

CODEX ALIMENTARIUS

INTERNATIONAL FOOD STANDARDS



Food and Agriculture
Organization of the
United Nations



World Health
Organization

E-mail: codex@fao.org - www.codexalimentarius.org

CODE OF PRACTICE ON GOOD ANIMAL FEEDING

CXC 54-2004

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1. INTRODUCTION

1. This code is to establish a feed safety system for food-producing animals which covers the whole food chain, taking into account relevant aspects of animal health and the environment in order to minimize risks to consumers' health. This code applies in addition to the principles of food hygiene already established by the Codex Alimentarius Commission (CAC),ⁱ taking into account the special aspects of animal feeding.

2. PURPOSE AND SCOPE

2. The objective of this code is to help ensure the safety of food for human consumption through adherence to good animal feeding practice at the farm level and good manufacturing practices (GMPs) during the procurement, handling, storage, processing and distribution of animal feed and feed ingredients for food-producing animals.

3. This code of practice applies to the production and use of all materials destined for animal feed and feed ingredients at all levels whether produced industrially or on-farm. It also includes grazing or free-range feeding, forage crop production and aquaculture.

4. Those issues of animal welfare other than food safety related animal health are not covered. Environmental contaminants should be considered where the level of such substances in the feed and feed ingredients could present a risk to consumers' health from the consumption of foods of animal origin.

5. While recognizing that, in its totality, a feed safety system would address animal health and environmental issues, in addition to consumers' health, this code of practice, in fulfilling the Codex mandate of consumer protection, only addresses food safety. Notwithstanding this, best efforts have been made to ensure that the recommendations and practices in this code of practice will not be detrimental to the more general animal health and environmental aspects of animal feeding.

3. DEFINITIONS

6. For the purpose of this code:

Feed (feeding stuff): any single or multiple materials, whether processed, semi-processed or raw, which is intended to be fed directly to food-producing animals.

Feed ingredient: a component part or constituent of any combination or mixture making up a feed, whether or not it has a nutritional value in the animal's diet, including feed additives. Ingredients are of plant, animal or aquatic origin or other organic or inorganic substances.

Feed additive:ⁱⁱ any intentionally added ingredient not normally consumed as feed by itself, whether or not it has nutritional value, which affects the characteristics of feed or animal products.

Medicated feed: any feed which contains veterinary drugs as defined in the CAC *Procedural Manual*.¹

Undesirable substances: contaminants and other substances which are present in and/or on feed and feed ingredients and which constitute a risk to consumers' health, including food safety related animal health issues.

ⁱ See recommended international code of practice – *General principles of food hygiene* (CXC 1-1969).

ⁱⁱ Microorganisms, enzymes, acidity regulators, trace elements, vitamins and other products fall within the scope of this definition depending on the purpose of use and method of administration.

4. GENERAL PRINCIPLES AND REQUIREMENTS

7. 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 (GAPs), GMPs and, where applicable, Hazard analysis and critical control point (HACCP) principlesⁱⁱⁱ should be followed to control hazards that may occur in food. Potential sources of contamination from the environment should be considered.

8. 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.

4.1 Feed ingredients

9. 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*.^{iv} 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, 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.

4.2 Labelling

10. 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; and
- "use before" or expiry date.

11. This subsection does not apply to labelling of feed and feed ingredients derived from modern biotechnology.^v

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

12. 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.^{vi}

4.3.1 Special conditions applicable to emergency situations

13. 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

ⁱⁱⁱ Hazard analysis and critical control point, as defined in the annex to the *General principles of food hygiene* (CXC 1-1969).

^{iv} See *Working principles for risk analysis for application in the framework of the Codex Alimentarius* (Codex Alimentarius Commission Procedural Manual).

^v 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.

^{vi} Development of detailed measures on traceability/product tracing should take into account the *Principles for traceability/product tracing as a tool within a food inspection and certification system* (CXG 60-2006).

