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DRAFT MALAWI STANDARD

Edible mushroom and mushroom products – Specification

(Second draft: 2016-08)

NOTE: This is a draft proposal and it shall neither be used nor regarded as a Malawi Standard

Edible mushroom and mushroom products – Specification

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TABLE OF CONTENTS

Contents	Page
Foreword.....	i
Technical Committee	i
Notice.....	i
Scope.....	1
Normative reference	1
Essential composition and quality factors.....	3
Food additives	7
Hygiene.....	8
Weights and measures	8
Packing, storage and transportation.....	9
Labelling	9
Methods of analysis and sampling	10

FOREWORD

This draft Malawi standard has been prepared by *MBS/TC 16*, Technical committee on *Primary Agricultural Products*, to provide a specification for edible mushroom and mushroom products.

The draft standard is identical to the following international standard:

Codex Stan 38, *General standard for edible fungi and fungus products*.

Acknowledgement is made for the use of the information.

TECHNICAL COMMITTEE

This draft Malawi standard was prepared by *Technical Committee MBS/TC 16, Primary Agricultural Products*, and the following companies, organizations and institutions were represented:

- ADMARC Limited;
- Agricultural Commodity Exchange for Africa;
- Auction Holdings Commodity Exchange;
- Bakhresa Grain Milling Malawi Limited;
- Blantyre Agricultural Development Division;
- Bvumbwe Agricultural Research Station;
- Lilongwe University of Agriculture and Natural Resources (LUANAR) – Bunda Campus;
- Malawi Bureau of Standards;
- National Smallholder Farmers' Association of Malawi (NASFAM);
- Rab Processors Limited; and
- Transglobe Produce Export Limited.

NOTICE

This standard shall be reviewed every five years, or earlier when it is necessary, in order to keep abreast of progress. Comments are welcome and shall be considered when the standard is being reviewed.

DRAFT MALAWI STANDARD

Edible mushroom and mushroom products – Specification

1 SCOPE

This draft Malawi standard contains general requirements applicable to all edible mushroom (fungi), whether fresh or processed, permitted for sale by the competent authorities in the consuming countries, except canned cultivated mushrooms of the genus *Agaricus*. Different requirements for the products covered by this standard may be laid down in group of products standards or in individual standards.

2 NORMATIVE REFERENCE

The following standards contain provisions, which through reference in this text, constitute provisions of this Malawi standard. All standards are subject to revision and, since any reference to a standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent edition of the standard indicated below. Information on current valid national and international standards can be obtained from the Malawi Bureau of Standards.

MS 19: *Labelling of prepacked foods – General standard;*

MS 21: *Food and food processing units – Code of hygienic conditions.*

CAC/RCP 2: *Code of hygienic practice for canned fruit and vegetable products recommended by the Codex Alimentarius Commission;*

MS XX: *Code of hygienic practice for dehydrated fruits and vegetables, including edible fungi recommended by the Codex Alimentarius Commission;*

CAC/RCP 8: *Code of hygienic practice for the processing and handling of quick frozen foods.*

3 DESCRIPTION

3.1 Definition of products

3.1.1 Edible mushroom means fruit bodies of a specific plant group - mushroom which either grow wild or are cultivated and which after necessary processing are suitable for use as a food.

3.1.2 Species means botanical species and closely related varieties, i.e. varieties of *Boletus edulis* and round or pointed *Morchella* shall be regarded as being of the same species.

3.1.3 Fresh mushroom means edible mushroom sorted and packed, delivered to the consumer as soon as possible after they have been picked.

3.1.4 Mixed mushroom means the product prepared by mixing edible mushroom or recognizable parts of edible mushroom of different species according to established proportion after being sorted in accordance with sub-section 3.4 of this standard.

3.1.5 Mushroom products means dried edible mushroom (including freeze-dried mushroom, mushroom grits, mushroom powder), pickled mushroom, salted mushroom, fermented mushroom, mushroom in vegetable oils, quick frozen mushroom, sterilized mushroom, mushroom extract, mushroom concentrate and dried mushroom concentrate.

3.1.6 *Dried mushroom* means the product obtained by drying or freeze drying edible mushroom of one species, whether whole or sliced.

3.1.7 *Mushroom grits* means coarsely ground dried edible mushroom of one species.

