing the risk of moving infected animals onto farms and the risk of spread to animals already present. Any movement of animals onto a farm carries a risk of introducing disease. Ideally, animals should be acquired from sources of known disease status. Incoming and returning stock should be kept separate from the rest of the herd/flock for a period that allows them to develop signs of any disease they may be incubating.
- Maintaining cleanliness and breaking possible pathways of disease transmission. Applying good hygiene and sanitary practices when handling livestock. This includes cleaning and disinfection of all personnel, equipment and livestock vehicles.

5.1.3. Animal health management

Farmers should establish good relationships with a veterinarian or veterinary practice and seek veterinary advice about suspicion of disease. Animal health and food safety issues should be addressed pro-actively through the development and implementation of herd and flock health plans.

5.2. Veterinary medicines

Controls on veterinary medicines are necessary to:

- protect consumer health by ensuring the safety of food of animal origin intended for human consumption;
- prevent the contamination of animal derived food with residues of veterinary medicines which exceed the established MRL;
- prevent or reduce as far as possible the direct and indirect transfer of resistant microorganisms or resistance determinants within animal populations and from food producing animals to humans;
- comply with the ethical obligation and economic need to maintain animal health.

The CAC guide on the use of veterinary drugs[5] states:

Modern food production systems should be designed and managed to ensure that the exposure of food producing animals to veterinary drugs does not pose a risk to human health.
The commercial entities involved in the production and marketing of food have the primary responsibility for ensuring food safety. The role of competent authorities is to control the use of veterinary drugs and to verify that appropriate practices are being applied and effective measures are in place within the veterinary drug distribution and food production systems to provide effective protection for consumer health and ensure fair practice in the food trade, consistent with the goals of Codex Alimentarius.

Residues may exert an adverse effect on consumers in a number of ways, such as:

- chronic toxicological adverse effects;
- acute pharmacological effects on consumers and on the microflora of the gastrointestinal tract of consumers;
- allergic reactions.

Different types of controls and monitoring programme may be justified where the risk assessment identifies one or more of these other end-points as being significant for human health. Detections of noncompliant residues (e.g. those exceeding applicable MRLs) justify regulatory follow up. Animals and/or production systems can be exposed to a variety of veterinary drugs and other chemicals that may as a result be present in the products derived from them. Their importance for consumer health protection, however, varies with type and source. An understanding of the circumstances required for each veterinary drug input to actually pose a risk to consumers of animal products, along with an estimate of the relative likelihood of this occurring, is essential to determine the appropriate controls and verification programmes which should be included in the design of national residue control and verification programmes.

The application of a veterinary medicines control and verification programme based on risk should provide the necessary basis for exporting countries to certify, where required, the safety of exported food, and for importing countries, subject to any additional assessment they deem necessary, to accept such consignments. The same principles should apply to export assurance programmes as are applied to the design and implementation of national assurance programmes.

Competent Authorities regulate the use of veterinary drugs, verify that appropriate practices are applied and that effective measures are in place within the veterinary drug distribution and food production system to provide effective protection of consumers and facilitate trade, consistent with the goals of Codex Alimentarius.

Regulation by the competent authority requires the application of control measures throughout the entire process from approval and registration of medicines to use in animals on farm.

5 Guidelines for the design and implementation of national regulatory food safety assurance programme associated with the use of veterinary drugs in food producing animals (CAC/GL 71-2009)

➤ Approval by competent authority

Appropriate official approval criteria should be established. These criteria may include the acceptance of the assessments of other recognised competent authorities where use patterns are likely to be similar. Approval systems should:

- require an evaluation of the human safety of residues of the veterinary drug relying on a risk analysis and establishing, where appropriate, maximum residue limits;
- take into account the needs of the producers in order to reduce the temptation to use unapproved veterinary drugs or prohibited substances;
- recognise that risk profiles and management options may vary substantially among production systems and regions.

The conditions for the approval of veterinary drugs should be specified in the appropriate national regulations. To mitigate potential risk, restrictions may be imposed on: formulations; criteria of use (e.g. time, species) and route of administration; indications for use; and withdrawal/withholding times for animal products.

➤ National register

All formulations of veterinary drugs approved in a country should be recorded in a national register. Information and/or education programmes on suitable use to provide effective treatment while affording protection of consumers should be provided for each approved veterinary product formulation.

For antimicrobial drugs, a summary of product characteristics should be provided for each medicine, containing the information necessary for the appropriate use of veterinary antimicrobial drugs. It constitutes, for each veterinary antimicrobial drug, the official reference of the content of its labelling and package insert. This summary should contain the following items:

- pharmacological properties;
- target animal species;
- indications;
- target microorganisms;
- dosage and administration route;
- withdrawal periods;
- incompatibilities;
- shelf-life;
- operator safety;
- particular precautions before use;
- instructions for the return or proper disposal of un-used or out-of-date products;
- any information on conditions of use relevant to the potential for selection of resistance should be included, for the purpose of guidance on prudent use;
- class and active ingredient of the veterinary antimicrobial drug.

