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## Dried insect products for compounded animal feeds — Specification

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## National foreword

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The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of representatives of consumers, traders, academicians, manufacturers, government and other stakeholders.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

This Draft Uganda Standard, DUS DARS 1844: 2023, *Dried insect products for compounded animal feeds — Specification*, is identical with and has been reproduced from an African Standard, DARS 1844: 2023, *Dried insect products for compounded animal feeds — Specification*, and adopted as a Uganda Standard.

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

This standard cancels and replaces US 1712: 2017, *Dried insect products for compounding animal feeds — Specification*, which has been withdrawn.

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

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**Dried insect products for compounded  
animal feeds — Specification**



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*Draft African Standard for comments only — Not to be cited as African Standard*

## Foreword

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This African Standard was prepared by ARSO TC 17 Animal Feeding, Feeds and Feeding stuffs.

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## Introduction

Insects offer non – negligible food alternatives. Adopted by many countries in the world and particularly in Africa. Insect consumption currently represents relevant economic choice to foil the menace of famine. About 2000 species of insects are regularly consume in the world, they appear as an invaluable source of highly digestible proteins in animal feed due to their genetic diversity. The nutritional value of insects for animal feed is mainly based on the high levels of crude protein (40 % – 75 %), so called essential fatty acids such as Omega 3 and 6 unsaturated fatty acids comparable to those found in fish.

In addition to the high proportion of fibres and their richness in essential amino acids (methionine, tryptophan, tyrosine, glutamine etc) supplied by the insect ration provide a balance of the intestinal flora and the digestive health of the animal.

The advantage of using insects in animal feed is essentially based on a tactical strategy based on their mass production. Their rapid growth, short development cycle, high egg laying and food conversion rate (*phytomasse* vs *zoomasse*) are all factors that reinforce their eligibility for breeding, consumption and industrialization. Contrary to conventional production (meat), insects need on average of only 2 grams of food per gram of weight gained, while cow will consume four times more. In addition, the meat : waste ratio provided by cattle, sheep, goat, camel etc. breeding produces a highly negative balance in comparison to the edible parts of insects ( 100 %) from which no loss will be recorded.

Despite it being a rich source of nutrients to animal feeding, if poorly handled, it can become a hazard not only to animal health but also to human health. Therefore, this standard contains the technical requirements on safety (such as heavy metal contaminants and pesticide residues) and quality of dried insect products for compounded animal feed.





## Dried insect products for compounded animal feeds — Specification

### 1 Scope

This African Standard specifies the requirements, sampling, and test methods for dried insect products as sources of protein for compounded 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 amendment) applies.

ARS 56, Prepackaged foods — Labelling

ARS 53, General principles of food hygiene — Code of practice

CAC / RCP 1, General principles of food hygiene

ISO 4832, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique

ISO 4833-1, Microbiology of the food chain — horizontal method for the enumeration of microorganisms — part 1: colony count at 30 °c by the pour plate technique

ISO 5498, Agricultural food products — determination of crude fibre content — general method

ISO 5983-1, Animal feeding stuffs — determination of nitrogen content and calculation of crude protein content — part 1: Kjeldahl method

ISO 5984, Animal feeding stuffs — determination of crude ash

ISO 5985, Animal feeding stuffs — determination of ash insoluble in hydrochloric acid

ISO 6490-1, Animal feeding stuffs — determination of calcium content — part 1: titrimetric method

ISO 6491, Animal feeding stuffs — Determination of phosphorus content — Spectrometric method

ISO 6495, Animal feeding stuffs — determination of water-soluble chlorides content — part 1: titrimetric method

ISO 6496, Animal feeding stuffs — determination of moisture and other volatile matter content

ISO 6497, Animal feeding stuffs — sampling

ISO 6579-1, Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of salmonella — part 1: detection of salmonella spp.

ISO 11085, Cereals-based products and animal feeding stuffs — determination of crude fat and total fat content by the randall extraction method

ISO 16649-2, Microbiology of food and animal feeding stuffs — horizontal method for the enumeration of beta-glucuronidase-positive escherichia coli — part 2: colony-count technique at 44 degrees c using 5-bromo4-chloro-3-indolyl beta-d-glucuronide

ISO 16050, Foodstuffs — determination of aflatoxin b1, and the total content of aflatoxins b1, b2, g1 and g2 in cereals, nuts and derived products — High-performance liquid chromatographic method

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ISO 17375, Animal feeding stuffs — determination of aflatoxin B1

ISO 27085, Animal feeding stuffs — Determination of calcium, sodium, phosphorus, magnesium, potassium, iron, zinc, copper, manganese, cobalt, molybdenum, arsenic, lead and cadmium by ICP-AES

## 3 Terms and definitions

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

### 3.1

#### **insect products for compounded animal feeds**

adult, nymphal, larval or pupal stages of edible insects in the form of dried whole insect, extruded, ground or pellet for use as an animal feed ingredient