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.

14. 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.

4.4 Inspection and control procedures

15. 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 foodborne hazards.^{vii} Inspection systems should be designed and operated on the basis of objective risk assessment appropriate to the circumstances.^{viii} Preferably, the risk assessment methodology employed should be consistent with internationally accepted approaches. Risk assessment should be based on current available scientific evidence.

16. 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.

4.5 Health hazards associated with animal feed

17. 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 CAC, may be useful in determining minimum safety standards for feed.

4.5.1 Feed additives and veterinary drugs used in medicated feed

18. 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.

19. Veterinary drugs used in medicated feed should comply with the provisions of the *Codex Guidelines for the design and implementation of national regulatory food safety assurance programmes associated with the use of veterinary drugs in food-producing animals* (CXG 71-2009).²

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

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

22. Antibiotics should not be used in feed for growth promoting purposes in the absence of a public health safety assessment.^{ix}

4.5.2 Feed and feed ingredients

23. 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.

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

^{vii} See *Principles for food import and export inspection and certification* (CXG 20-1995).

^{viii} See *Guidelines for the design, operation, assessment and accreditation of food import and export inspection and certification systems* (CXG 26-1997).

^{ix} See *WHO Global Principles for the Containment of Antimicrobial Resistance in Animals Intended for Food*, June 2000, Geneva, Switzerland.

4.5.3 Undesirable substances

25. 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 minimized. Animal products that could be a source of the Bovine Spongiform Encephalopathy (BSE) agent^x 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.

26. 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.

5. PRODUCTION, PROCESSING, STORAGE, TRANSPORT AND DISTRIBUTION OF FEED AND FEED INGREDIENTS

27. The production, processing, storage, transport and distribution of safe and suitable feed and feed ingredients is the responsibility of all participants in the feed chain, including farmers, feed ingredient manufacturers, feed compounders, truckers, etc. Each participant in the feed chain is responsible for all activities that are under their direct control, including compliance with any applicable statutory requirements.

28. Feed and feed ingredients should not be produced, processed, stored, transported or distributed in facilities or using equipment where incompatible operations may affect their safety and lead to adverse effects on consumers' health. Due to the unique characteristics of aquaculture, the application of these general principles must consider the differences between aquaculture and terrestrial-based production.

29. Where appropriate, operators should follow GMPs and, where applicable, HACCP principles to control hazards that may affect food safety. The aim is to ensure feed safety and in particular, to prevent contamination of animal feed and food of animal origin as far as this is reasonably achievable, recognizing that total elimination of hazards is often not possible.

30. The effective implementation of GMPs and, where applicable, HACCP-based approaches should ensure, in particular, that the following areas are addressed.

5.1 Premises

31. Buildings and equipment used to process feed and feed ingredients should be constructed in a manner that permits ease of operation, maintenance and cleaning and minimizes feed contamination. Process flow within the manufacturing facility should also be designed to minimize feed contamination.

32. Water used in feed manufacture should meet hygienic standards and be of suitable quality for animals. Tanks, pipes and other equipment used to store and convey water should be of appropriate materials which do not produce unsafe levels of contamination.

33. Sewage, waste and rainwater should be disposed of in a manner which avoids contamination of equipment, feed and feed ingredients.

5.2 Receiving, storage and transportation

34. Chemical fertilizers, pesticides and other materials not intended for use in feed and feed ingredients should be stored separately from feed and feed ingredients to avoid the potential for manufacturing errors and contamination of feed and feed ingredients.

35. Processed feed and feed ingredients should be stored separately from unprocessed feed ingredients and appropriate packaging materials should be used. Feed and feed ingredients should be received, stored and transported in such a way so as to minimize the potential for any cross-contamination to occur at a level likely to have a negative impact on food safety.

