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Animal feeds — Code of practice for production, processing, storage, transport, and distribution

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This African Standard was prepared by ARSO/TC 17, *Animal feeding, feeds and feeding stuffs*.

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Introduction

There are potential risks to human health associated with the contamination of feed with chemical or biological agents. This Code of practice outlines the means by which these hazards can be controlled by adopting appropriate processing, handling and monitoring procedures.

Animal feeds — Code of practice for production, processing, storage, transport and distribution

1 Scope

This Draft African Standard provides guidelines for the production, processing, storage, transport, and distribution of animal feeds.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 6497: Animal feeding stuffs — Sampling

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
feed
any substance whether raw, semi processed and processed which is intended for animal nutrition

3.2
feed additive
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

3.3
ingredient
part or constituent of any combination or mixture making up a feed

3.4
formula feed
two or more ingredients proportioned, mixed and processed according to specifications

3.5
complete feed
nutritionally balanced feed for animals. It is compounded to be fed as the sole ration and is capable of maintaining life and/or promoting production without any additional substances being consumed except water.

3.6
concentrate
feed used on its own or with another to improve the nutritive balance of the complete total meal/ration and may/ may not be further diluted and mixed to produce a supplement or a complete feed

3.8
supplement
feed used with another to improve the nutritive balance or performance of the animal. It may be:

i. fed undiluted as a supplement to other feeds,
ii. offered *ad libitum* along with the basal ration,
iii. further mixed to produce a complete feed.

3.9
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

3.10
feed miller
producer
processor
firm or organization involved in the formulation, processing and production of animal feeds according to specific guidelines based on the nutritional requirements of the various species of animals, stage of development and production system under consideration.

4 General management

4.1 The ultimate responsibility for the production of safe and wholesome feed lies with the feed miller, producer or processor who should adhere to the laid down regulations, rules, standards and statutory requirements.

4.2 Records should be maintained concerning source of ingredients, formulations including details and source of all additives, date of manufacture, processing and storage conditions, and any date of dispatch, batch No, details of any transport and destination.

4.3 Water used in feed manufacture shall be of potable quality.

4.4 Machinery coming into contact with feed shall be dried following any wet cleaning process.

4.5 Condensation should also be minimized.

4.6 Sewage waste and rain water shall be disposed of in a manner that ensures that equipment, ingredients and feed are not contaminated.

4.7 All plant personnel should be adequately trained and should work according to Good Manufacturing Practice (GMP) standards.

5 Raw materials

5.1 Raw materials of animal and plant origin should be produced according to the specific standard for each raw material.

5.2 Raw materials of animal and plant origin should be obtained from sources, preferably, with a supplier warranty. Monitoring of ingredients should include inspection and sampling of ingredients for contamination using risk-based protocols.

5.3 Feed ingredients should be obtained from safe sources and be subjected to a risk analysis where the ingredients are derived from processes and/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.

5.4 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.

5.5 Laboratory testing when undertaken should be by standard methods or any accredited method.

5.6 In order to control the spread of specific pathogens, it may be necessary to specify for any given ingredient the country and species of origin and any treatment process used prior to purchase.

5.7 Minerals, supplements, vitamins, and other additives shall be registered and obtained from manufacturers who guarantee the concentration and purity of ingredients and provide instructions for correct use and expiry dates.

5.8 Manufacturers of feed additives in particular, should provide clear information to the user to permit correct and safe use.

6 Feed quality assurance

6.1 Quality assurance begins with the concept of what the feed product is to be, in terms of the species being fed and the expected results.

6.2 Ingredient specifications are important to quality assurance in defining the quality of the feedstuffs to be accepted by the processor when raw materials are received for processing.

6.3 The formulation of the finished feed shall meet the animal production objectives of the customer as well as the regulatory requirements of the government.

6.4 Proper sampling of ingredients at receipt should be carried out in accordance with recommended sampling protocols

6.5 In-plant quality control should be carried out to monitor the product as it is produced, to ensure that it conforms to the formula specifications.

6.6 The equipment should be cleaned between batches to prevent cross contamination (contamination of another feed) in cases where certain species may be poisoned by some ingredients used in feeds for different species of animals.

7 Sanitation and integrated pest management

7.1 Sanitation

7.1.1 Sanitation and control of pests are an extension of quality assurance wherein the feed processor controls the entry of potential health hazards into the feed processing.

7.1.2 From the point at which feedstuffs are received (the receiving pit, elevator, etc.) it is the processor's responsibility to minimize the presence of substandard or contaminated ingredients in the plant. This is by inspecting and sampling loads when contamination (mouldy or wet, or insect-ridden) is suspected.

7.1.3 The integrated approach requires:

i. regular inspection of the plant and the inbound feedstuffs,
ii. good housekeeping,
iii. physical and mechanical methods are applied to keep pests out of the plant, and
iv. chemical applications are used correctly to control insects, pathogens, birds and rodents.