➤ Distribution and sale

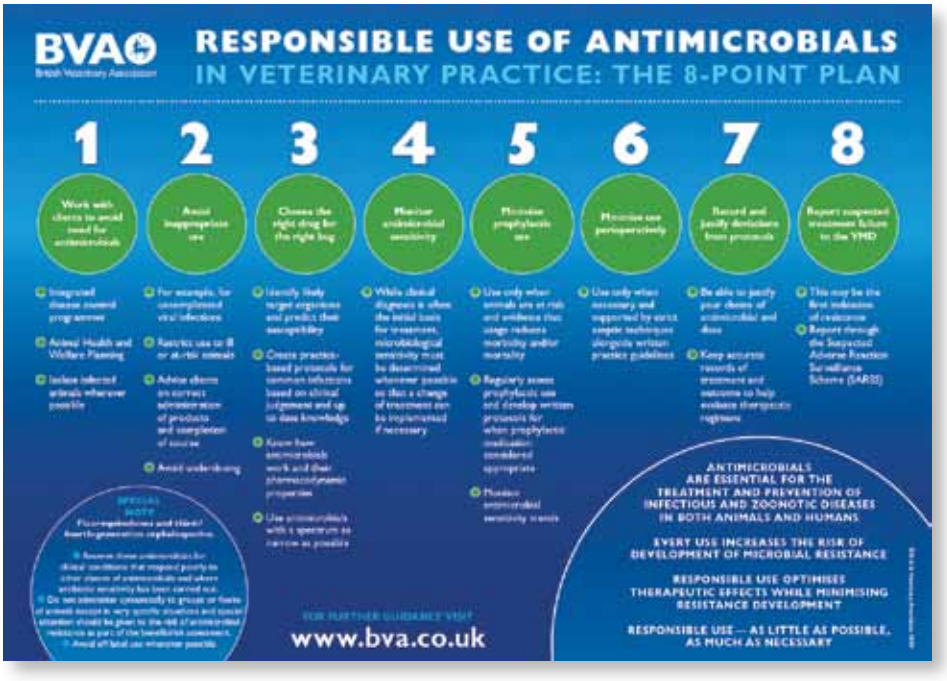
National regulations should establish which veterinary drugs may be sold domestically and how these may be used. Formulations not recorded in the national register should not be used and sanctions should be in place to act as a deterrent against such use.

Additional conditions should be imposed on the sale and use of certain veterinary drugs to ensure appropriate use and to prevent misuse or abuse. In the case of veterinary antimicrobial drugs, the relevant authorities should make sure that all medicines used in food producing animals are:

- prescribed by a veterinarian or other suitably trained person authorized in accordance with national legislation or used under conditions stipulated in the national legislation;
- supplied only through licensed/authorized distribution systems;
- administered to animals by a veterinarian or, under the supervision of a veterinarian or other suitably trained person authorized in accordance with national legislation; and that
- proper records are kept of their administration.

Veterinarians have a critical role in ensuring veterinary medicines are used responsibly. Below are examples of material directed at veterinarians to promote responsible use.

Source: http://www.vmd.defra.gov.uk/pdf/leaflet_antimicrobials.pdf



Source: http://www.bva.co.uk/public/documents/bva_antimicrobials_poster.pdf

➤ Administration of medicines

Farmers and animal keepers 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 strictly in accordance with the officially approved instructions. Off-label use of veterinary drugs should only be permitted in accordance with direct and written advice from a veterinarian in accordance with national authorities' laws and regulations. Such advice should be consistent with national and/or international guidance documents and technical information on this issue.

Producers should be encouraged to seek advice of veterinarians or other competent professionals on the application of the correct withdrawal time, where the label direction for use may not be available or may not be clear.

Records should be kept of all details of the treatment and the withdrawal time/withholding time required before the animal or product from the animal can be harvested for human consumption.

Animal keepers should have appropriate on-farm food safety assurance measures in place with respect to the use of and/or exposure of food-producing animals to veterinary drugs. All workers directly involved with the animals should be familiar with these measures.

Producers should be able to identify all food-producing animals, or lots of these animals, which have been treated with or exposed to veterinary drugs to ensure compliance with withdrawal/withholding times.

Continuous food safety assurance measures such as record keeping should ensure that products (e.g. milk, eggs, honey) are harvested only if appropriate withdrawal/withholding times have been followed. Treated or exposed animals for which the withdrawal time/withholding time has not elapsed should be kept separate from animals that have not been treated, or be positively identified to reduce the potential for mistakes.

In the particular case of veterinary antimicrobial drugs, producers of food-producing animals have additional responsibilities, including:

- to use veterinary antimicrobial drugs only when necessary and not as a replacement for good management and farm hygiene, or other disease prevention methods such as vaccination;
- to implement a health plan in cooperation with the veterinarian in charge of the animals that outlines preventative measures (e.g. mastitis plan, worming and vaccination programmes, etc.);
- to use veterinary antimicrobial drugs in the species, for the uses and at the doses on the approved labels and in accordance with the prescription, product label instructions or the advice of a veterinarian familiar with the animals and the production site;
- to inform the veterinarian in charge of the unit of recurrent disease problems;
- to maintain all clinical and laboratory records of microbiological and susceptibility tests if required by the national regulatory authority. These data should be made available to the veterinarian in charge of treating the animals in order to optimize the use of veterinary antimicrobial drugs;
- to keep adequate records of all veterinary antimicrobial drugs used, including the following:
  - name of the veterinary antimicrobial drug/active substance and batch number;
  - name of supplier;
  - date of administration;
  - identification of the animal or group of animals to which the veterinary antimicrobial drug was administered;
  - clinical conditions treated;
  - quantity and duration of the antimicrobial agent administered;
  - withdrawal periods;
  - result of laboratory tests;
  - result of treatment;
  - name of the prescribing veterinarian or other suitably trained person authorized in accordance with national legislation.