36. The presence of undesirable substances in feed and feed ingredients should be monitored and controlled.

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

37. Feed and feed ingredients should be delivered and used as soon as possible. All feed and feed ingredients should be stored and transported in a manner which minimizes deterioration and contamination and enables the correct feed to be sent to the right animal group.

38. Care should be taken to minimize deterioration and spoilage at all stages of handling, storage and transport of feed and feed ingredients. Special precautions should be taken to limit fungal and bacterial growth in moist and semi-moist feed. Condensation should be minimized in feed and feed ingredient manufacturing and processing facilities. Dry feed and feed ingredients should be kept dry in order to limit fungal and bacterial growth.

39. Waste feed and feed ingredients and other material containing unsafe levels of undesirable substances or any other hazards should not be used as feed but should be disposed of in an appropriate manner including compliance with any applicable statutory requirements.

5.3 Personnel training

40. All personnel involved in the manufacture, storage and handling of feed and feed ingredients should be adequately trained and aware of their role and responsibility in protecting food safety.

5.4 Sanitation and pest control

41. Feed and feed ingredients, processing plants, storage facilities and their immediate surroundings should be kept clean and effective pest control programmes should be implemented.

42. Containers and equipment used for manufacturing, processing, transport, storage, conveying, handling and weighing should be kept clean. Cleaning programmes should be effective and minimize residues of detergents and disinfectants.

43. Machinery coming into contact with dry feed or feed ingredients should be dried following any wet cleaning process.

44. Special precautions should be taken when cleaning machinery used for moist and semi-moist feed and feed ingredients to avoid fungal and bacterial growth.

5.5 Equipment performance and maintenance

45. All scales and metering devices used in the manufacture of feed and feed ingredients should be appropriate for the range of weights and volumes to be measured and be tested regularly for accuracy.

46. All mixers used in the manufacture of feed and feed ingredients should be appropriate for the range of weights or volumes being mixed and be capable of manufacturing suitable homogeneous mixtures and homogeneous dilutions and be tested regularly to verify their performance.

47. All other equipment used in the manufacture of feed and feed ingredients should be appropriate for the range of weights or volumes being processed and be monitored regularly.

5.6 Manufacturing controls

48. Manufacturing procedures should be used to avoid cross-contamination (for example flushing, sequencing and physical clean-out) between batches of feed and feed ingredients containing restricted or otherwise potentially harmful materials (such as certain animal by-product meals and veterinary drugs). These procedures should also be used to minimize cross-contamination between medicated and non-medicated feed and other incompatible feed. In cases where the food safety risk associated with cross-contamination is high and the use of proper flushing and cleaning methods is deemed insufficient, consideration should be given to the use of completely separate production lines, transfer, storage and delivery equipment.

49. Pathogen control procedures, such as heat treatment or the addition of authorized chemicals, should be used where appropriate, and monitored at the applicable steps in the manufacturing process.

5.7 Recalls

50. Records and other information should be maintained as indicated in subsection 4.3 of this code to include the identity and distribution of feed and feed ingredients so that any feed or feed ingredient considered to pose a threat to consumers' health can be rapidly removed from the market and that animals exposed to the relevant feed can be identified.

6. ON-FARM PRODUCTION AND USE OF FEED AND FEED INGREDIENTS

51. This section provides guidance on the cultivation, manufacture, management and use of feed and feed ingredients on farms and in aquaculture.

52. This section should be used in conjunction with the applicable requirements of Section 4 and Section 5 of this code.

53. To help ensure the safety of food used for human consumption, GAPs should be applied during all stages of on-farm production of pastures, cereal grain and forage crops used as feed or feed ingredients for food-producing animals. For aquaculture, the same principles should apply, where applicable. Three types of contamination represent hazards at most stages of on-farm production of feed and feed ingredients, namely:

- biological – such as bacteria, fungi and other microbial pathogens;
- chemical – such as residues of medication, pesticides, fertilizer or other agricultural substances; and
- physical, – such as broken needles, machinery and other foreign material.

