

DRAFT UGANDA STANDARD

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Edible insects — Specification



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Contents

Page

| | |
|--|------------------------------|
| Foreword | iv |
| Introduction..... | Error! Bookmark not defined. |
| 1 Scope | 1 |
| 2 Conformance | Error! Bookmark not defined. |
| 3 Normative references | 1 |
| 4 Terms and definitions | 1 |
| 5 Symbols (and abbreviated terms) | 2 |
| 6 Clause | Error! Bookmark not defined. |
| 6.1 Subclause (level 1) | Error! Bookmark not defined. |
| 6.1.1 Subclause (level 2) | Error! Bookmark not defined. |
| 6.1.2 Subclause (level 2) | Error! Bookmark not defined. |
| 6.2 Subclause (level 1) | Error! Bookmark not defined. |
| 7 Clause | Error! Bookmark not defined. |
| 8 Special | Error! Bookmark not defined. |
| Annex A (normative) Annex title | 5 |
| A.1 General | 5 |
| A.2 Clause | Error! Bookmark not defined. |
| A.2.1 Subclause (level 1) | Error! Bookmark not defined. |
| A.2.2 Subclause (level 1) | Error! Bookmark not defined. |
| A.3 Clause | Error! Bookmark not defined. |
| Annex B (informative) Which styles correspond to which element — Quick reference guide | Error! Bookmark not defined. |
| Bibliography | 8 |

Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Trade, Industry and Cooperatives established under Cap 327, of the Laws of Uganda, as amended. UNBS is mandated to coordinate the elaboration of standards and is

- (a) a member of International Organisation for Standardisation (ISO) and
- (b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and
- (c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

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 key stakeholders including government, academia, consumer groups, private sector and other interested parties.

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.

The committee responsible for this document is Technical Committee UNBS/TC 2, *Food and agriculture*

Introduction

Entomophagy (the practice of eating insects) as well as their use in livestock and pet feeds are increasing world-wide (Ssepuuya, Mukisa & Nakimbugwe, 2016). People throughout the world have been eating insects as a regular part of their diets for millennia. The earliest citing of entomophagy can be found in biblical literature; nevertheless, in some societies there remains a degree of disdain and disgust for their consumption (FAO, n.d). In Uganda, the most commonly consumed insects are termites (*Macrotermes* Spp) and grasshoppers (*Ruspolia nitidula*), consumed among many cultures. These insects though seasonal, form an important part of Ugandan diets since time immemorial (Mbabazi, Byaruhanga, & Omara, 2011). These insects are not only an emergency resource but are appreciated as palatable and tasty. A lot more species of edible insects are consumed in Africa (Annex 1).

Edible insects have been well-recognized worldwide as nutritious food, they provide proteins (amino acids such as methionine, cysteine, lysine, and threonine), carbohydrate, fats, some minerals (calcium, iron, zinc, phosphorous), some essential vitamins—vitamin A, B complex, C (Johnson, 2010). Although the majority of edible insects are gathered in forest habitats, mass-rearing systems are being developed in many countries. Edible insects offer a significant opportunity to merge traditional knowledge and modern science to improve human food security worldwide. Given the increasing trade in edible insects and their products in Uganda, there is need for standards to regulate their quality

Edible insect — Specification

1 Scope

This Draft Uganda standard specifies the requirements, sampling and test methods for edible insects.

2 Normative references

The following referenced documents 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.

US ISO 6496, Animal feeding stuffs -- Determination of moisture and other volatile matter content

US ISO 5983-1, Animal feeding stuffs -- Determination of nitrogen content and calculation of crude protein content -- Part 1: Kjeldahl method

US ISO 6492, Animal feeding stuffs -- Determination of fat content

US ISO 5984, Animal feeding stuffs -- Determination of crude ash

US ISO 5985, Animal feeding stuffs -- Determination of ash insoluble in hydrochloric acid

US ISO 4833-1, Microbiology of the food chain -- Horizontal method for the enumeration of microorganisms -- Part 1: Colony count at 30 degrees C by the pour plate technique

US EAS 38, Labelling of pre-packaged foods — General requirements

US EAS 39, Hygiene in the food and drink manufacturing industry — Code of practice

US 45, *General standard for food additives*

US ISO 4832 Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of coliforms -- colony-count technique

US ISO 16649, 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

ISO 6888-3, Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of coagulase-positive staphylococci (staphylococcus aureus and other species) -- part 3: detection and MPN technique for low numbers

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1.