3.1.8 *Mushroom powder* means dried edible mushroom of one species ground so finely as to allow the powder to pass through a sieve having a 200 microns mesh.

3.1.9 *Pickled mushroom* means fresh or previously preserved edible mushroom of one or more species appropriately prepared after previous cleaning, washing and blanching, soaked in vinegar and with or without the addition of salt, spices, sugars, vegetable oils, acetic, lactic, citric or ascorbic acid, and then pasteurized in hermetically sealed containers.

3.1.10 *Salted mushroom* means fresh edible mushroom of one species, either whole or sliced, preserved in brine after previous cleaning, washing and blanching.

3.1.11 *Fermented mushroom* means fresh edible mushroom of one species preserved by salt and by lactic acid fermentation.

3.1.12 *Quick frozen mushroom* means fresh edible mushroom of one species which, after cleaning, washing and blanching, are subjected to a freezing process in appropriate equipment and comply with the conditions laid down hereafter in this section and in sub-section 8.2 of this standard. This freezing operation shall be carried out in such a way that the range of temperature of maximum crystallization is passed quickly. The quick-freezing process shall not be regarded as complete unless and until the product temperature has reached -18 °C (0 °F) at the thermal centre after thermal stabilization.

3.1.13 *Mushroom extract* means a product concentrated from fresh edible mushroom juice or from dried mushroom water of edible mushroom of one or more species with the addition of salt and which is concentrated to 7 % of saltless extract.

3.1.14 *Mushroom concentrate* means a product concentrated from fresh edible mushroom juice or from dried mushroom water of edible mushroom of one or more species with the addition of salt and which is concentrated to 24 % of saltless extract.

3.1.15 *Dried mushroom concentrate* means the dried product obtained from mushroom extract or mushroom concentrate.

3.1.16 *Sterilized mushroom* means edible mushroom, either fresh, salted or frozen, of one more species, whole or sliced, packed in airtight containers in water and salt, and heat treated to a degree guaranteeing the resistance of the product to spoilage.

3.1.17 *Mushroom in olive oil and other vegetable oils* means edible mushroom either fresh or previously salted, of one species, whole or sliced, packed in airtight containers in olive oil or other edible vegetable oil and heat treated to a degree guaranteeing the resistance of the product to spoilage.

3.1.18 *Cakes or loaves of mushroom mycelium.*

3.2 Definition of defects

3.2.1

damaged mushroom

mushroom with more than quarter of the cap missing

3.2.2

crushed mushroom

parts of mushroom passing through a sieve having a 15 x 15 mm mesh for fresh mushroom and a 5 x 5 mm mesh for dried mushroom

3.2.3

spoiled mushroom

mushroom which are brownish or rotten as a result of attack by microorganisms and/or mould

3.2.4

maggot damaged mushroom

mushroom having holes caused by maggots

3.2.5

seriously maggot damaged mushroom

mushroom having four or more holes caused by maggots

3.2.6

organic impurities of vegetable origin

admixtures of other edible mushroom, parts of plants such as leaves and pine needles

3.2.7

mineral impurities

those substances which, after ashing, remain as insoluble residues in hydrochloric acid

3.3 Main species

All edible mushroom permitted for sale by the competent authorities in the consuming countries.

3.4 Examination and sorting of raw material

As there are edible mushroom which closely resemble inedible or poisonous mushroom, care shall be taken to ensure, when the mushroom are being picked, that only those of the same edible species are collected. Where such care has not been adequately exercised, the edible mushroom species shall be sorted from the collected mushroom, before they are marketed, preserved or used in the preparation of mushroom products. Wild mushroom which are to be marketed or preserved, or used in the preparation of mushroom products shall be carefully examined by an expert to determine whether there are any inedible mushroom amongst them, and such inedible mushroom shall be removed.

4 ESSENTIAL COMPOSITION AND QUALITY FACTORS

4.1 Fresh mushroom

4.1.1 Condition: Fresh edible mushroom shall be healthy, i.e. not spoiled, practically clean, firm, undamaged, free, as far as possible, from maggot damage and shall possess the flavour and taste appropriate for the species.

