GHANA STANDARDS AUTHORITY

GHANA STANDARD **GS 1382:2023**

ANIMAL FEEDING STUFF – SPECIFICATION FOR DRIED INSECT PRODUCTS FOR COMPOUNDED ANIMAL FEED

COMPLIMENTARY COPY 2023. IITA GHANA - CSIR CAMPUS

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Foreword

The Ghana Standards Authority is the National Statutory Body responsible for the development and promulgation of Ghana Standards.

The Ghana Standards Authority is a member of the African Organization for Standardization (ARSO), the International Organization for Standardization (ISO) and an associate member of the International Electrotechnical Commission (IEC).

This Ghana Standard outlines the essential requirements for dried insect products for compounded animal feed.

The Committee responsible for the development of this standard is the National Technical Committee for Agriculture (GSA / TC 12).

This is the first edition.

Users of this standard should note that the standard undergoes revision from time to time and any references to it statutorily imply its latest edition.

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GHANA STANDARD **GS 1382:2023**

Animal Feeding Stuff – Specification for Dried Insect Products for Compounded Animal Feed

1 Scope

This Ghana Standard specifies the requirements, sampling and methods of test for dried insects products for compounded animal feed. This standard also covers dried insect products as animal feed ingredient.

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.

2.1 GS ISO 6497 - Animal feeding stuffs - Sampling

2.2 GS ISO 16050 - Foodstuffs - Determination of Aflatoxin B1 and Total Content of Aflatoxins B1, B2, G1 and G2 in Cereals, Nuts and Derived Products - High Performance Liquid Chromatographic Method

2.3 ISO 712 - Cereals and cereal products — Determination of moisture content — Reference method

2.4 ISO 776 - Pulps — Determination of acid-insoluble ash

2.5 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

2.6 ISO 4833-2 - Microbiology of the food chain — Horizontal method for the enumeration of microorganisms — Part 2: Colony count at 30 °C by the surface plating technique

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

2.8 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

2.9 ISO 6579-1 - Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp.

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2.10 ISO 2481 - Sodium chloride for industrial use — Determination of halogens, expressed as chlorine — Mercurimetric method

2.11 AOAC 2003.06 - Crude Fat in Feeds, Cereal Grains, and Forages

2.12 AOAC 978.10 - Fiber (crude) in animal feed and pet foo

2.13 AOAC 923.03 - Ash of flour. Direct method

2.14 EN 15763 - Foodstuffs. Determination of trace elements. Determination of arsenic, cadmium, mercury and lead in foodstuffs by inductively coupled plasma mass spectrometry (ICPMS) after pressure digestion

2.15 EN 13806, Foodstuffs - Determination of trace elements. Determination of mercury by cold-vapour atomic absorption spectrometry (CVAAS) after pressure digestion

2.16 GS CXC 1, Recommended International Code of Practice - General Principles of Food Hygiene

2.17 CAC/RCP 54, Code of practice on good animal feeding

2.18 Codex Pesticide Residues in Food – Online database

3 Terms and definitions

For the purposes of this standard the following definitions apply.

3.1
insect products
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 insects
edible insect product presented in their natural form after primary processing to minimize microbiological contamination and moisture

3.3
ground insect product
edible insect product presented as meal, pellets or crumbs after primary processing to minimize microbiological contamination and moisture

3.4
defatted insect product
insect material presented as whole insect, meal, pellets or crumbs that has undergone additional processing to remove a portion of the fat content

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3.5
extruded edible insect product
insect product presented as whole insect or ground insect product that has undergone additional processing using an extruder

4 General Requirements

4.1 Ingredients

4.1.1 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 / requirements.

4.1.2 Dried insect products shall be free from adulterants, extraneous material and objectionable odour.

4.1.3 Dried insect products shall be free from infestation and contamination from pests.

4.1.4 Dried insect products shall be free from moulds and fungi.

4.1.5 Dried insect products shall be within acceptable levels of toxic substances and pathogenic micro-organisms.

4.2 Presentation of dried insect products

Dried insect products shall be presented as follows;

i. whole edible insects;
ii. ground edible insect products;
iii. defatted edible insect products; and
iv. extruded edible insect products

4.3 Specific requirements

Dried insect products shall also conform to the quality criteria specified in Table 1, when tested in accordance with the appropriate methods of test.