Detailed information on the design and implementation of national programmes for veterinary medicines are contained in specific CAC texts[6]:

- Guidelines for the Design and Implementation of National Regulatory Food Safety Assurance Programmes Associated with the Use of Veterinary Drugs in Food Producing Animals (CAC/GL 71-2009)
- Code of Practice to Minimize and Contain Antimicrobial Resistance (CAC/RCP 61-2005)
- Recommended International Code of Practice for Control of the Use of Veterinary Drugs (CAC/RCP 38-1993)

6 Guidelines for the design and implementation of national regulatory food safety assurance programmes associated with the use of veterinary drugs in food producing animals (CAC/GL 71-2009)
http://www.codexalimentarius.org/download/standards/11252/CXG_071e.pdf

5.3. Animal feed

Contaminated animal feed can cause biological and chemical food safety hazards to be present in food of animal origin. The safety of food for human consumption should be protected through adherence to good animal feeding practice at the farm level and good manufacturing practices during the procurement, handling, storage, processing and distribution of animal feed and feed ingredients for food producing animals.

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. Good agricultural practices, good manufacturing practices (GMPs) and, where applicable, Hazard Analysis and Critical Control Point (HACCP) principles 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 should be obtained from safe sources. 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.

Traceability 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.

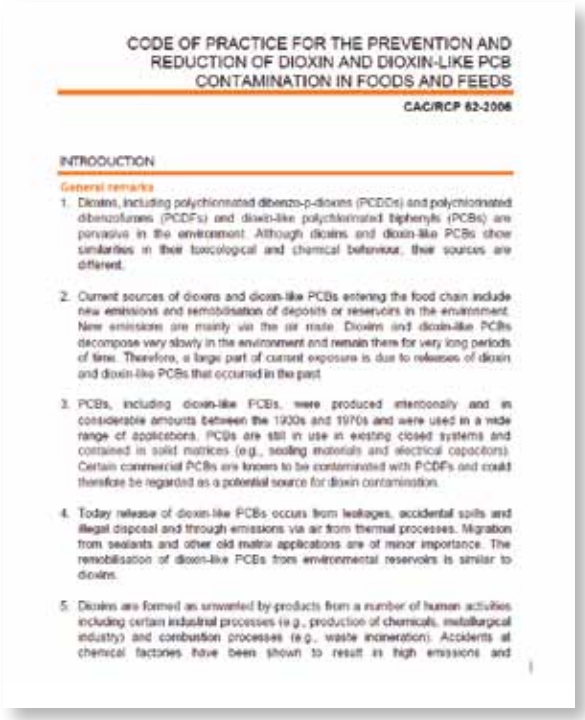
Feed and feed ingredients manufacturers and other relevant parts of industry should practice self-regulation to secure compliance with required standards for production, storage and transport. It will also be necessary for risk-based official regulatory programmes to be established to check that feed 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. 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.

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.

Dioxins and polychlorinated biphenyls (PCBs) are a notable recent example of a threat to human health through the consumption of contaminated food of animal origin. Incidents of food contamination have occurred in several EU countries and have led to widespread recall of suspect food and large economic losses.

Sources:
http://www.bbc.co.uk/news/world-europe-12133361
http://www.who.int/mediacentre/factsheets/fs225/en/

Dioxins and PCBs are the subject of a specific CAC text.



CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF DIOXIN AND DIOXIN-LIKE PCB CONTAMINATION IN FOODS AND FEEDS

CAC/RCP 62-2006

INTRODUCTION

General remarks

1. Dioxins, including polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) and dioxin-like polychlorinated biphenyls (PCBs) are pervasive in the environment. Although dioxins and dioxin-like PCBs show similarities in their toxicological and chemical behaviour, their sources are different.

2. Current sources of dioxins and dioxin-like PCBs entering the food chain include new emissions and remobilisation of deposits or reservoirs in the environment. New emissions are mainly via the air route. Dioxins and dioxin-like PCBs decompose very slowly in the environment and remain there for very long periods of time. Therefore, a large part of current exposure is due to releases of dioxin and dioxin-like PCBs that occurred in the past.

3. PCBs, including dioxin-like PCBs, were produced intentionally and in considerable amounts between the 1930s and 1970s and were used in a wide range of applications. PCBs are still in use in existing closed systems and contained in solid matrices (e.g., sealing materials and electrical capacitors). Certain commercial PCBs are known to be contaminated with PCDFs and could therefore be regarded as a potential source for dioxin contamination.

4. Today release of dioxin-like PCBs occurs from leakages, accidental spills and illegal disposal and through emissions via air from thermal processes. Migration from sealants and other old matrix applications are of minor importance. The remobilisation of dioxin-like PCBs from environmental reservoirs is similar to dioxins.