Whole edible insects

Edible insects, farmed or wild-harvested, intended for human food in their natural form after primary processing to minimize contamination and improve palatability.

3.2

Insect powder

Is a particulate product obtained after milling/grinding edible insects

3.3

Insect paste

Is a semi solid product obtained after milling/grinding edible insects

3.4

extraneous material

any material that is not of that particular edible insect e.g species, castes, sand, stones, metallic chips, plant parts, pests, etc

4 Requirement

4.1 General requirements

Edible Insect shall be:

- a) in form of either whole or granulated or powder or paste and either fried or dried
- b) characteristic of the colour of the insect prepared
- c) free from adulterants, extraneous material and objectionable odour.
- d) free from infestation and contamination from pests

4.2 Edible insects may be whole or with some body parts removed.

4.3 Acceptable food grade ingredients and seasonings may be used.

5.0 Specific requirements

Edible insects shall conform to the specific requirements when tested with the test methods described in table 1.

Table 1: Specific requirements for edible insects (dried insects and Fried edible insects)

| s/n | Parameter | Limits, %, m/m | Test method |
|-----|-----------------------------------|----------------|---------------|
| i | Moisture Content (max) | 13 | US ISO 6496 |
| ii | Crude protein, (Min), | 20 | US ISO 5983-1 |
| iii | Free fatty acid , max), mg/g | 205 | US ISO 6492 |
| iv | Total ash (max) | 15 | US ISO 5984 |
| v | Acid insoluble ash, (max), %, m/m | 4 | "US ISO 5985 |

5 Food additives

Only the food additives permitted in US 45 standards for food additives may be used except colourants

6 Contamination

6.1 Pesticide

Edible insects shall comply with the maximum pesticide residue and veterinary residues limits established by CODEX Alimentarius commission for similar commodities.

6.2 Heavy metals

The maximum content of lead (Pb) in edible insects flour when determined in accordance with the method described in AOAC 972.25 shall not exceed 0.2 mg/kg. The product shall not contain other heavy metal contaminants in amounts which may represent a hazard to health.

6.3 Aflatoxin

The maximum content of aflatoxins in edible insects when determined in accordance with the method described in US ISO 16050 shall not exceed 5 µg/kg (ppb) for aflatoxin B₁ and 10 µg/kg for total aflatoxins

7 Hygiene

7.1 Edible insects shall be produced, prepared and handled in accordance with the provisions of appropriate sections of US EAS 39.

7.2 Edible insect shall conform to the microbial limits stated in table 2:

Table 2: Microbiological requirements for edible insects

| s/n | Requirement | Limits (maximum) | Test method |
|-----|--|------------------|----------------|
| i | Total plate count, cfu/g | 10 ⁵ | US ISO 4833-1 |
| ii | Staphylococcus spp, cfu/g | Absent | US ISO 6888-3, |
| iii | <i>Eschericia. coli</i> count per g, Max | Absent | US ISO 11866 |
| iv | Salmonella sp, 25g, | Absent | US ISO 6785 |
| v | Yeast and moulds, cfu/g | 10 ³ | US ISO 661 |

8 Packaging

Edible insects shall be packaged in food grade containers which will safeguard the hygienic, nutritional, and organoleptic qualities of the product

9 Labelling

In addition to the requirements in US EAS 38, each package shall be legibly and indelibly labelled with the following:

- a) The name of the product shall be Edible insects and the common name of the insect Brand name/trade name;
- b) the name and physical address of the manufacturer;
- c) lot identification
- d) net weight in metric units;
- e) date of manufacture;
- f) country of origin;
- g) storage conditions;
- h) list of ingredients
- i) expiry date

9.2 Nutrition labelling

The amount of nutrients in edible insects shall be declared on the label in accordance with US EAS 803.

9.3 Nutrition and health claims

Edible insects may have claims on the importance of the micronutrients in nutrition and health. Such claims when declared shall be consistent with US EAS 804 and US EAS 805.