6.1 Agricultural production of feed

54. Adherence to GAPs is encouraged in the production of natural, improved and cultivated pastures and in the production of forage and cereal grain crops used as feed or feed ingredients for food-producing animals. Following GAP standards will minimize the risk of biological, chemical and physical contaminants entering the food chain. If crop residuals and stubbles are grazed after harvest, or otherwise enter the food chain, they should also be considered as livestock feed. Most livestock will consume a portion of their bedding. Crops that produce bedding material or bedding materials such as straw or wood shavings should also be managed in the same manner as animal feed ingredients. Good pasture management practices, such as rotational grazing and dispersion of manure droppings, should be used to reduce cross-contamination between groups of animals.

6.1.1 Site selection

55. Land used for production of animal feed and feed ingredients should not be located in close proximity to industrial operations where industrial pollutants from air, groundwater or runoff from adjacent land would be expected to result in the production of foods of animal origin that may present a food safety risk. Contaminants present in runoff from adjacent land and irrigation water should be below levels that present a food safety risk.

6.1.2 Fertilizers

56. Where manure fertilization of crops or pastures is practised, an appropriate handling and storage system should be in place and maintained to minimize environmental contamination, which could negatively impact on the safety of foods of animal origin. There should be adequate time between applying the manure and grazing or forage harvesting (silage and hay making) to allow the manure to decompose and to minimize contamination.

57. Manure, compost and other plant nutrients should be properly used and applied to minimize biological, chemical and physical contamination of foods of animal origin which could adversely affect food safety.

58. Chemical fertilizers should be handled, stored and applied in a manner such that they do not have a negative impact on the safety of foods of animal origin.

6.1.3 Pesticides and other agricultural chemicals

59. Pesticides and other agricultural chemicals should be obtained from safe sources. Where a regulatory system is in place, any chemical used must comply with the requirements of that system.

60. Pesticides should be stored according to the manufacturer's instructions and used in accordance with good agricultural practice in the use of pesticides.^{xi} It is important that farmers carefully follow the manufacturer's instructions for use for all agricultural chemicals.

61. Pesticides and other agricultural chemicals should be disposed of responsibly in a manner that will not lead to contamination of any body of water, soil, feed or feed ingredients that may lead to the contamination of foods of animal origin which could adversely affect food safety.

^{xi} As defined in the *Definitions for the purposes of the Codex Alimentarius* (Procedural Manual of the Codex Alimentarius Commission).

6.2 Manufacturing of feed on-farm

6.2.1 Feed ingredients

62. On-farm feed manufacturers should follow the applicable guidelines established in subsection 4.1 of this code when sourcing feed ingredients off the farm.

63. Feed ingredients produced on the farm should meet the requirements established for feed ingredients sourced off the farm. For example, seed treated for planting should not be fed.

6.2.2 Mixing

64. On-farm feed manufacturers should follow the applicable guidelines established in Section 5 of this code. Particular attention should be given to subsection 5.6 of this code.

65. In particular, feed should be mixed in a manner that will minimize the potential for cross-contamination between feed or feed ingredients that may have an effect on the safety or withholding period for the feed or feed ingredients.

6.2.3 Monitoring records

66. Appropriate records of feed manufacturing procedures followed by on-farm feed manufacturers should be maintained to assist in the investigations of possible feed-related contamination or disease events.

67. Records should be kept of incoming feed ingredients, date of receipt and batches of feed produced in addition to other applicable records set out in subsection 4.3 of the code.

6.3 Good animal feeding practice

68. Good animal feeding practices include those practices that help to ensure the proper use of feed and feed ingredients on-farm while minimizing biological, chemical and physical risks to consumers of foods of animal origin.

6.3.1 Water

69. Water for drinking or for aquaculture should be of appropriate quality for the animals being produced. Where there is reason to be concerned about contamination of animals from the water, measures should be taken to evaluate and minimize the hazards.

