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Animal feeds — Good practices for production and processing of fodder crops

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Foreword

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ARSO shall not be held responsible for identifying any or all such patent rights.

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 — Good practices for production and processing of fodder crops

1 Scope

This Draft African Standard provides the guidelines for good practices for selection, sustainable growing, processing, storage and ecolabelling of fodder crops.

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.

FDARS 2139, Code of practice on good animal feeding

FDARS 1828, *Animal feeds — Code of practice for production, processing, storage, transport and distribution*

CODEX STAN 193*, Codex general standard for contaminants and toxins in food and feed*

3 Terms and definitions

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

3.1
feed supplement
feed ingredient used with another to improve the nutrient balance or performance of the animal and that can be undiluted, diluted and mixed to produce a complete feed or as free choice with other parts of the ration

3.2
provider miller
producer
processor
firm or organization involved in the formulation, processing and production of fodder crops according to specific guidelines based on the nutritional requirements of the various species of animals, stage of development and production system under consideration

3.3
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

3.4
hay
plants that have been cut, dried, for use as animal feed, particularly for ruminants and equines such as cattle, goats, sheep, horses, etc.

3.5
silage
feed resulting from an anaerobic fermentation process of sugars in forage with a high moisture content and that is preserved in succulent condition

3.6

feed additives
substance intentionally added to feed and/or water, not consumed as feed by itself, whether or not it has a nutritional value, that affects the characteristics of feed including organoleptic properties, animal products, animal production or performance or welfare, or the environment

3.7
haylage
silage made from forages that is partially dried

Note 1 to entry: Haylage may be stored in a silo or cut and compressed into bags.

Note 2 to entry: Haylage and silage are both ensiled forages but haylage is drier than silage and its *dry matter* percent is higher than 50 %.

4 General principles and requirements

4.1 Silage, haylage and hay processing should be obtained and maintained in a stable condition to protect the final product from contamination by pests, chemical, physical, microbial and/or other objectionable substances during production, handling, storage and transport.

4.2 Where appropriate, good agricultural practices (GAP), 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 feed.

4.1 Forage crops

4.1.1 Forage crops produced for silage, haylage and hay should be obtained from safe sources and should be subjected to a risk analysis where the crops are derived from agriculture processes or technologies not hitherto evaluated from a food safety point of view.

4.1.2 Where feed additives are used in forage crops, manufacturers of feed additives in particular should provide clear information to the user to permit correct and safe use.

4.1.3 Monitoring of forage crops prepared for Silage, haylage and hay should include inspection and sampling and analysis for undesirable substances using risk-based protocols.

4.1.4 Forage crops produced for silage, haylage and hay 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

4.2.1 Labelling should be clear and informative as to how the user should handle, store and use.

4.2.2 Labelling should be consistent with any statutory requirements and should describe the feed and provide instructions for use.

4.3 Traceability and record keeping of forage crops and its products

4.3.1 Traceability of Silage, haylage and hay product should be enabled by proper labelling and record keeping for timely and effective withdrawal or recall of products if known or probable adverse effects on animals and consumers' health are identified.

4.3.2 Records should be maintained and readily available regarding the production, distribution and use of Silage, haylage and hay to facilitate the prompt trace-back of Silage, haylage and hay product to the immediate previous source and trace-forward to the next subsequent recipients if known or probable adverse effects on animals and consumers' health are identified.

4.3.1 Special conditions applicable to emergency situations

4.3.1.1 Operators should, as soon as reasonable, inform the competent authorities in the country if they consider that a feed or feed ingredients does not satisfy the feed safety requirements established in this Code of practice.

4.3.1.2 The information should be as detailed as possible and should at least contain:

a) a description of the nature of the problem;
b) a description of the feed or feed ingredients;
c) the species for which it is intended;
d) the lot / batch identifier; and
e) the name of the manufacturer and the place of origin.

4.3.1.3 The competent authorities and operators should immediately take effective measures to ensure that those feed or feed ingredients do not pose any danger to animals and consumers' health.

4.3.1.4 As soon as it becomes likely that a particular feed or feed ingredient is to be traded internationally and may pose a danger to animals and 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

4.4.1 Silage, haylage and hay manufacturers and other relevant parts of the industry should practice self-regulation/auto-control to secure compliance with required standards for production, storage, receiving and transport.

4.4.2 Inspection and control procedures should be used to verify that silage, haylage and hay meet requirements to protect consumers against food-borne hazards.

4..4.3 Inspection systems should be designed and operated based on objective risk assessment appropriate to the circumstances. Preferably the risk assessment methodology employed should be consistent with internationally accepted approaches. Risk assessment should preferably be based on current available scientific evidence.