### 3.2

#### **whole edible insects**

edible insect products presented in their natural form after primary processing to minimize microbiological contamination and moisture

### 3.3

#### **ground edible insect products**

edible insect products presented as meal, pellets or crumbs after primary processing to minimize microbiological contamination and moisture

### 3.4

#### **defatted edible insect products**

edible insect products presented as whole insect or ground insect product that has undergone additional processing to remove a portion of the fat content

### 3.5

#### **extruded edible insect products**

insect products presented as whole insect or ground insect product that has undergone additional processing using an extruder

## 4 General requirements

Dried insect products for compounded animal feeds shall be free from:

- a) adulterants, extraneous material and objectionable odour;
- b) infestation and contamination from pests; and
- c) moulds and fungi

### 4.1 Ingredients

4.1.1 Dried edible insect products for compounded animal feeds shall be produced from edible species.

4.1.2 The product may contain optional ingredients to improve the palatability and when used they shall be suitable for animal feeding and comply with relevant standards.

#### 4.2 Presentation of dried insect products for compounded animal feed

Dried edible insect product for compounded animal feeds may be presented in the form of:

- a) whole edible insects;
- b) ground edible insect products;
- c) defatted edible insect products; and
- d) extruded edible insect products

#### 4.3 Specific requirements

Dried insect products for compounded animal feeds shall comply with specific requirements prescribed in Table 1, when tested in accordance with the test methods provided therein.

**Table 1 - Specific requirements for dried insect products**

S/N	Parameters	Whole, ground or extruded	Defatted	Test method
i.	Moisture content (%), max.	12	12	ISO 6496
ii.	Crude protein (% DM), min	30	30	ISO 5983-1
iii.	Crude Fat (% DM), max.	40	12	ISO 11085
iv.	Crude Fiber (%DM), max.	12	15	ISO 5498
v.	Total ash (% DM), max	15	20	ISO 5984
vi.	Acid insoluble ash (%DM), max.	4	4	ISO 5985
vii.	Calcium (%DM), min.	3	3	ISO 6490-1
viii.	Phosphorous, (%DM), min.	0,6	0,6	ISO 6491
ix.	Sodium Chloride, (%DM), max.	2	2	ISO 6495

#### 5 Hygiene

Dried insect products for compounded animal feeds shall be prepared in accordance with provisions specified in CAC RCP 1

#### 6 Microbiological limits

Dried insect products shall not exceed microbiological limits as shown in Table 2 when tested in accordance with test methods specified therein.

**Table 2 - Microbial limits for dried insect products**

S/N	Microorganism	Maximum limits	Test method
I.	Total Viable Count, cfu/g	10 <sup>5</sup>	ISO 4833-1
II.	Total coliform count cfu/g	500	ISO 4832
III.	<i>Escherichia coli</i> cfu/g	10	ISO 16649-2

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IV.	<i>Salmonella spp</i> in 25 g	Absent	ISO 6579-1
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## 7 Contaminants

### 7.1 Heavy metals

Dried edible insect products for compounded animal feeds shall comply with the maximum limits of heavy metals as specified in Table 3 when tested in accordance with the test methods specified therein.

**Table 3 - Heavy metal limits in dried edible insect products**

S/N	Metal contaminants	Maximum limits mg/kg	Test method
i	Arsenic	0,1	ISO 27085
ii	Lead	0,5	
iii	Cadmium	0,4	
iv	Mercury	0,1	

### 7.2 Aflatoxins

Dried edible insect products for compounded animal feeds shall comply with the maximum aflatoxin limits as specified in Table 3 when tested in accordance with the test methods specified therein.

**Table 4 - Aflatoxin limits in dried edible insect products**

Contaminant	Maximum limits ppb	Test method
Total aflatoxin	10	ISO 16050
Aflatoxin B1	5	ISO 17375

### 7.3 Pesticides and antibiotics

Pesticide and antibiotic residues in dried edible insect products for compounded animal feeds shall comply with the maximum pesticide and antibiotic residue limits established by the Codex Alimentarius Commission.

## 8 Packaging

**8.1** Dried insect products shall be packaged in clean, food grade packaging materials which are strong and sufficiently sealed so as to withstand reasonable handling without tearing, bursting or falling open during normal handling and transportation.

**8.2** The containers shall be free from parasites and any disease-causing agents.

**8.3** Containers for insect products shall be clean and free from visible indications of contamination.

## 9 Labelling

In addition to the requirements in ARS 56, each package shall be legibly and indelibly marked with the following information;

- a) name of product "Dried edible insect products for compounded animal feeds"
- b) presentation form of insect product;
- c) net weight of the product;
- d) the species and life stage of insect used;
- e) batch number;
- f) name and address including physical addresses of the manufacturer;
- g) country of origin,
- h) date of manufacture and expiry date;
- i) declaration of crude protein (%), crude fat (%), Crude fibre (%), Calcium and Phosphorus (%)
- j) instructions for use, handling and storage

## **10 Sampling**

Sampling shall be done in accordance with ISO 6497.

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