Table 1 - Nutritional requirements for dried insect products.

Parameters	Whole, ground or extruded	Defatted insect product	Test method
Moisture content, (%), max.	12	12	ISO 712
Crude protein (%DM), min.	30	30	AOAC 2001.11
Fat (%DM), max.	40	12	AOAC 2003.06
Fibre (%DM), max.	12	15	AOAC 978.10
Total ash, (% DM), max.	15	20	AOAC 923.03

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Acid insoluble ash, (% DM), max.	4	4	ISO 776
Calcium, (% DM), min.	3	3	EN 15763
Phosphorus, (%DM), min.	0,6	0,6	EN 15763
Sodium Chloride, (%DM), min.	2	2	ISO 2481

4.4 Grading by crude protein content

In addition to the minimum requirements in Table 1, dried insect products shall be graded as follows, based on the crude protein content.

4.4.1 high protein content
Insect products in this grade shall contain not less than 50 % crude protein on dry matter basis (DM).

4.4.2 medium protein content
Insect products in this grade shall contain between 30 % and 49 % crude protein on dry matter basis (DM).

5. Hygiene

It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the relevant sections of GS CXC 1, Recommended International Code of Practice - General Principles of Food Hygiene and CAC/RCP 54, Code of practice on good animal feeding.

5.1 Microbial requirements

Dried insect products shall conform to the microbiological limits specified in Table 2, when tested in accordance with the appropriate methods of test.

Table 2 - Microbial limits for dried insect products

Microorganism	Maximum limit	Test method
Total viable count (TVC), cfu/g	10^4	ISO 4833-1,2
Total coliform count, cfu/g	500	ISO 4832
Escherichia coli, cfu/g	10	ISO 16649 – 2
Salmonella spp in 25 g	Absent	ISO 6579-1

6. Contaminants

6.1 Heavy metals

Dried edible insect products shall comply with the maximum limits as specified in Table 3 when tested in accordance with the appropriate methods of test.

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Table 3 - Limits for heavy metals in dried edible insect products

Heavy metal	Maximum limit mg/kg	Test method
Arsenic	0,1	EN 15763
Lead	0,5	
Cadmium	1,4	
Mercury	0,1	EN 15763, EN 13806

6.2 Pesticide and antibiotics residues

Dried insect products shall comply with those maximum residue limits for pesticides and antibiotics established by the Codex Alimentarius Commission (Codex Pesticide Residues in Food – Online database) for this commodity.

6.3 Aflatoxin

Aflatoxin contamination shall not exceed 10 ppb for total aflatoxin and 5 ppb for aflatoxin B1 when tested according to the methods specified in GS ISO 16050.

6.4 Veterinary drug residue

Dried insect products shall comply with those maximum residue limits for veterinary drug residues established by the Codex Alimentarius Commission (Codex Veterinary Drug Residues – Online database) for this commodity.

7. Packaging and Labelling

7.1 Packaging

Dried insect products shall be packaged in suitable containers which are strong and sufficiently sealed so as to withstand reasonable handling without tearing, bursting or falling open during normal handling and transportation.

7.2 Labelling

Each package of dried insect product shall be indelibly and legibly marked with the following information.

i) Name of product “Dried insect product for compounded animal feeds / animal feed ingredient”
ii) Form of presentation
iii) Grade and crude protein content (%)
iv) Net weight of the product (SI unit)
v) The species and life stage of the insect used
vi) Batch number
vii) Name and physical / digital address of the manufacturer;
viii) Country of origin
ix) Date of manufacture and best before date;
x) Nutrient declaration: Crude Fat (%) and Moisture content (%)
xi) Instructions for use, handling and storage

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8. Sampling

Sampling shall be done in accordance with the appropriate sections of GS ISO 6497.