4.4.4 Monitoring of silage, haylage and hay, whether by industry or official inspection bodies, should include inspection, sampling and laboratory analysis to detect unacceptable levels of undesirable substances.

4.5 Health hazards associated with silage, haylage and hay products

4.5.1 All silage, haylage and hay products should meet minimum safety standards.

4.5.2 It is essential that the levels of undesirable substances are sufficiently low in silage, haylage and hay products and that their concentration in food for human consumption is consistently below the level of concern.

4.5.3 Maximum Residue Level (MRL) and Extraneous Maximum Residue Levels (EMRL) set for silage, haylage and hay should comply with the requirements of the codex stan 193.

4.5.1 Feed additives used in silage, haylage and hay production

4.5.1.1 Feed additives used in Silage, haylage and hay production should be assessed for safety and used under stated conditions of use as approved by the competent authorities.

4.5.1.2 Feed additives should be received, handled, and stored to maintain their integrity and to minimise misuse or unsafe contamination. Product containing feed additives should be used in strict accordance with instructions for use on the packaging materials.

4.5.2 Silage, haylage and hay products

4.5.2.1 Silage, haylage and hay products 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 animal's health.

4.5.2.2 In particular, silage, haylage and hay products contaminated with unacceptable levels of undesirable substances should be identified as unsuitable for animal feed and not be marketed or used.

4.5.2.3 Silage, haylage and hay products should not be presented or marketed in a manner liable to mislead the user.

4.5.3 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.

5 Silage, haylage and hay production, processing, storage, transport and distribution

In addition to the requirements of ARS 1828, the following should be considered in the production, processing, storage, transport, receiving, and distribution of silage, haylage and hay products:

A. Production, processing, storage, transport, receiving and distribution of safe and suitable silage, haylage and hay products is the responsibility of all actors along the feed value chain, including farmers, feed manufacturers, feed compounders and truckers. Each actor in the feed value chain is directly responsible for compliance with any applicable statutory requirements.
B. Silage, haylage and hay products should not be produced, processed, stored, transported and distributed using equipment and facilities that are incompatible with any statutory requirements that may affect their safety and hence, affecting animal's' health.
C. 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, recognising that total elimination of hazards is often not possible.
D. Effective implementation of GMPs and, where applicable, HACCP-based approaches should ensure that the following types of contaminants of silage, haylage and hay products are minimised:
    i. biological, (bacteria, fungi and other microbial pathogens);
    ii. chemicals, (residues of medication, pesticides, fertilizer or other plant protection products (PPP); and
    iii. physical contaminants, (broken needles, machinery and other foreign material).

5.1 Good Agriculture Practices (GAP) in fodder production

5.1.1 Site selection

Land used for production of silage, haylage and hay products 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

5.1.2 Selection of suitable cultivars and varieties

5.1.2.1 The right variety of fodder should be selected based on various factors such as varietal characteristics, productivity, quality, market acceptability, nutritional value, disease and stress resistance, adaptability to different soil and climate conditions.

5.1.2.2 Under drought and salinity conditions Barley and Alfalfa may be selected as the fodder crops. Other suitable fodder crops include sorghum, pearl millet, maize, oat, and Egyptian clover (*Trifolium alexandrinum).*

5.1.2.3 Appropriate forage legumes and other forage crops should be selected in accordance with their suitability to a particular agricultural system and their resilience to climate change.

5.1.2.4 Seed production ability and dual-purpose types should be taken into consideration.

5.1.3 Crop diversification

5.1.3.1 Cropping systems that integrate appropriate forage species with food crops can optimize the use of labour and farm machinery while maximizing the biological benefits of weed control through competition, mechanical and biological methods, as well as reducing use of herbicide as an option for weed control.

5.1.3.2 Non-host crops and legumes may be included to minimize disease, and provide biological source of nitrogen.

5.1.4 Improving soil health

5.1.4.1 Plant diversity is essential for Soil physical and chemical properties, maintenance of high soil organic matter content, and biological activity that are fundamental to sustaining silage, haylage and hay production.

5.1.4.2 The following practices should be applied to improve the soil health:

a) enhancing soil biological activity to increase water and nutrient availability and uptake;
b) minimizing soil moisture loss and reducing erosion, runoff, and leaching of nutrients and agrochemicals into surface or groundwater; and
c) appropriate crop rotation, manure and pasture management, and conservation tillage practices.