5. Dioxins are formed as unwanted by-products from a number of human activities including certain industrial processes (e.g., production of chemicals, metallurgical industry) and combustion processes (e.g., waste incineration). Accidents at chemical factories have been shown to result in high emissions and

Source: http://www.codexalimentarius.org/input/download/standards/10693/CXP_062e.pdf

Detailed description of controls on animal feeds is contained in a CAC Code: Code of Practice on Good Animal Feeding (CAC/RCP 54-2004).

5.4. Specific pre-harvest food safety controls

General pre-harvest control measures may be supplemented with actions directed at specific biological hazards.

Many zoonotic diseases that cause disease in animals are subject to animal disease control measures on farm. Examples include bovine tuberculosis and *Brucella melitensis*, for which measures to control the disease in animals has benefits for food safety and human health. Controls for animal diseases are covered in other EDES Handbooks.

Specific controls for zoonotic agents that do not cause clinical disease in animals may be applied in some cases where there is good understanding of the epidemiology of the agent and of methods of transmission to humans. An example of this is *Salmonella* spp. that are pathogenic to man but are generally carried asymptomatically by animals e.g. *S. enteritidis*, *S. typhimurium*.

Verotoxigenic *E. coli* is an example of a food-borne hazard for which current understanding of the agent and its epidemiology is insufficient to enable effective controls to be applied in the pre-harvest phase. This situation may change if vaccines become available.

➤ *Salmonella* spp.

Food animals constitute the main reservoir for *Salmonella* causing food-borne Salmonellosis.

Consequently, pre-harvest *Salmonella* control efforts should constitute an integral part of any sustainable strategy to prevent and reduce food-borne Salmonellosis.

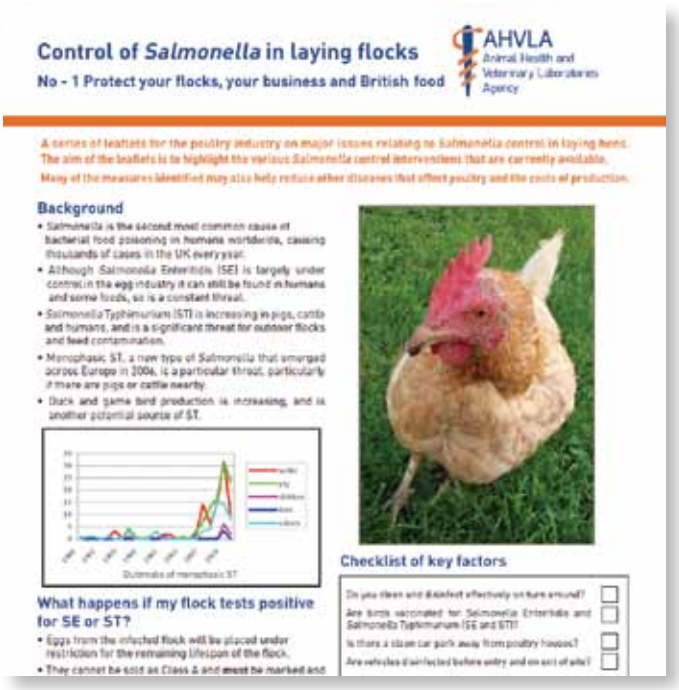
Pre-harvest Salmonella control efforts can effectively control *Salmonella* from slaughter poultry and table egg production, and reduce *Salmonella* in swine production. Pre-harvest Salmonella control efforts can reduce the occurrence of *Salmonella* in food for human consumption and thus reduce the risk of human food-borne Salmonellosis.

The three main elements of pre-harvest Salmonella control are:

- Prevent introduction of infection
- Prevent survival and spread of infection within the herd/flock
- Reduce/eliminate an established infection.

Improved biosecurity in poultry flocks and the use of vaccination has resulted in significant decreases in human Salmonellosis in many countries. In the EU, a coordinated approach on zoonotic diseases has helped reduce human cases of Salmonellosis in the EU by almost one-half over five years (2004-2009), and targets have been set for further reducing *Salmonella* in poultry.

The information leaflet below is an example of educational material for farmers about on-farm measures to control *Salmonella*.



Control of *Salmonella* in laying flocks

No - 1 Protect your flocks, your business and British food

AHVLA
Animal Health and Veterinary Laboratories Agency

A series of leaflets for the poultry industry on major issues relating to Salmonella control in laying hens.
The aim of the leaflets is to highlight the various Salmonella control interventions that are currently available.
Many of the measures identified may also help reduce other diseases that affect poultry and the costs of production.

Background

- Salmonella is the second most common cause of bacterial food poisoning in humans worldwide, causing thousands of cases in the UK every year.
- Although Salmonella Enteritidis (SE) is largely under control in the egg industry it can still be found in humans and some foods, so is a constant threat.
- Salmonella Typhimurium (ST) is increasing in pigs, cattle and humans, and is a significant threat for outdoor flocks and feed contamination.
- Monophasic ST, a new type of Salmonella that emerged across Europe in 2006, is a particular threat, particularly if there are pigs or cattle nearby.
- Duck and game bird production is increasing, and is another potential source of ST.

Outbreaks of monophasic ST

What happens if my flock tests positive for SE or ST?