4.1.2 Composition: The number of stalks shall not exceed the number of caps.

4.1.3 Tolerances for defects

4.1.3.1 Wild growing mushroom

Mineral impurities not more than 1 % m/m

Organic impurities of vegetable origin not more than 0.3 % m/m

Content of maggot damaged mushroom not more than 6 % m/m of total damage including not more than 2 % m/m serious damage

4.1.3.2 Cultivated mushroom

Mineral impurities not more than 0.5 % m/m

Organic impurities
(including compost material)

1. for uncut mushroom not more than 8 % m/m

2. for cut mushroom not more than 1 % m/m

Content of maggot damaged mushroom not more than 1 % m/m of total damage including not more than 0.5 % m/m, serious damage

4.2 Mushroom products – General requirements

4.2.1 Raw material: only fresh edible mushroom which have been treated or processed immediately after they have been picked, before deterioration sets in, may be used in the preparation of mushroom products. Both as raw material and as preserved mushroom, they shall be healthy, clean, undamaged, free, as far as possible, of maggot damage and possess the flavour and taste appropriate to the species.

4.2.2 Permitted ingredients

Mushroom products may contain salt (sodium chloride), vinegar, spices and herbs, sugars (any carbohydrate sweetening matter), refined edible vegetable oil, refined edible animal fat, butter, milk, milk powder, cream, water and wine.

4.2.3 Styles

Processed mushroom may be presented in various styles, e.g. whole with stalks, whole caps (buttons) without stalks, slices, pieces and stalks, grits, powder or concentrate.

4.2.4 Other styles

Any other presentation of the product shall be permitted provided that the product:

- a) is sufficiently distinctive from other forms of presentation laid down in this standard;
- b) meets all relevant requirements of this standard, including requirements relating to limitations on defects, drained weight, and any other requirements in this standard which are applicable to that style in the standard which most closely resembles the style or styles intended to be provided for under this provision;
- c) is adequately described on the label to avoid confusing or misleading the consumer.

4.2.5 Composition

Except in the case of mushroom products consisting entirely of caps or where the addition of stalks is stated on the label in accordance with the provisions of sub-section 9.1.6, the number of stalks shall not exceed the number of caps.

4.3 Mushroom products – Special requirements

4.3.1 Dried mushroom

4.3.1.1 Quality criteria

- a) Colour and flavour shall be appropriate to the species.
- b) Water content

Product	Maximum water content
Freeze-dried mushroom	6 % m/m
Dried (other than freeze-dried) mushroom	12 % m/m
Dried mushroom Shii-ta-ke	13 % m/m

4.3.1.2 Permitted defects

Mineral impurities	not more than 2 % m/m
Organic impurities of vegetable origin	not more than 0.02 % m/m except for Shii-take mushrooms, for which the maximum shall be 1 % m/m

Content of maggot damaged mushroom:

wild growing mushroom	not more than 20 % m/m of total damage, including serious damage
cultivated mushroom	not more than 1 % m/m of total damage, including not more than 0.5 % m/m serious damage

4.3.2 Mushroom grits and mushroom powder

4.3.2.1 Quality criteria

a) Water content of mushroom grits	not more than 13 % m/m
b) Water content of mushroom powder	not more than 9 % m/m

4.3.2.2 Permitted defects

Mineral impurities	not more than 2 % m/m
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4.3.3 Pickled mushroom

4.3.3.1 Permitted ingredients

a) Salt (sodium chloride)	not more than 2.5 % m/m
b) Sugars	not more than 2.5 % m/m
c) Vinegar	not more than 2 % m/m expressed as acetic acid

4.3.3.2 Tolerances for defects

a) Mineral impurities	not more than 0.1 % m/m
b) Organic impurities of vegetable origin	not more than 0.02 % m/m
c) Content of maggot damaged mushroom:	
1. wild growing mushroom	not more than 6 % m/m of total damage including not more than 2 % m/m serious damage.
2. cultivated mushroom	not more than 1 % m/m of total damage including not more than 0.5 % m/m serious damage

4.3.4 Fermented mushroom

4.3.4.1 Essential composition and quality factor

Lactic acid, naturally occurring as a result of the fermentation process	not less than 1 % m/m
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4.3.4.2 Permitted ingredients

Salt (sodium chloride)	not less than 3 % m/m and not more than 6 % m/m
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4.3.4.3 Tolerances for defects

a) Mineral impurities	not more than 0.2 % m/m
b) Organic impurities of vegetable origin	not more than 0.1 % m/m

c) Content of maggot damaged mushroom not more than 4 % m/m

4.3.5 Mushroom in olive oil and other vegetable oils

4.3.5.1 Permitted ingredients

a) Salt (sodium chloride) not more than 1 % m/m

b) Olive oil or other edible vegetable oil.