5.1.4.3 Maintain soil cover to create a suitable environment for soil biota, as well as to reduce erosion.

5.1.4.4 Judicious use of organic and inorganic fertilizers input at the right time in the right amounts.

5.1.5 Water management

5.1.5.1 Effective management of water resources and utilizing water efficiently for rainfed crop and forage production, irrigation, and livestock are key factors for implementing good agricultural practices.

5.1.5.2 The following practices should be applied:

A. maximize water infiltration and minimize unproductive use of surface water runoff through water harvesting;
B. efficient use of ground water or avoidance of drainage where required;
C. improve soil structure and increase soil organic matter content through maintaining a diversity of legumes and grasses, green manuring and soil covering through mulching;
D. improve water use efficiency through adopt techniques to monitor crop and soil water status, accurately schedule irrigation, and prevent soil salinization by adopting water-saving measures and re-cycling where possible;
E. enhance the functioning of the water cycle by establishing permanent soil cover;
F. manage water tables to prevent excessive extraction or stagnation;
G. provide adequate, safe and clean watering points for livestock; and
H. promote good practices of harvesting forage at a height recommended by extension agents (8 - 10 cm of stubble above the ground) to support field maintenance of residual forage that prevents soil erosion.

5.1.6 Integrated weed management

5.1.6.1 Weeding is a crucial operation in fodder crops during the early stages of crop growth to ensure better establishment and a health forage stand. The highest competition between crop and weed occurs within the first growth stage of most seasonal forages therefore there is the need for early intervention to manage the weeds.

5.1.6.2 Integrated weed management is recommended for good agricultural practices.

5.1.6.3 The components of integrated weed management are cultural management, mechanical, chemical, and biological managements.

5.1.6.4 The growing concern over herbicide resistance, their residual effect, and declining profitability are major challenges of high input agriculture. Therefore, preference for cultural methods of weed management are recommended to support sustainable agriculture. Cultural management involves enhancing crop competitiveness, optimum plant population, planting pattern and crop diversification.

5.1.7 Crop protection strategies

5.1.7.1 Maintaining the health of crops is crucial for a successful farming venture, as it ensures a high yield and quality produce. To achieve this, farmers should adopt long-term strategies that manage risks, such as:

a) planting disease and pest-resistant crops;
b) rotating crops and forage; and
c) and using agrochemicals judiciously to control weeds, pests, and diseases.

5.1.7.2 It is essential to follow the principles of Integrated Pest Management (IPM) to achieve optimal results and maintenance of a healthy crop.

5.1.7.3 Good practices related to forage crop protection should include the following:

a) use of resistant cultivars and varieties, crop sequences, associations, and cultural practices that maximize biological prevention of pests and diseases;

b) maintenance of a regular and quantitative assessment of the balance status between pests and diseases and beneficial organisms of all crops;

c) adoption of biological control practices where and when applicable;

d) application of pest and disease forecasting techniques where available;

e) interventions following consideration of all possible methods and their short and long-term effects on farm productivity and environmental implications in order to minimize the use of agrochemicals, in particular to promote IPM;

f) where applicable rates, timings, and pre-harvest intervals; ensure that agrochemicals are only applied by specially trained and knowledgeable persons; and

g) ensure that equipment used for the handling and application of agrochemicals complies with established safety and maintenance standards; and maintain accurate records of agrochemical use.

5.1.8 Harvesting and post-harvest operations

5.1.8.1 Product quality depends on the implementation of acceptable protocols for harvesting, storage and processing of farm products.

5.1.8.1.1 Harvesting should comply with regulations related to pre-harvest intervals for agrochemicals. Proper stage of harvesting and frequency of cutting determines the yield and quality of herbage produced.

5.1.8.1.2 Forage crops should be harvested at an appropriate growth stage to obtain adequate fresh biomass with acceptable dry matter and nutrients, especially crude protein.

5.1.8.2 The number of cuts depends on the rate of growth and temperature during the crop's life cycle. In most forages, this stage is achieved at the 50 % flowering stage to dough stage. In single cut types, this is strictly followed, but in multi-cut types, the pre-flowering stage is preferred to obtain more subsequent cuts. In forages, cutting management influences not only the yield but also the forage quality. Multi-cut forages should be harvested, leaving an 8-10 cm stubble for quick regeneration and adequate recovery from ratoons.

5.1.9 Integration of crop-livestock components

5.1.9.1 Integrating livestock into crop rotations and utilizing the nutrient cycling provided by grazing or housed livestock can be of benefit to the fertility of the entire farm.

5.1.9.2 Combining livestock with crop production is an effective risk aversion mechanism that has been developed over generations of experience by farmers in rainfed areas.