6.3.2 Pasture grazing

70. The grazing of pastures and crop lands should be managed in a way that minimizes the avoidable contamination of foods of animal origin by biological, chemical and physical food safety hazards.

71. Where appropriate, an adequate period should be observed before allowing livestock to graze on pasture, crops and crop residuals and between grazing rotations to minimize biological cross-contamination from manure.

72. Where agricultural chemicals are used, operators should ensure that the required withholding periods are observed.

6.3.3 Feeding

73. It is important that the correct feed is fed to the right animal group and that the directions for use are followed. Contamination should be minimized during feeding. Information should be available of what is fed to animals and when, to ensure that food safety risks are managed.

74. Animals receiving medicated feed should be identified and managed appropriately until the correct withholding period (if any) has been reached and records of these procedures must be maintained. Procedures to ensure that medicated feed are transported to the correct location and are fed to animals that require the medication should be followed. Feed transport vehicles and feeding equipment used to deliver and distribute medicated feed should be cleaned after use, if a different medicated feed or non-medicated feed or feed ingredient is to be transported next.

6.4 Stable feeding and lot/intensive feeding units

75. The animal production unit should be located in an area that does not result in the production of food of animal origin that poses a risk to food safety. Care should be taken to avoid animal access to contaminated land, and to facilities with potential sources of toxicity.

6.4.1 Hygiene

76. The animal production unit should be designed so that it can be adequately cleaned. The animal production unit and feeding equipment should be thoroughly cleaned regularly to prevent potential hazards to food safety. Chemicals used should be appropriate for cleaning and sanitizing feed manufacturing equipment and should be used according to instructions. These products should be properly labelled and stored away from feed manufacturing, feed storage and feeding areas.

77. A pest control system should be put in place to control the access of pests to the animal production unit to minimize potential hazards to food safety.

78. Operators and employees working in the animal production unit should observe appropriate hygiene requirements to minimize potential hazards to food safety from feed.

6.5 Aquaculture^{xii}

79. Aquaculture includes a wide range of species of finfish, molluscs, crustaceans, cephalopods, etc. The complexity of aquaculture is reflected in the wide range of culturing methods ranging from huge cages in open seas to culturing in small freshwater ponds. The diversity is further reflected by the range of stages from larvae to full grown size, requiring different feed as well as different culture methods. Nutritional approaches range from feeding only naturally occurring nutrients in the water to the use of sophisticated equipment and scientifically formulated compound feed.

80. To ensure food safety, necessary precautions should be taken regarding culturing methods, culturing sites, technologies, materials and feed used to minimize contamination in order to reduce food hazards.

7. METHODS OF SAMPLING AND ANALYSIS

7.1. Sampling

81. Sampling protocols should meet scientifically-recognized principles and procedures.

7.2 Analysis

82. Laboratory methods developed and validated using scientifically-recognized principles and procedures should be used.^{xiii} When selecting methods, consideration should also be given to practicability, with preference given to those methods which are reliable and applicable for routine use. Laboratories conducting routine analyses of feed and feed ingredients should ensure their analytical competency with each method used and maintain appropriate documentation.^{xiv}

^{xii} Aquaculture producers should refer to relevant sections of the *Code of practice for fish and fishery products* (CXC 52-2003) for additional information.

^{xiii} See *General criteria for the selection of methods of analysis using the criteria approach* (Procedural Manual of the Codex Alimentarius Commission).

^{xiv} For example, through quality assurance systems such as ISO 17025.

NOTES

¹ FAO & WHO. 2025. *Codex Alimentarius Commission Procedural Manual – Thirtieth edition*. Rome.
<https://doi.org/10.4060/cd4216en>

² FAO & WHO. 2009. *Guidelines for the design and implementation of national regulatory food safety assurance programmes associated with the use of veterinary drugs in food-producing animals*. Codex Alimentarius Guideline, No. CXG 71-2009. Codex Alimentarius Commission. Rome.