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

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

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

7.2 Cleanliness

7.2.1 The cleanliness of a feed processing facility shall start with the design of the plant. The surfaces should be accessible and there shall be no dead space.

7.2.2 The plant and its equipment should be accessible and easy to clean and the facility perimeter relatively free of debris and undergrowth.

7.2.3 The exterior of the plant should be reasonably clean and free of filth, including dust.

7.2.4 Cleaning should be done regularly to prevent the accumulation and spoilage of spilled feeds, feedstuffs or other components used in feed processing.

7.3 Receiving area

7.3.1 The location at which raw materials are received should have adequate dust control and also be easy to clean to prevent attraction of pests, particularly birds and rodents, which may carry salmonella, or other pathogens which would be carried with the feed to the animal and the ultimate consumer.

7.3.2 Contamination by moulds and bacteria may be controlled by running a couple of tonnes of wheat offal or any fibrous material containing 5 % propionic acid through the conveying systems of the mill. Care should be taken with propionic acid or formic acid due to the corrosive effects on the machinery and palatability problems.

7.4 Storage

7.4.1 Feeds should be properly stored to prevent deterioration and contamination.

7.4.2 Processed feeds should be separated from unprocessed ingredients.

7.4.3 Tanks and conveyors should be designed in a way that they are easy to clean and to minimize accumulation of spoiled ingredients or other contaminants.

7.4.4 Tanks containing ingredients should be monitored for temperature and moisture. Elevated temperature and moisture levels are an early sign of deterioration in feedstuffs and finished feeds due to fungal growth or insect infestations.

7.4.5 Storage bins should be cleaned regularly. Packed feeds should be stacked with a gang way between them and off the floor to allow adequate cleaning, ventilation and inspection.

8 Transport

8.1 Vehicles such as trucks, ships, barges or drawn carts should be free of other contaminants so that cross-contamination, or contamination with pests or other cargo is minimized.

8.2 Plant management should inspect all contract vehicle carriers as well as its own fleet, to be confident the means of transport do not create a health problem for the personnel involved.

8.3 Contamination of fresh feed from fertilizers, chemicals, moisture or other previous cargoes is a potential concern, as is the possibility that recycled bags which have toxic residues may be used.

8.4 Feeds should be delivered and used within the stipulated shelf life of the feed.

9 General principles

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, chemical, physical, microbiological

contaminants and other objectionable substances during production, handling, storage and transport. Feeds should be in good condition and meet generally accepted quality standards. Where appropriate, good agricultural practices, good manufacturing practices (GMPs) and, where applicable, Hazard Analysis and Critical Control Point (HACCP) principles should be followed to control hazards that may occur in food. Potential sources of contamination from the environment should be considered.

Entities that produce feed or feed ingredients and those that rear animals for use as food should collaborate to identify potential hazards and their levels of risk to consumers' health.

9.1 Packaging

Animal feed should be packaged in clean food grade containers which are of sufficient strength and sufficiently sealed so as to withstand reasonable handling without tearing, bursting or falling open during normal handling and transportation

9.2 Labelling

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

a) country of origin of the feed;
b) information about the species or category of animals for which the feed is intended;
c) the purpose for which the feed is intended;
d) a list of feed ingredients, including appropriate reference to additives, in descending order of production;
e) physical address of manufacturer or registrant;
f) Net weight in SI Units;
g) registration number if applicable;
h) directions and precautions for use;
i) lot identification;
j) manufacturing date; and
k) use before or expiry date.

NOTE Feed ingredients consisting, containing or produced from GMOs should be labelled with reference to the genetic modification as a risk management measure.

9.3 Traceability/Product Tracing and Record-Keeping

In order to facilitate product tracing of feed and feed ingredients, including additives, proper labelling and record keeping should be done at all stages of production and distribution. This should facilitate the prompt traceback or trace-forward of materials and products if any actual or potential health risks are identified, prompt and complete withdrawal or recall of products where necessary. Records should be maintained and readily available regarding the production, distribution and use of feed ingredients for as long as appropriate to enable trace-back should a safety problem emerge, and representative samples of feed and feed ingredients should be kept where applicable for a suitable period of time not less than six months.

9.3.1 Records keeping

Feed manufacturers should keep records containing full details of the supplier and date of receipt of feed ingredients, of the manufacturing process and the destination of all feed. These records could include:

a) inventory records (including labels and invoices on received goods);
b) actual formulae;
c) mixing sheets;
d) daily production logs;

e) files of complaints;
f) files on manufacturing errors and corrective actions taken;
g) analytical results and investigations of out-of-tolerance sample results;
h) records respecting the disposition of returned and recalled feeds and feed ingredients;
i) records of the disposition of flushed or recovered material; and
j) records of mixer validation and scale/metering device verification.

9.3.2 Special conditions applicable to emergency situations

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

As soon as it becomes likely that a particular feed or feed ingredient is to be traded internationally and may pose a danger to consumers' health, the competent authorities of the exporting country 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.

