DUS DARS 939

DRAFT UGANDA STANDARD

First Edition
2024-mm-dd

Feed maize — Specification

Reference number
DUS DARS 939: 2023

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National foreword

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This Draft Uganda Standard, DUS DARS 393: 2023, *Feed maize — Specification*, is identical with and has been reproduced from an African Standard, DARS 393: 2023, *Feed maize — Specification*, and adopted as a Uganda Standard.

The committee responsible for this document is Technical Committee UNBS/TC 210, *Animal feeds and feeding stuffs.*

Wherever the words, “African Standard" appear, they should be replaced by "Uganda Standard".

AFRICAN STANDARD

DARS 939

Second Edition 2023

Feed maize— Specification

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Foreword

The African Organization for Standardization (ARS) is an African intergovernmental organization made up of the United Nations Economic Commission for Africa (UNECA) and the Organization of African Unity (AU). One of the fundamental mandates of ARSO is to develop and harmonize African Standards (ARS) for the purpose of enhancing Africa's internal trading capacity, increase Africa's product and service competitiveness globally and uplift the welfare of African communities. The work of preparing African Standards is normally carried out through ARSO technical committees. Each Member State interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, Regional Economic Communities (RECs), governmental and non-governmental organizations, in liaison with ARSO, also take part in the work.

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Introduction

With the rapid rise of the industrial food animal production system, an increasing number of food animals once raised on pastures are now raised in feedlots. Feedlot-raised animals are kept indoors for the majority of the year, and they are given feed formulated to speed their growth to market weight and supply them with essential nutrients, while minimizing costs to operators. Concerns have arisen about the content of these feeds, however, as grain-based diets can produce serious and sometimes fatal digestive tract problems in food animals such as cows, goats, and sheep whose stomachs are best suited to digesting high-cellulose containing plants like grass. In addition, recent studies have shown that chemical additives in feed may accumulate in animal tissues, potentially exposing consumers to unwanted chemicals such as veterinary drug residues and heavy metals. It is important to consider how livestock feed affects animal health, and by extension the health of people who consume these animal products.

Feed maize — Specification

1 Scope

This Draft African Standard specify the requirements, sampling and methods of tests for maize grain of varieties grown from common maize grains *(Zea mays)* intended for the preparation of animal feeds. It does not apply to maize intended for human consumption.

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.

ARS 56, *Prepackaged foods — Labelling*

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

ISO 605*, Pulses — Determination of impurities, size, foreign odours, insects, and species and variety — Test methods*

ISO 711, *Cereals and cereal products — Determination of moisture content (Basic reference method)*

ISO 712*, Cereals and cereal products — Determination of moisture content — Routine reference method*

ISO 16050, *Foodstuffs — Determination of aflatoxin B_1, and the total content of aflatoxin B_1, B_2, G_1 and G_2 in cereals, nuts and derived products — High performance liquid chromatographic method*

ISO 24333, *Cereals and cereal products — Sampling*

AOAC Official Method 2001.04, *Determination of Fumonisins B_1 and B_2 in corn and corn flakes — Liquid chromatography with immunoaffinity column cleanup*

3 Terms and definitions

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

3.1
bulk density
test weight
cereals ratio of the mass of a cereal to the volume it occupies after being poured into a container under well-defined conditions

Note 1 to entry: Bulk density is expressed in kilograms per hectolitre of grains as received. Other units such as grams per litre or pound per bushel could also be used.

3.2
impurity
all matters of a sample of grain other than the basic cereal of unimpaired quality

Note 1 to entry: In maize, impurities comprise four main categories: broken grain, damaged grains, other grains and miscellaneous impurities

3.3
broken grain
grain or pieces of grain that can pass through a sieve with a circular mesh of 4,5 mm in diameter

3.4
damaged grain
whole kernel that is distinctly discoloured, sprouted, diseased or damaged by weather, pest, heat, or any other causes and that is not an unsound grain but that is still fit for human and/or animal consumption

3.4.1
heat-damaged grain
grain with a chestnut to black coloration, resulting from the effect of heat, and of which a section of the endosperm is yellowish-grey or brownish black resulting from the effect of spontaneous heat generation or too extreme heating during drying

3.4.2
sprouted grain
grain in which the radicle or plumule is clearly visible to the naked eye

Note 1 to entry: Account should be taken of the general appearance of the sample when its content of sprouted grains is assessed.

Note 2 to entry: Sprouted grains are those where the germ has undergone clearly visible changes which makes it easy to distinguish the sprouted grain from the normal grain.

3.4.3
grain attacked by pests
grain that shows visible damage owing to attack by insects, rodents, mites or other pests

3.5
other grain
grain other than maize, in any condition

3.6
miscellaneous impurity
element that can consist of extraneous seeds, unsound grains, extraneous matter, and impurities of animal origin

3.6.1
extraneous seed
seed of a plant, whether or not cultivated, other than cereal

Note 1 to entry: "Noxious seeds" means seeds that are toxic to humans and animals, seeds hampering or complicating the cleaning and milling of cereals and seeds affecting the quality of products processed from cereals.