9. Criteria for Conformity

A lot shall be declared as conforming to this standard if the final sample satisfies all the requirements given in this specification, GS 1382.

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Annex A

(informative)

List of insects recommended for the production of processed animal proteins intended as feed/ feed ingredients for farmed animals.

Insect products may be produced from;

i. Black Soldier Fly larvae and pupae (*Hermetia illucens*);
ii. Crickets adults and nymphs (Family Gryllidae);
iii. Blowfly/Housefly larvae and pupae (Calliphioridae/ Muscidae);
iv. Grasshopper adults and nymphs (Sub-order Caelifera);
v. Silkworm pupae (*Bombyx* spp.);
vi. Mealworm larvae and pupae (*Tenebrio* spp);
vii. Termite adults (Termitidae);
viii. Lakefly adult larvae and pupae (Chironomidae, Chaoboridae, Ephemeroptera),
ix. Cockroach adult and nymph (Blattelidae) among others.
x. Palm weevil larvae *(Rhynchophorus spp)*

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International Platform of Insects for Food and Feed (IPIFF). 2022. Guide on good hygiene practices for European Union producers of insects as food and feed

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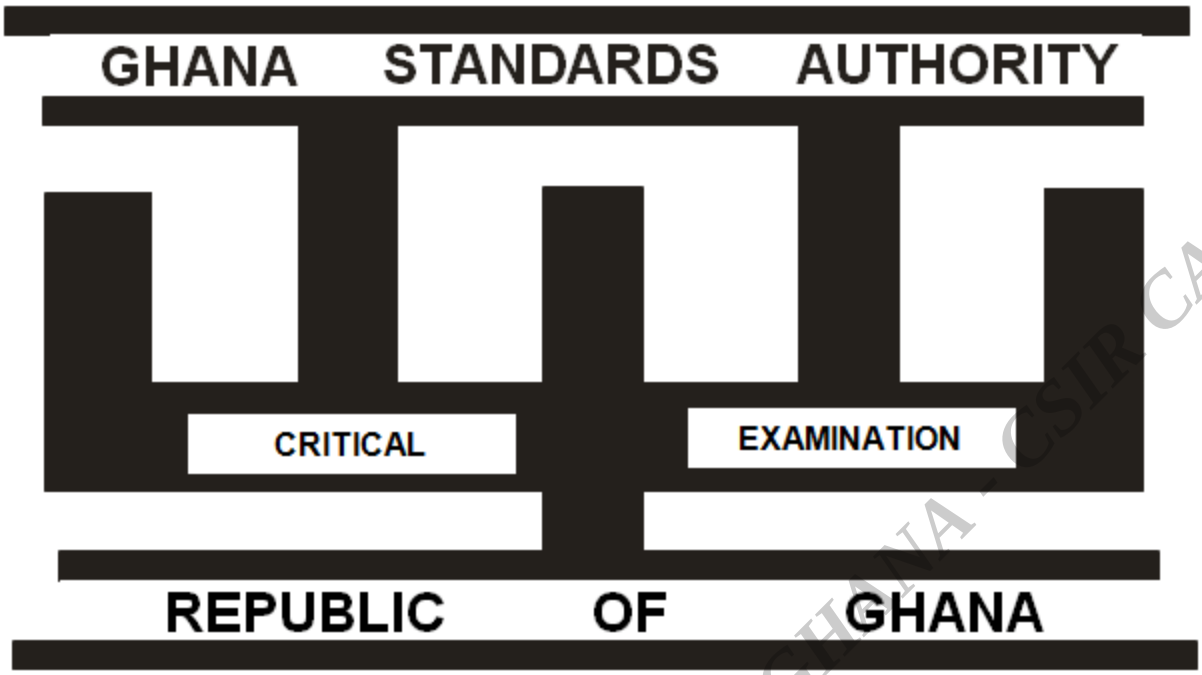

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Figure 2 – An illustration of the Layout of Information for Company Licence Number and the Standard Number on the Ghana Standards Certification Mark

THE GHANA STANDARDS CERTIFICATION MARK

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