5.1.9.3 The system is a great example of recycling all the products of the farming operations, including local materials, household waste, etc., with little dependence on outside resources. It is a suitable and sustainable approach for remote rural areas where access to outside resources or services is difficult.

5.1.10 Sustainability through GAP

Good agricultural practices (GAP) should follow:

a) soil conservation/rehabitalization;
b) integrated system including a pest, disease and weed management;
c) efficient water management through micro irrigation/ fertigation; and
d) in-situ and ex-situ moisture conservation.

5.2 Silage, haylage and hay processing

5.2.1 Where silage, haylage and hay are produced, procedures designed to minimise contamination and prevent the inclusion of undesirable feed components should be followed.

5.2.2 Ensure that nutritional levels are adequate and maintained during storage to promote animal health, growth and production.

5.2.1 Silage, haylage and hay preparation techniques

5.2.1.1 In contrast to hay, silage and haylage are the products obtained from wet storage.

5.2.1.2 This method of storage uses the acidifying power of lactic bacteria, which reduces the pH to around 4, below which chemical reaction and fermentation is reduced to the barest minimum.

5.2.1.3 This fermentation process preserves forage in its wet state away from air.

5.2.1.4 This ensures that minimum dry matter and nutritional value are lost through the effluent leakage.

5.2.1.5 To obtain good silage, it is necessary to use airtight silos (total anaerobiosis).

5.2.1.6 After harvesting, forage is adequately chopped to a suitable particle size and compacted in a silo to eliminate oxygen. Where necessary apply additional techniques such as pre-tedding for forage with a high water content, or use preservatives (sugar products, formic acid, anti-moulds, etc.) to improve fermentation.

5.2.1.7 It is essential to harvest forage at the optimal time, from the viewpoint of nutritional quality, quantity available and climatic conditions.

5.2.2 Haylage preparation

Haylage is prepared by reconstituting fairly dried (90 % DM) forage materials and crop residues such as stovers and straws to moisture hay of about 50 % moisture content. In most cases, readily available sugars such as molasses is added to the dried materials during reconstitution. The reconstituted materials are then compacted and fermented in anaerobic environment as recommended for silage. When fully fermented, this product constitutes haylage.

5.2.2.1 Hay preparation techniques

5.2.2.1.1 Hay is obtained after dry storage or desiccation of the grass; it contains less than 15 % water.

5.2.2.1.2 During tedding, green forage is cut and dried as quickly as possible. Drying can be done naturally (exposure to the sun on the ground and aerating the forage regularly by turning it over) or artificially curing it by active circulation of air with limited exposure to sunlight.

5.2.2.1.3 Sun-drying requires two or three days without rain. The hay shall then be kept in appropriate conditions (covered area). If mature grass is harvested when it is already dried, it can be

referred to as standing hay. Such standing hay produced on grazing land has the nutritive value of straw because it is harvested when the plants reach maturity.

5.2.2.1.4 Artificial drying is very efficient process but expensive method of conserving forage crops. Drying is brought about by allowing hot air (150 ^{o}C) to pass through herbages for about 20 min to 50 min depending upon the drier design and the moisture content of the crop.

5.2.2.1.5 When forage materials are sufficiently dry, they can be baled in either tinny rectangular but compacted bales or in round big bales. While the small rectangular hay bales can be stored without sealing with a wrapper, the round bales require mechanical sealing with wrapping material that is water proof. Both the round bales and small rectangular bales if not sealed, should be stored on pallets within a well-ventilated store free of vermin. If sealed with a wrapping material, the big round bales can be left in the field.

5.2.2.2 Silage, haylage and hay mixture preparation techniques

5.2.2.2.1 Silage, haylage and hay mixture is a modern technique of preserving forage that combines the benefits of both hay and silage making. This method of preservation has certain advantages and disadvantages over other systems. The process involves baling forage mixture with a round baler and storing it in a sealed container, typically a plastic bag. This container preserves the forage, which has a relatively high moisture content. Both grasses and legumes can be preserved as round bale mixture if proper techniques are followed.

5.2.2.2.2 Although, the silage obtained can be kept for approximately a year, baled silage is more likely to spoil, compared to silage in traditional silos because:

a) fermentation is less complete; and
b) damage to the plastic covering results in harmful introduction of oxygen.

5.3 Safety and quality assurance

5.3.1 Quality assurance begins with the concept of what the feed product is to be expected, in terms of the species composition (grass and legumes) and the expected results.