3.6.2
unsound grain
grain rendered unfit for human and/or animal consumption, owing to putrefaction, mildew, grain affected with fusariosis, or bacterial or other causes

Note 1 to entry: Unsound grains also include grains damaged by spontaneous heat generation or too extreme heating during drying which are fully grown grains in which the tegument is coloured greyish-brown to black while the cross-section of the kernel is coloured-yellowish grey to brownish-black.

3.6.3
extraneous matter
matter in a sample that can pass through a sieve with apertures of 1,0 mm and that also includes stones, sand, fragments of straw, cob and similar impurities in a sample that are retained by a sieve with apertures of 1,0 mm

3.6.4

impurity of animal origin
matter of animal origin (eggs, larvae, nymphs or adults of insects and their fragments, rodent hairs and their fragments, mites and their fragments) separated from the product under specified conditions

3.7
stained kernels
kernels whose natural colour has been altered by external factors. This includes ground, soil or weather damaged kernels, which may have dark stains or discolourations with a rough external appearance

3.8
diseased grains
grains made unsafe for human consumption due to decay, moulding, or bacterial decomposition, or other causes that may be noticed without having to cut the grains to examine them

3.9
discoloured kernels
kernels materially discoloured by excessive heat, including that caused by excessive respiration (heat damage) and dried damaged kernels. Kernels may appear darkened, wrinkled, blistered, puffed or swollen, often with discoloured, damaged germs. The seed coat may be peeling or may have peeled off completely, giving kernels a checked appearance.

3.10
mouldy kernels
maize grains with visible mycelial growth on its tip or surface

3.11
foreign matter
all organic and inorganic material (such as sand, soil and glass) other than maize, broken kernels and other grains

4 Quality requirements

4.1 General requirements

4.1.1 Maize shall be free from foreign odours, moulds, live pests, rat droppings, toxic or noxious weed seeds and other injurious contaminants as determined from samples representative of the lot.

4.1.2 Maize shall be whole and clean.

4.1.3 Maize may be presented as yellow, white, red, or a mixture of these colours.

4.2 Specific requirements

Feed maize grain shall be graded on the basis of the maximum limits established in table 1 when tested according to the test methods specified therein

Table 1 — Maximum specific requirements for feed maize grains

S/N	Characteristics	Maximum Limits			Test methods
		Grade 1	Grade 2	Grade 3	
(1)	Moisture, % m/m	14	14	14	ISO 711 ,712
(2)	Broken kernels, % m/m	6	8	10	ISO 605
(3)	Damaged grain, % m/m	10	10	10	
(4)	Miscellaneous impurities, % m/m	2	2	2	
(5)	Total content of the impurities, % m/m	15	15	15	

5. Contaminants

5.1 Heavy metals

Feed maize grains shall comply with those maximum limits for metal contaminants specified in CODEX STAN 193 and in particular those listed in Table 2.

Table 2 Heavy Metal limits

S/N	Heavy metals	Maximum limits ppm	Test methods
(1)	Arsenic (As)	2,0	ISO 27085
(2)	Mercury (Hg)	0,5	ISO 6637
(3)	Lead (Pb)	1,0	ISO 6633
(4)	Cadmium (Cd)	5,0	ISO 6561-1 or ISO 6561-2

5.2 Pesticide residues

Maize grains shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity.

5.3 Aflatoxin

Maize grains for animal feeds shall comply with those maximum limits for aflatoxins specified in CODEX STAN 193 and in particular those listed in Table 3.

Table 3 — Aflatoxin limits for feed maize

S/N	Aflatoxin	Maximum limits ppb	Test methods
(1)	Total aflatoxin	20	ISO 16050
(2)	Aflatoxin B1	10	ISO 17034

6 Hygiene

Feed maize shall be processed and handled in accordance with CAC 54.

7 Packaging and Labelling

7.1 Packaging

The feed maize shall be packaged in new and clean food grade packaging material or delivered in bulk containers. The packaging material shall be properly sealed. In the case of bulk deliveries, the delivery outlet of the bulk tanker shall be sealed after loading.

7.2 Labelling

In addition to the requirements of ARS 56, the following specific labelling requirements shall apply and shall be legibly and indelibly marked:

(a) Name, colour, variety and grade of the feed maize

(b) Name and address or contact information of producer;

(c) Net weight when packed, in SI units:
(d) Lot/Batch /Code number;
(e) Crop year
(f) Country of origin; and
(g) Directions for use and storage conditions

8. Sampling

Sampling shall be done in accordance with the ISO 24333.

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Cereals Grading and Marking Rules, 2001, Ministry of Agriculture, Government of India, Schedule V, *Grade Designation and Definition of Quality of Maize*

CODEX STAN 153:1985 (Rev.1:1995), *Standard for Maize (Corn)*

Corn, Official Grain Grading Guide, August 1, 2012, Canadian Grain Commission

United States Standards for Corn, Effective September 1996

CODEX STAN 193:1995 (Rev.5:2009), *General standard for contaminants and toxins in foods*

CODEX STAN 228:2001 (Rev.1:2004), *General methods of analysis for contaminants*