10 Sampling

Methods of sampling of edible insects shall be accordance with US EAS 900

Annex A
(normative)

Inventory of most consumed insect species in Africa

| Insect order | Species name | Common names |
|--------------|--|---|
| Lepidoptera | <i>Bunaeaalcinoë</i> (Stoll) | Cabbage tree emperor moth |
| | <i>Anaphe panda</i> (Boisduval) | Boisduval silk worm |
| | <i>Cirinaforda</i> (Westwood) | Pallid emperor moth/sheafoliator |
| | <i>Gonimbrasiabelina</i> | Mopane worm |
| | <i>Imbrasiaertli</i> (Rebel) | Confused emperor |
| | <i>Anaphevenata</i> (Butler) | African silk worm |
| | <i>Cirinabutyrospirmi</i> (Vuillot) | Larvae of scarab beetle/ tree caterpillar |
| | <i>Imbrasiaoyemensis</i> (Rougeot) | |
| | <i>Eumetacervina</i> (Druce) | Bag worm |
| | <i>Gynanisaata</i> (Strand) | |
| | <i>Urotasinope</i> | Tailed emperor |
| | <i>Dactylocerastucina</i> (Drury) | Drury's owl moth |
| | <i>Platysphinxstigmatica</i> (Mabill) | |
| | <i>Epanaphecarteri</i> (Walsingham) | |
| | <i>Imbrasiaepimethea</i> (Drury) | |
| | <i>Agrius convolvuli</i> | Sweet potato hawkmoth |
| | <i>Gynanisamaja</i> | Emperor moth |
| | <i>Imbrasiacytherea</i> | Pine tree emperor moth |
| | | |
| Orthoptera | <i>Schistocerca gregaria</i> (Forskål) | Desert locust |

| | | |
|------------|--|--|
| | <i>Locustamigratoriamigratorioides</i> | Migratory locust |
| | <i>Nomadacrisseptemfasciata</i> (Serville) | Red locust |
| | <i>Locustanapardalina</i> (Walker) | Brown locust |
| | <i>Anacridiummelanorhodonmelanorhodon</i> (Walker) | Sahelian tree locust |
| | <i>Acanthacrisruficornis</i> (Fabricius) | Garden locust |
| | <i>Ruspoliadifferens</i> (Serville) | Bush cricket/katydid, edible grasshopper |
| | <i>Zonocerus variegatus</i> (Linnaeus) | Variegated grasshopper |
| | <i>Gryllusbimaculatus</i> (De Geer) | Field crickets |
| | <i>Acheta domesticus</i> | House crickets |
| | <i>Henicuswhellani</i> (Chopard) | |
| | <i>Brachytrupesmembranaceus</i> (Drury) | Giant cricket/Large African cricket |
| | <i>Gastrimargus africanus</i> (Saussure) | Short horned grasshoppers |
| | <i>Paracinema tricolor</i> (Thunberg) | Tri-color grasshopper |
| | <i>Ruspolianitidula</i> | Large cone-headed grasshopper |
| Coleoptera | <i>Oryctes spp.</i> | Coconut rhinoceros beetle |
| | <i>Rhynchophorus</i> spp | Palm weevils |
| | <i>Rhynchophorusphoenicis</i> (Fabricius) | African palm weevil |
| | <i>Oryctesowariensis</i> (Palisot de Beauvois) | |
| | <i>Goliathus spp.</i> | Goliath beetle |
| | <i>Augosoma sp.</i> | Centaur Rhino beetle. |
| | <i>Sternoceras</i> spp | |
| | | |
| Isoptera | <i>Macrotermesbellicosus</i> (Smeathman) | Mound-building termite |
| | <i>Macrotermessubhyalinus</i> (Rambur) | Soldier termite |
| | <i>Macrotermesfalciger</i> (Gerstäcker) | Termite |

| | | |
|-------------|--|---|
| | <i>Macrotermes natalensis</i> (Haviland) | Fungus-growing termite |
| | <i>Macrotermes mossambicus</i> (Hagen) (<i>Macrotermes michaelsoni</i>) | African termite |
| | | |
| Hymenoptera | <i>Apis mellifera mellifera</i> (Linnaeus) | The Western/European honey bee |
| | <i>A. mellifera adansonii</i> (Latreille) | West African honey bee |
| | <i>Carebaravidua</i> (Smith) | Black ant |
| | <i>Carebaralignata</i> (Westwood) | Minor worker |
| | <i>Oecophylla longinoda</i> (Latreille) | Weaver ant |
| | <i>Polistes hebraeus</i> Fabricius and <i>Vespula</i> sp. | Yellow oriental paper wasp and common wasps |
| | | |
| Hemiptera | <i>Encosternum delegorguei</i> (Spinola) | Edible stinkbug |
| | <i>Coridius viduatus</i> (Fabricius) | Melon bug |
| | <i>Agonoscelis versicolor</i> (Fabricius) | Cluster bug |
| | <i>Agonoscelis pubescens</i> (Thunberg) | Sudan millet bug |
| | <i>Lobaleopardina</i> (Distant) | |
| | | |

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