5.3.2 To maintain the safety and quality of silage, haylage and hay, the following practices are recommended:

a) proper sampling of ingredients at receipt shall be carried out before laboratory testing is done in accordance with the requirements of ARS 1828;
b) in the production site, quality control shall be carried out to monitor the product as it is produced, to ensure that it conforms to the specifications;
c) the equipment should be cleaned after batches to avoid contamination with the residual of aerobic fermented forages, which leads to increased aflatoxin level;
d) machinery coming into contact with feed should be dried after wet cleaning;
e) sewage waste and rainwater shall be disposed of in a manner that ensures that equipment, ingredients are not contaminated;
f) there should be easy access to grassland that can be tedded;
g) harvesting forage plants to produce hay shall be after dew dries;
h) the very young clover or the plants after flowering shall not be used in hay production;
i) wires shall not be used to tie bundles to avoid injury to the animal;
j) silage, haylage and hay should be stored in a well-ventilated area;
k) silage shall not be pressed in pits where the ground water level is high;
l) the fodder crop shall be harvested at the appropriate stage;
m) to eliminate contamination with soil about 8 - 10 cm stubble shall be left; and
n) tight coverage shall apply to prevent air from entering the silo.

5.4 Premises

5.4.1 Buildings and equipment used to process silage haylage and hay product should be constructed in a manner that permits ease of operation, maintenance and cleaning and minimises product contamination.

5.4.2 Process flow within the manufacturing facility should also be designed to minimise feed contamination.

5.5 Fertilizers

5.5.1 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.

5.5.2 There should be adequate time between applying the manure and grazing or forage harvesting (Silage, haylage and hay making) to allow the manure to decompose and to minimize contamination.

5.5.3 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.

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

5.6 Pesticides and other agricultural chemicals

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

5.6.2 Pesticides should be stored according to the manufacturer's instructions and used in accordance with Good Agricultural Practice in the Use of Pesticides (GAP), it is important that farmers carefully follow the manufacturer's instructions for use for all agricultural chemicals.

5.6.3 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.

5.7 Monitoring records

5.7.1 Appropriate records of silage, haylage and hay manufacturing procedures should be maintained.

5.7.2 Records should be kept of incoming Silage, haylage and hay products, date of receipt and batches of feed produced in addition to other applicable records.

5.8 Handling, storage and transportation

In addition to the requirements of ARS 1828, the following are recommended:

a) Silage, haylage and hay products 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.

b) Chemical fertilizers, pesticides, and other materials not intended for use in silage, haylage and hay products should be stored separately to avoid the risk of cross-contamination between them.
c) Silage, haylage and hay products should be stored separately and appropriate packaging materials should be used.
d) The presence of undesirable substances in silage, haylage and hay products should be monitored and controlled.
e) Silage, haylage and hay products should be delivered and used as soon as possible. All silage, haylage and hay products should be stored and transported in a manner that minimizes deterioration and contamination.
f) Special precautions should be taken to limit fungal and bacterial growth in Silage, haylage and hay products. Condensation should be minimized in Silage, haylage and hay manufacturing and processing facilities.
g) Wastes of Silage, haylage and hay 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.
h) Vehicles such as trucks, ships, barges, or drawn carts shall be free of other contaminants so that cross-contamination or contamination with other pests or other cargo is minimized.
i) Processing area management shall inspect all contract vehicle carriers as well as its own fleet, to be confident that the means of transport does not contaminate the feeds and hence creating a health problem for the animals or the human consumer.
j) Hay, haylage and silage should be delivered and used as soon as possible after opening their containers.

6 Personnel training

All personnel involved in the processing, storage and handling of silage, haylage and hay products should be adequately trained and aware of their role and responsibility in ensuring food safety and shall work according to Good Manufacturing Practice (GMP) standards.

7 Sanitation and pest control

7.1 Silage, haylage and hay product, processing units, storage facilities, and their immediate surroundings should be kept clean and effective pest control programs should be implemented.

7.2 Containers and equipment used for manufacturing, processing, transport, storage, conveying, handling, and weighing should be kept clean.

7.3 Cleaning programs should be effective and minimise residues of detergents and disinfectants.

7.4 Machinery coming into contact with silage, haylage and hay product should be dried following any wet cleaning process.
7.5 Special precautions should be taken when cleaning machinery used for silage, haylage and hay product to eliminate contamination.

8 Equipment performance and maintenance

All mixers and balers used in the manufacture of silage, haylage and hay should be appropriate for the range of weights or volumes being mixed and be tested regularly to verify their performance.

9 Recalls

Records and other information should be retained concerning source of raw materials 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.

9 Sampling and analysis

9.1 Sampling

Sampling should be carried out in accordance with the recommended sampling protocols.

9.2 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.

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