- Eggs from the infected flock will be placed under restriction for the remaining lifespan of the flock.
- They cannot be sold as Class A and must be marked and

Checklist of key factors

Do you clean and disinfect effectively on farm around?
Are birds vaccinated for Salmonella Enteritidis and Salmonella Typhimurium (SE and ST)?
Is there a clean car park away from poultry houses?
Are vehicles disinfected before entry and on exit of site?

Source: http://vla.defra.gov.uk/reports/rep_salm_leaflets.htm

6. Food safety controls at harvesting

6.1. Meat inspection

Inspection at the abattoir of live animals (ante-mortem) and carcases (post-mortem) is an important component of food safety controls to ensure the safety and suitability of meat. Meat inspection also plays an important role in surveillance for animal diseases and therefore has a dual role in public and animal health.

Ante-mortem inspection aims to detect animals that are showing clinical signs of disease and to either exclude them from the food chain or subject them to other inspections of tests. Post-mortem inspection permits the identification of pathology or abnormalities that can be detected by organoleptic methods – sight, touch, smell. Control and/or reduction of biological hazards of animal and public health importance by ante- and post-mortem meat inspection is a core responsibility of the veterinary services of a country and they should have primary responsibility for the development of relevant inspection programmes.

Detailed description of the design and operation of abattoirs and the design of meat inspection systems are beyond the scope of this Handbook but are the subject of a specific CAC Code: Code of Hygienic Practice for Meat (CAC/RCP 58-2005).

The Code sets out the characteristics of a post-mortem inspection programme which are reproduced in the box below.

Characteristics of a risk-based post-mortem inspection programme are:

- design and application of organoleptic procedures and tests that are relevant and proportional to meat-borne risks associated with grossly-detectable abnormalities;
- tailoring of procedures to the spectrum and prevalence of diseases and defects reasonably likely to be present in the particular slaughter population, taking into account the type (age), geographical origin and primary production system of the slaughter animals, e.g. multiple incisions of relevant muscles in all pigs from geographical regions where *Taenia solium* is present;
- procedures that minimise cross-contamination through handling to the greatest extent practicable, and may include procedures that are limited to visual observation of carcasses and other relevant parts in the first instance if justified by risk assessment;
- inspection of non-edible parts of animals where they may play an indicator role in the judgement of edible parts;
- modification of traditional procedures where scientific investigation has shown them to be ineffective, or, of themselves, hazardous to food, e.g. routine incision of lymph nodes of young animals to detect granulomatosus abnormalities;
- application of more intensive organoleptic procedures on a routine basis when a disease or condition capable of general distribution is found in a single part of a carcass and other relevant parts, e.g. cysts of *Taenia saginata* in cattle, xanthosis;
- application of additional risk-based inspection procedures on a routine basis when live animals are positive to a diagnostic test, e.g. tuberculin test in cattle, mallein test in horses;
- use of laboratory tests for hazards that are unaddressed by organoleptic inspection, e.g. *Trichinella* spp., chemical residues and contaminants;
- application of measurable outcomes of organoleptic inspection that reflect a risk-based approach;
- integration with HACCP plans for other process control activities;
- on-going tailoring of procedures to take into consideration information received from the primary producer on a lot-by-lot basis;
- and return of information to the primary producer so as to seek continuous improvement in the safety and suitability status of animals presented for slaughter.

Further information about meat inspection can be found in standard texts, including:
Manual on Meat Inspection for Developing Countries
http://www.fao.org/docrep/003/t0756e/t0756e00.htm

6.2. Process control

While traditional meat inspection systems have a very important role in food safety controls, in recent years there has been a recognition that meat inspection does not detect many of the food-borne hazards of current concern – micro-organisms pathogenic to man carried asymptomatically in the intestines of animals e.g. *Salmonella*, *Campylobacter*, *Yersinia*. Contamination of meat with these organisms can be minimised by the implementation, by the abattoir operator, of effective process control based on the principles of HACCP. Such systems should aim to reduce the transfer of organisms from the intestines and external surfaces (skin, hide, fleece) to meat and other edible parts during the slaughter and dressing process.

The box below contains an excerpt from the CAC Code about process control principles.

Principles of meat hygiene applying to process control

- Production of meat that is safe and suitable for human consumption requires that detailed attention be paid to the design, implementation, monitoring and review of process control.
- The establishment operator has the primary responsibility for implementing systems for process control. Where such systems are applied, the competent authority should verify that they achieve all meat hygiene requirements.
- Process control should limit microbiological contamination to the lowest level practicable, according to a risk-based approach.
- HACCP should be applied wherever practicable as the system of choice for process control, and should be supported by prerequisite GHP that includes sanitation standard operating procedures (SSOPs).
- Process control should reflect an integrated strategy for control of hazards throughout the food chain, with information available from primary production and pre-slaughter being taken into account wherever possible and practicable.

6.3. Carcase decontamination treatments

Decontamination treatments involve applying a chemical substance to animal carcasses during the slaughter process to reduce contamination by microbes such as *Salmonella* or *Campylobacter*. A variety of chemicals can be used for decontamination of carcases, including lactic acid and compounds containing chlorine.

Any decontamination process will remove only a proportion of organisms present and should be used as a food safety measure in addition to good process control.

The use of decontamination treatments is not accepted by all countries. In some countries (such as USA), they are used routinely, while in others, including the EU, they are not permitted. Any country considering the use of decontamination treatments should be aware of these differences and that they have been the subject of international trade disputes.