4.3.5.2 Tolerances for defects

a) Mineral impurities not more than 0.1 % m/m

b) Organic impurities of vegetable origin not more than 0.02 % m/m

c) Maggot damaged mushroom:

1. wild growing mushroom not more than 6 % m/m of total damage including not more than 2 % m/m serious damage

2. cultivated mushroom not more than 1 % m/m of total damage including not more than 0.5 % m/m serious damage.

3.3.6 Quick frozen mushroom

3.3.6.1 Tolerances for defects

a) Mineral impurities not more than 0.2 % m/m

b) Organic impurities of vegetable origin not more than 0.02 % m/m

c) Content of maggot damaged mushroom:

1. wild growing mushroom not more than 6 % m/m of total damage including not more than 2 % m/m serious damage

2. cultivated mushroom not more than 1 % m/m of total damage including not more than 0.5 % m/m serious damage.

3.3.7 Sterilized mushroom

3.3.7.1 Permitted ingredient

Salt (sodium chloride) not more than 2 % m/m

4.3.7.2 Tolerances for defects

a) Mineral impurities not more than 0.2 % m/m

b) Organic impurities of vegetable origin not more than 0.02 % m/m

c) Content of maggot damaged mushroom:

1. wild growing mushroom not more than 6 % m/m of total damage including not more than 2 % m/m serious damage

2. cultivated mushroom not more than 1 % m/m of total damage including not more than 0.5 % m/m serious damage

4.3.8 Mushroom Extract and Mushroom Concentrate

4.3.8.1 Permitted ingredient

Salt (sodium chloride) not more than 20 % m/m

4.3.8.2 Tolerances for defects

- a) Mineral impurities
- b) Organic impurities (of non-vegetable origin)

4.3.9 Dried mushroom concentrate

4.3.9.1 Quality criteria

Water content not more than 9 % m/m

4.3.9.2 Permitted ingredient

Salt (sodium chloride) not more than 5 % m/m

4.3.9.3 Permitted defects

- (a) Mineral impurities
- (b) Organic impurities (of non-vegetable origin)

4.3.10 Salted mushroom (semi-processed product)

4.3.10.1 Permitted ingredient

Salt (sodium chloride) not less than 15 % m/m and not more than 18 % m/m

4.3.10.2 Tolerances for defects

- a) Mineral impurities not more than 0.3 % m/m
- b) Organic impurities of vegetable origin not more than 0.05 % m/m
- c) Content of maggot damaged mushroom:
 - 1. wild growing mushroom not more than 6 % m/m of total damage including not more than 2 % m/m serious damage
 - 2. cultivated mushroom not more than 1 % m/m of total damage including not more than 0.5 % m/m serious damage.

5 FOOD ADDITIVES

The additives used in the products covered by the provisions of this standard shall conform to the maximum limits provided in the table below:

Table 1: Maximum limits for additives

S/N	Additive	Maximum Level
1	Acetic acid	Not limited except as provided for below in respect of pickled mushroom and sterilized mushroom
2	Lactic acid	
3	Citric acid	
4	Ascorbic acid	
5	Acetic	20 g/kg in pickled mushroom
6	Lactic acid	5 g/kg singly or in combination in sterilized mushroom
7	Citric acid	

6. HYGIENE

6.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of MS 21, and other Codes of practice recommended by the Codex Alimentarius Commission which are relevant to this product.

6.2 To the extent possible in Good Manufacturing Practice, the product shall be free from objectionable matter.

6.3 When tested by appropriate methods of sampling and examination, the product:

- a) shall be free from microorganisms in amounts which may represent a hazard to health;
- b) shall be free from parasites which may represent a hazard to health; and
- c) shall not contain any substance originating from microorganisms in amounts which may represent a hazard to health.

6.4 Products covered by this standard which are in the dried or dehydrated form should be prepared in accordance with the provisions of CAC/RCP 5.

6.5 Products covered by this standard which have been pasteurized in hermetically sealed containers should be prepared in accordance with CAC/RCP 2.