9.4 Inspection and control procedures

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

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

9.5 Health hazards associated with animal feed

The following should be observed to ensure that hazards associated with animal feeds are minimized.

a) Animal feeds should meet minimum safety standards.
b) It is essential that the levels of undesirable substances are sufficiently low in animal feeds and that their concentration in food for human consumption is consistently below the level of concern.
c) Maximum Residue Level (MRL) and Extraneous Maximum Residue Levels (EMRL) set for animal feeds should comply with the requirements of the codex stan 193.

9.5.1 Feed Additives

Feed additives should be assessed for safety and used under stated conditions of use as prescribed by the competent authorities.

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

Antibiotics should not be used in feed for growth promoting purposes.

9.5.2 Feed and Feed Ingredients

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

Feed and feed ingredients should not be presented or marketed in a manner, which may confuse or mislead the user.

9.5.3 Undesirable Substances

Undesirable substances such as industrial and environmental contaminants like animal droppings, pesticides, radionuclides, persistent organic pollutants, pathogenic agents and toxins such as mycotoxins should be identified, controlled and minimised.

10 Production, processing, storage, transportation and distribution

The production, processing, storage, transportation 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, which are under their direct control including compliance with any applicable statutory requirements.

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 the health of consumers.

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 as far as this is possible achievable, recognizing that total elimination of hazards is often not possible.

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

10.1 Premises and equipment

Buildings and equipment used to process feed and 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.

Water used in feed manufacture should be potable. Tanks, pipes and other equipment used to store and convey water should be of appropriate materials, which do not produce unsafe levels of contamination.

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

10.2 Handling, storage and transportation

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.

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 to minimize the potential for any cross-contamination to occur at a level likely to have a negative impact on food safety.
The presence of undesirable substances in feed and feed ingredients should be monitored and controlled.

Feed and feed ingredients should be delivered and used before expiry. All feed and feed ingredients should be stored and transported in a manner, which minimizes deterioration and contamination. Proper labelling should be applied to ensure the delivery of feeds to the appropriate category of animals.

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 feeds. Condensation should be minimized in feed and feed ingredient manufacturing and processing facilities. Feed and feed ingredients should be kept dry in order to limit fungal and bacterial growth.

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.

10.3 Personnel training

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

10.4 Equipment performance and maintenance

All scales and metering devices including moisture meters used in the manufacture of feed and feed ingredients should be appropriate for the range of weights and volumes to be measured and regularly calibrated.

All mixers used in the manufacturer 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, homogeneous dilutions and regularly calibrated.

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

10.5 Manufacturing controls

Manufacturing procedures should be used to avoid cross-contamination (for example flushing, sequencing and physical clean-up) between batches of feed and feed ingredients containing restricted or otherwise potentially harmful materials (such as certain animal by-product meals, veterinary drugs). These procedures should also be used to minimize cross-contamination between medicated and non-medicated feed and other incompatible feeds. 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.

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.

10.6 Recalls

Records and other information should be maintained, as indicated at item 4.2, to include the identity and distribution path 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 the animal exposed to the relevant feed can be identified.

11 On-farm production and use of feed and feed ingredients

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

This section should be used in conjunction with the applicable requirements of Clause 4 and Clause 5.

To help ensure the safety of food used for human consumption, good agricultural practices should be applied during all stages of on-farm production of cereal grains used as feed or feed ingredients for food producing animals. 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.

11.1 Agricultural Production of Feed and feed ingredients

Adherence to good agricultural practices is encouraged in the production of natural, improved and cultivated cereal grain crops used as feed and feed ingredient for animals. Good agricultural practice standards should be applied to minimize the risk of biological, chemical and physical contaminants entering the food chain.

11.1.1 Site Selection

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, ground water 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.

11.1.2 Fertilizers

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.

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.

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.

11.1.3 Pesticides and Other Agricultural Chemicals

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

Pesticides should be stored according to the manufacturer's instructions and used in accordance with GAP in the use of pesticides. It is important that farmers carefully follow the manufacturer's instructions for use for all agricultural chemicals.

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

11.2 Manufacturing of feed on-farm

11.2.1 Feed Ingredients

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

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.

11.2.2 Mixing

On-farm feed manufacturers should comply with applicable guidelines in this document to minimize the risk of cross-contamination between feed and feed ingredients during mixing.

11.2.3 Monitoring records

Appropriate records should be assigned and maintained by manufacturers to facilitate investigation of possible contamination or pathological events related to animal feed during feed manufacturing procedures.

Records should be kept for all types of inputs and outputs relating to feed manufacturing such as raw materials, additives and others.

11.3 Good animal feeding practice

Good animal feeding practices include those practices, which 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.

11.3.1 Water

Water for drinking should be potable.

11.3.2 Feeding

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

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 should 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.

11.4 Hygiene

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.

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

12 Sampling and analysis

12.1 Sampling

Sampling should be carried out in accordance with ISO 6497.

12.2 Analysis

Laboratory methods developed and validated using scientifically recognized principles and procedures should be used. 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.

Bibliography

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