7. Post-harvest controls

Animal products may be subject to processes and treatments after harvest before they are sold to consumers. These include processes to extend the shelf life of basic commodities, such as meat and milk, and the production of specific products to meet consumer and market requirements.

There is a very wide range of process that may be applied to each commodity; for example, meat processes include:

- Raw ground or comminuted e.g. pork sausage
- Meat with secondary inhibitors / non-shelf stable e.g. cured corned beef
- Heat treated / not fully cooked, non-shelf stable e.g. partially-cooked patties
- Fully cooked / non-shelf stable e.g. cooked ham
- Non-heat treated / shelf stable e.g. dry salami
- Heat treated / shelf stable e.g. beef jerky
- Thermally processed / commercially sterile e.g. canned meat

It is beyond the scope of this Handbook to consider in detail all processes that may be applied to food of animal origin. The fundamental requirement is that food business operators must address the food safety hazards for each process, and HACCP is the method that should be employed to achieve this. Readers should refer to EDES Handbooks and CAC texts on HACCP[7] and to CAC standards for specific food products[8].

Food safety management systems must take account of the intended use of each food i.e. is it intended to be cooked before consumption or to be consumed without any further treatment, such as ready-to-eat foods.

The Hazard Analysis Critical Control Point system (HACCP) has become the universally recognized and accepted method for food safety assurance. The recent and growing concern about food safety from public health authorities, food industry and consumers worldwide has been the major impetus in the application of the HACCP system. This concern has been substantiated by a significant increase in the incidence of food-borne diseases in many countries during recent years.

WHO has recognized the importance of the HACCP system for prevention of food-borne diseases for over 30 years and has played an important role in its development and promotion. Codes Guidelines for the Application of HACCP system have been adopted by the FAO/WHO Codex Alimentarius Commission. All relevant Codes of Hygienic Practice include HACCP Principles, including the Codex Code on General Principles of Food Hygiene.

The Codes Guidelines play a crucial role in the international harmonization of the application of the Codex system. Codex standards, guidelines (including the Guidelines for the Application of HACCP system) and recommendations constitute the reference for food safety requirements in international trade.

7 Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application (Annex to CAC/RCP 1-1969, Rev. 4-2003)
8 http://www.codexalimentarius.org/standards/list-of-standards/en/

8. Surveillance

8.1. Chemical food safety hazards

An assessment of the presence and levels of harmful chemical substances in the diet is important for food safety. Potentially harmful chemical substances include e.g. pesticide or veterinary drug residues, heavy metals, environmental or process contaminants, naturally occurring toxins that can be present in food at levels that might adversely affect the health of consumers. With the development of food chemistry, there has been a rapid development from simple checking of purity and adulteration to sophisticated tests for the presence of a range of chemical substances in food at increasingly lower levels. Today, effective food control systems are considered essential to protect the health and safety of consumers.

The selection of priorities for chemical analysis is part of the official food control system and it follows general scientific principles for protecting the public from potential hazards in the food supply. Nevertheless, individual societies may perceive the selection of these priorities differently in accordance with their own political, economic or cultural practices and traditions. Currently, this responsibility has been delegated to food safety risk managers who are advised by risk assessors.

Food safety risk assessments take account of both toxicological information and estimates of dietary exposure of the population to the chemical substances in order to evaluate benefits and risks for public health. To estimate exposure, it is essential to analyse the food that is eaten for the presence and levels of contaminants then relate the occurrence levels to the amounts of the respective food consumed. Some monitoring or surveillance data focus on individual chemical substances in raw commodities and may not provide a direct link to the dietary exposure assessment of the population.

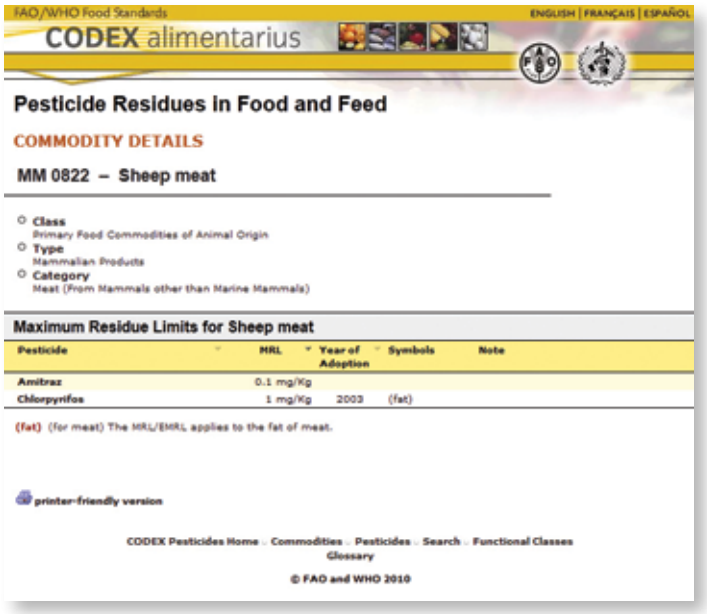
In an international context, the Codex Alimentarius Commission generates guidance and standards for the management of food safety and consumer protection. Countries have responded accordingly by introducing food legislation and Codex based standards and by establishing or strengthening food safety agencies to monitor compliance with such regulations.