6.6 Products covered by this standard which are in the quick-frozen state should be prepared in accordance with CAC/RCP 8.

6.7 Products covered by this standard which do not fall within one of the categories at **6.4**, **6.5** and **6.6** above, for example, fresh edible mushroom, should be prepared in accordance with the relevant sections of MS 21.

7 WEIGHTS AND MEASURES

7.1 Fill of container

Minimum fill: The container shall be well filled with mushrooms and the product (including packing medium) shall occupy not less than 90 % of the water capacity of the container.

The water capacity of the container is the volume of distilled water at 20 °C which the sealed container will hold when completely filled.

7.2 Minimum drained weight

The drained weight of the product shall be not less than the following percentages, calculated on the basis of the weight of distilled water at 20 °C which the sealed container will hold:

S/N		Container size 0.5 l or less	Container size more than 0.5 l
1	Regular packs	50 % m/m	53 % m/m
2	Vinegar packs		
3	Wine packs		

8 PACKING, STORAGE AND TRANSPORTATION

8.1 The packaging used for Fresh Mushroom shall be perforated to allow the free passage of air, if needed.

8.2 The product shall be maintained at a low temperature such as will maintain the quality during transportation, storage and distribution up to and including the time of final sale. The recognized practice of thawing and repacking products under controlled conditions followed by the application of the quick-freezing process as defined in sub-section 3.1.12 of this standard is permitted.

8.3 In the case of (a) Dried Mushroom, and (b) Mushroom Grits and Mushroom Powder, attention is directed to the need to prevent these products from absorbing moisture and being attacked by insects, particularly moths and mites.

9 LABELLING

In addition to the requirements of MS 19, the following specific provisions apply:

9.1 The name of the food

9.1.1 Products complying with the definitions and other requirements of this standard shall be appropriately designated to indicate their true nature. The terms "mushroom" and "mushrooms" may be replaced by the terms which have customarily been used to describe the genus or species concerned in the country in which the product is intended to be sold, e.g. "mushroom" or "mushrooms" for the genus *Agaricus*. The method of processing to which the product has been subjected, e.g. "dried", "sterilized" or "quick-frozen", shall be indicated on the label.

9.1.2 In the case of fresh, dried, salted, quick-frozen, fermented, pickled and canned mushroom, the common name of the species of mushroom shall be stated in addition to the word "mushroom". The scientific name of the species shall also be stated.

9.1.3 In the case of mushroom products consisting of more than one species of mushroom, the word "mixed" shall form part of the designation. Additionally, the name (including scientific name) of the species shall be stated on the label.

9.1.4 In the case of mushroom products made from mushroom other than fresh mushroom, there shall be a statement on the label indicating the method of processing to which the mushroom used in the preparation of the final product have been subjected.

9.1.5 Where salted mushroom are used as raw material for the preparation of other mushroom products, there shall be a statement on the label indicating that salted mushroom have been used.

9.1.6 If stalks have been added to fresh mushroom or mushroom products, the words "stalks added" shall appear on the label.

9.2 Other styles – If the product is produced in accordance with the other styles provision (sub-section 4.2.4), the label shall contain in close proximity to the name of the product such additional words or phrases that will avoid misleading or confusing the consumer.

9.3 List of ingredients

A complete list of ingredients shall be declared on the label in descending order of proportion except for dried mushroom.

10. METHODS OF ANALYSIS AND SAMPLING

It is recommended that the products covered by the provisions of this standard should be sampled and tested in accordance with the Codex Alimentarius Volume 13.

THE MALAWI BUREAU OF STANDARDS

The Malawi Bureau of Standards is the standardizing body in Malawi under the aegis of the Ministry of Industry and Trade. Set up in 1972 by the Malawi Bureau of Standards Act (Cap: 51:02), the Bureau is a parastatal body whose activities aim at formulating and promoting the general adoption of standards relating to structures, commodities, materials, practices, operations and from time to time revise, alter and amend the same to incorporate advanced technology.

CERTIFICATION MARK SCHEME

To bring the advantages of standardization within the reach of the common consumer, the Bureau operates a Certification Mark Scheme. Under this scheme, manufacturers who produce goods that conform to national standards are granted permits to use the Bureau's "Mark of Quality" depicted below on their products. This Mark gives confidence to the consumer of the commodity's reliability.

