DKS 2711:2016

KENYA STANDARD

Dried Insect products for compounding animal feeds - Specification

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TECHNICAL COMMITTEE REPRESENTATION

The following organizations were represented on the Technical Committee:

1. Ministry of Agriculture Livestock Fisheries — State Department of Livestock
2. Kenyatta University—Department of animal science
3. Kenya Agricultural Research Institute (KARI)
4. Unga Farm Care EA Ltd.
5. Modern Ways Ltd.
6. ICIPE
7. Department of Veterinary Services
8. AKEFEMA-Association of Kenya Feed Manufacturers
9. Government chemist department.
10. Pioneer Feeds Ltd
11. Embu University
12. Pembe Flour Mills
13. Joeliz Bone meal Ltd.
14. Proctor and Allan (EA) Ltd
15. IDRC/ACIAR, NWO, GIZ and DANIDA
16. Kenya Marine and Fisheries Research Institute
17. Kenya Bureau of Standards — Secretariat

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FOREWORD

This Kenya Standard was prepared by the Animal Feeds Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

The supply of feed ingredients especially the animal protein based ingredients is becoming limited due to the increase in consumption of animal products and nutrition challenges prevailing in Kenya. To address this challenge, it has become necessary to seek for an alternative animal protein source and insect products are potential candidates since insects are naturally part of animal diets. Insects grow and reproduce easily, have high feed conversion efficiency and can even be reared on bio-waste streams. These organic waste would otherwise go to dumping sites/ landfills,thereby worsening environmental contamination. It is technically feasible to produce insects on a large scale and to use them as alternative sustainable protein rich ingredient in cattle, fish, pig and poultry diets. The insect based protein wil also reduce the foreighn exchange used in importing protein based ingredients. However, scaling up of insects production is hindered by lack of policies and standards in Kenya..

It is anticipated that this standard will assist both manufacturers of insect products and animal feeds to maintain good quality and exercise proper quality control during production.

In the preparation of this standard, reference was made to:

- Fertilizers and Animal Feedstuffs Act, Cap 345.
- World Bank, 2013. Fish to 2030, prospects for fisheries and aquaculture.
- FAO 2013. Edible insects Future prospects for food and feed security. FAO, Rome

Acknowledgment is made for the assistance received from these sources.

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1. SCOPE

This Kenya Standard prescribes the requirements for dried insect products as sources of protein for compounding animal feeds.

2 Normative references

The following referenced documents are indispensable for the application 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

(i) KS 2543:2014 The animal feed industry - Code of practice
(ii) KS 63- Methods of test for animal feedstuffs
(iii) KS ISO 4832 — Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of coliforms — Colony-count technique.
(iv) KS 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-bromo-4-chloro-3-indolyl beta-D-glucuronide.
(v) KS ISO 6579 Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella spp.

3. DEFINITION

3.1 Insect products — Shall include adult, nymphal, larval or pupal stages of insects or processed insect material for use as an animal feed ingredient.

3.2 Whole insects – Shall be insect material presented in their natural form after primary processing to minimize microbiological contamination and moisture.

3.3 Ground insect product– Shall be insect material presented as meal, pellets or crumbs after primary processing to minimize microbiological contamination and moisture.

3.4 Classes of Insect product covered in the standard

3.4.1 High protein whole or ground insect product-Shall be insect material produced from insects with crude protein of 50% and above on dry matter basis (DM).

3.4.2 **Low protein whole or ground insect product** - Shall be insect material produced from insects with crude protein of minimum 30% and below 50% on dry matter basis (DM).

3.5 Defatted insect product – Shall be insect material presented as whole insect, meal, pellets or crumbs that has undergone additional processing to remove a portion of the fat content.

4. GENERAL REQUIREMENTS

4.1 Insect products shall be within acceptable levels of toxic substances and pathogenic micro-organisms.

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4.2 Insect products shall be free from adulterants, extraneous material and objectionable odour.

4.3 Insect products shall be free from infestation and contamination from pests

5.0 Specific nutritional requirements for insect products

Insect products shall also conform to the nutritional requirements prescribed in Table 1.

Table 1: Nutritional requirements for different classes of dried insect products

Parameters (%DM)	Whole or ground insects (Low protein)	Whole or ground insects (High protein)	Defatted insect meal	Test method
Moisture Content (max)	10	10	10	KS -63*
Crude protein (Low protein range)	30 - 49	50(min)	45(min)	"
Fat (max)	40	30	12	"
Fibre (max)	12	12	15	"
Total ash (max)	15	15	20	"
Acid insoluble ash (max)	4	4	4	"
Calcium (max)	5	5	5	"
Phosphorous (min)	0.6	0.6	0.6	"
Lysine (min)	1.0	2.4	1.0	"
Methionine (min)	0.4	0.7	0.4	KS -63

*Methods of test for animal feedstuffs

6.0 Microbiological requirements

Insect products shall conform to microbiological requirements as shown in Table 2.

Table 2— Microbiological limits

Microorganism	Max. limit (CFU/ml)	Test method
Total Viable Count (TVC)	-	KS 63
Total Coliform Count	500	KS ISO 4832
Escherichia coli (pathogenic)	Nil	KS ISO 16649
Salmonellae sp	Nil	KS ISO 6579

7.0 Heavy metals and pesticide residues

Heavy metal contaminants, drugs and pesticide residues, shall not exceed the limits established by the Codex Alimentarius

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8.0 Aflatoxins

Total aflatoxin level shall not exceed 20ppb.

9.0 Packaging and Labelling

9.1 Packaging

9.1.1 Insect products for sale shall be packed in containers which are strong and sufficiently sealed so as to withstand reasonable handling without tearing, bursting or falling open during normal handling and transportation. The containers shall be free from parasites and any disease causing agents.

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

9.2 Labelling — the packages shall be securely closed and marked with the following information:

(i) Name and class of insect product;

(ii) Net Weight of the product;

(iii) The species of insect used;

(iv) Batch number;

(v) Name and physical address of the manufacturer;

(vi) Date of manufacture and expiry date;

(vii) Nutrient declaration:- Crude protein (%), Crude Fat (%) and Moisture content (%)

(viii) Instructions for storage and handling

10. SAMPLING

For the purpose of determining compliance with this standard, samples of insect products shall be collected from the market or elsewhere and shall be required to comply with all the requirements of this Kenya Standard.

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Annex 1(informative)
Potential species for production of insect products

Insect products may be produced from Black Soldier Fly larvae and pupae (*Hermetia illucens*); Crickets adults and nymphs (Family Gryllidae); Blowfly/Housefly larvae and pupae (Calliphioridae/ Muscidae); Grasshopper adults and nymphs (Sub-order Caelifera); Silkworm pupae (*Bombyx* spp.); mealworm larvae and pupae (*Tenebrio* spp); Termite adults (Termitidae); Lakefly adult larvae and pupae (Chironomidae, Chaoboridae, Ephemeroptera), cockroach adult and nymph (Blattelidae) among others.