8.2. Pesticides

In the case of pesticides, CAC has published recommendations for sampling foods:
Recommended Methods of Sampling for Pesticide Residues for the Determination of Compliance with MRLs (CAC/GL 33-1999)
http://www.codexalimentarius.org/download/standards/361/CXG_033e.pdf

and publishes Maximum Residue Limits (MRLs) for pesticides in both primary and processed food of animal origin:
http://www.codexalimentarius.net/pestres/data/commodities/index.html?lang=en

Examples of MRLs for pesticides in meat and milk are given below.


FAO/WHO Food Standards

ENGLISH | FRANÇAIS | ESPAÑOL

CODEX alimentarius

Pesticide Residues in Food and Feed

COMMODITY DETAILS

MM 0822 – Sheep meat

- **Class**
  Primary Food Commodities of Animal Origin
- **Type**
  Mammalian Products
- **Category**
  Meat (From Mammals other than Marine Mammals)

Maximum Residue Limits for Sheep meat

Pesticide	MRL	Year of Adoption	Symbols	Note
Amitraz	0.1 mg/Kg			
Chlorpyrifos	1 mg/Kg	2003	(fat)	

(fat) (for meat) The MRL/EMRL applies to the fat of meat.

printer-friendly version

CODEX Pesticides Home . Commodities . Pesticides . Search . Functional Classes
Glossary

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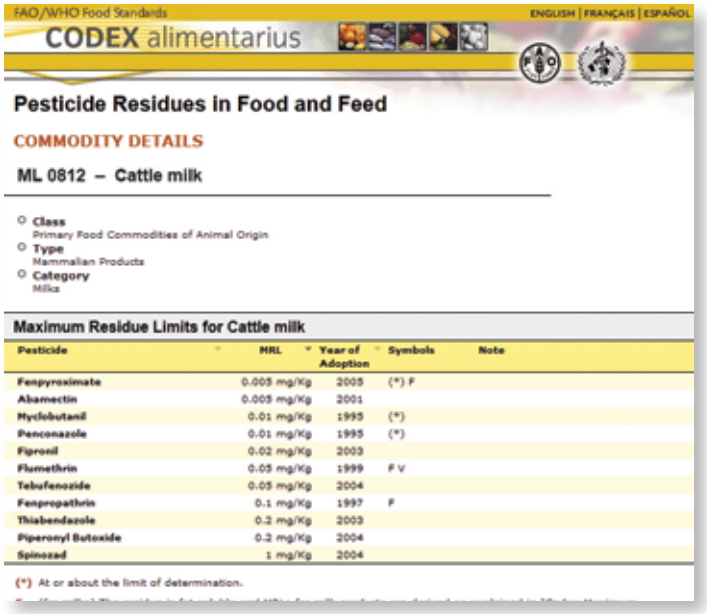
Source: http://www.codexalimentarius.net/pestres/data/commodities/details.html?id=194&lang=en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Pesticide Residues in Food and Feed

COMMODITY DETAILS

ML 0812 – Cattle milk

- **Class**
  Primary Food Commodities of Animal Origin
- **Type**
  Mammalian Products
- **Category**
  Milks

Maximum Residue Limits for Cattle milk

Pesticide	MRL	Year of Adoption	Symbols	Note
Fenpyroximate	0.005 mg/Kg	2005	(*) F	
Abamectin	0.005 mg/Kg	2001		
Hyclobutanil	0.01 mg/Kg	1995	(*)	
Penconazole	0.01 mg/Kg	1995	(*)	
Fipronil	0.02 mg/Kg	2003		
Flumethrin	0.05 mg/Kg	1999	F V	
Tebufenozide	0.05 mg/Kg	2004		
Fenpropathrin	0.1 mg/Kg	1997	F	
Thiabendazole	0.2 mg/Kg	2003		
Piperonyl Butoxide	0.2 mg/Kg	2004		
Spinozad	1 mg/Kg	2004		

(*) At or about the limit of determination.

Source: http://www.codexalimentarius.net/pestres/data/commodities/details.html?id=189&lang=en

8.3. Veterinary medicines

The safety of foods is achieved by the implementation of appropriate rules applied from primary production or import to retail or export and requires the participation of all parties involved. Competent Authorities should verify correct implementation of programmes and, where necessary, if action has been taken.

An understanding of the circumstances required for each veterinary drug input to actually pose a risk to consumers of animal products, along with an estimate of the relative likelihood of this occurring, is essential to determine the appropriate controls and verification programmes which should be included in the design of national residue control and verification programmes.

The application of a control and verification programme based on risk should provide the necessary basis for exporting countries to certify, where required, the safety of exported food, and for importing countries, subject to any additional assessment they deem necessary, to accept such consignments. The same principles should apply to export assurance programmes as are applied to the design and implementation of national assurance programmes.

Details of national programmes for the monitoring and surveillance of residues of veterinary medicines are contained in:
Guidelines for the Design and Implementation of National Regulatory Food Safety Assurance Programmes Associated with the Use of Veterinary Drugs in Food Producing Animals (CAC/GL 71-2009)
http://www.codexalimentarius.org/download/standards/11252/CXG_071e.pdf

and Maximum Residue Levels for veterinary drugs are published in:
http://www.codexalimentarius.net/vetdrugs/data/vetdrugs/index.html?lang=en

In the EU there is specific legislation[9] in place regarding residues of veterinary medicines, and some pesticides and contaminants (heavy metals) in food of animal origin. Legislation lays out the requirements that must be met in relation to the planning and execution of national residue control plans for live animals and products of animal origin. The principal objective of the legislation is to detect illegal use of substances in animal production and the misuse of authorised veterinary medicinal products and to ensure the implementation of appropriate actions to minimise recurrence of all such residues in food of animal origin.

As an example, the UK, as a Member State of the EU, carries out a statutory surveillance programme to comply with EU legislation. In addition, non-statutory surveillance is carried out on certain foods on a risk basis.

Source: http://www.vmd.defra.gov.uk/vrc/surveillance.html

9 Council Directive 96/23/EC

An example of annual report on the surveillance is below.

Source: http://www.vmd.defra.gov.uk/VRC/pdf/reports/vrcar2010.pdf

A list of EU legislation concerning residues and contaminants in food is given at Annex 1.

8.4. Biological food safety hazards

Surveillance for food-borne diseases transmitted by food of animal origin involves surveillance in animal and human populations and in foods themselves. Effective surveillance requires close collaboration between human health, veterinary and food-related disciplines.

Internationally, in recognition of the serious risks posed to human health by foodborne diseases, WHO has set up the Global Foodborne Infections Network (GFN), a network of institutions and individuals committed to enhancing the capacity of countries to detect, respond and prevent food-borne and other enteric infections: http://www.who.int/gfn/en/

The GFN promotes integrated, laboratory-based surveillance and foster intersectoral collaboration among medical and veterinary health specialists and food-related disciplines through training courses and activities around the world.

Surveillance of biological food safety hazards in food of animal origin is a critical tool to inform decision making across the food-borne disease control system and to measure the success of the system and to promote trade by providing assurances about the effectiveness of national food safety measures.

A national surveillance system for food of animal origin should aim to deliver the following results:

- provide evidence for informed action to protect public health;
- provide evidence to effect specific actions and programmes to prevent or reduce as far as practicable the incidence of food-borne disease;
- provide evidence which will give public information and improve consumer confidence;
- permit an assessment of the application of food safety programmes including enforcement and education policies;
- identify specific trends and emerging issues. The identification of such trends will instruct and inform the discussions required for directing surveillance programmes;
- ability to compare local, regional, national and international data and to establish benchmarks between local and national data sets;

- provide evidence to ensure the most effective use of surveillance resources;
- provide information which will direct further research into areas of public health and consumer concern.

Surveillance of food for microbiological hazards is frequently directed at specific pathogens of concern. *Salmonella* is an example of such an organism, and programmes for the reduction of foodborne disease incidents caused by *Salmonella* usually involve surveillance of food for its presence.

Examples of two surveys of *Salmonella* in eggs and fresh chicken are given below.

Source: http://www.food.gov.uk/science/research/surveillance/fsisbranch2007/eggsurvey

Source: http://www.food.gov.uk/science/research/surveillance/fsisbranch2009/fsis0409

9. Appendix

Annex 1: EU legislation on residue and contaminant controls

Council Directive 96/23/EC of 29 April 1996 on measures to monitor **certain substances and residues thereof** in live animals and animal products and repealing Directives 85/358/EEC and 86/469/EEC and Decisions 89/187/EEC and 91/664/EEC

Commission Decision 98/179/EC of 23 February 1998 laying down detailed rules on official sampling for the monitoring of certain **substances and residues thereof in live animals and animal products**

Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on **undesirable substances in animal feed**

Commission Decision 2002/657/EC of 12 August 2002 implementing Council Directive 96/23/EC concerning the performance of **analytical methods and the interpretation of results**

Commission Regulation (EC) No 401/2006 of 23 February 2006 laying down the **methods of sampling and analysis** for the official control of the levels of **mycotoxins** in foodstuffs

Commission Regulation (EC) No 1881/2006 of 19 December 2006 setting maximum levels for **certain contaminants** in foodstuffs

Commission Regulation (EC) No 1883/2006 of 19 December 2006 laying down methods of **sampling and analysis** for the official control of levels **of dioxins and dioxin-like PCBs** in certain foodstuffs

Commission Regulation (EC) No 333/2007 of 28 March 2007 laying down the **methods of sampling and analysis** for the official control of the levels of **lead, cadmium, mercury, inorganic tin, 3-MCPD and benzo(a) pyrene** in foodstuffs

Regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on **food additives**

Regulation (EC) No 470/2009 of the European Parliament and of the Council of 6 May 2009 laying down Community procedures for the establishment of **residue limits of pharmacologically active substances in foodstuffs of animal origin**, repealing Council Regulation (EEC) No 2377/90 and amending Directive 2001/82/EC of the European Parliament and of the Council and Regulation (EC) No 726/2004 of the European Parliament and of the Council

Commission Regulation (EU) No 37/2010 of 22 December 2009 on **pharmacologically active substances** and their **classification regarding maximum residue limits** in foodstuffs of animal origin

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SAFE FOOD IN ACP
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EDES is funded by the European Union

Printed on FSC-certified paper
with environmentally friendly
solvent-free inks.
Publication date: September 2012

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Design: www.inextremis.be