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**DRAFT MALAWI STANDARD
(SADC HARMONIZED)**

**Smoked finfish, smoke-flavoured finfish
and smoke-dried finfish – Specification**

Note: This is a draft standard and it shall neither be used nor regarded as a Malawi standard

Smoked finfish, smoke-flavoured finfish and smoke-dried finfish– Specification

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FOREWORD

This draft standard is a Southern African Development Community (SADC) Harmonized Text (SADCSTAN) covering the requirements and methods of tests for smoked finfish, smoke-flavoured finfish and smoke-dried finfish

The harmonization of standards and technical regulations in the SADC region is an obligation under the SADC protocol on Trade which was established under the SADC Treaty to provide for elimination of tariffs and non-tariff barriers to trade.

This standard is identical to SADC HT 84, *Smoked finfish, smoke-flavoured finfish and smoke dried finfish*.

Acknowledgement is made for the use of the above standard.

TECHNICAL COMMITTEE

This draft standard was prepared by the Technical Committee MBS/TC 39, *Fish and fishery products*, and the following companies, organizations and institutions were represented:

Malawi Bureau of Standards.

MALDECO Fisheries

Malawi College of Fisheries;

Ministry of Agriculture, Irrigation and Water Development – Department of Fisheries;

Lake Harvest; and

Lilongwe University for Agriculture and Natural Resources.

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

Smoked finfish, smoke-flavoured finfish and smoke-dried finfish – Specification

1 SCOPE

1.1 This draft standard applies to smoked, smoke-flavoured and smoke-dried finfish prepared from fresh, chilled or frozen raw material. It deals with whole finfish, fillets and sliced and similar products thereof. The standard applies to finfish, either for direct consumption, for further processing, or for addition into speciality or minced products where finfish constitutes only part of the edible contents.

1.2 It does not apply to finfish treated with carbon monoxide (filtered, “clear” or ‘tasteless’ smoke), finfish packaged in hermetically sealed containers processed to commercial sterility. Speciality or minced products as such are not included (e.g. fish-salads).

2 NORMATIVE REFERENCES

The following standard contains provisions, which through reference in this text, constitute provisions of this draft 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 draft 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;*

MS 188: *Edible salt – Specification;*

MS 214: *Potable water – Specification;*

MS 237: *Food additives – General Standard;*

MS 302: *General standard for contaminants and toxins in foods and feed;*

MS 790: *Code of practice for fish and fishery products;*

MS 935: *Principles and guidelines for the establishment and application of microbiological criteria related to foods;*

CODEXSTAN 233: *Sampling plans for prepackaged foods (AQL-6.5);*

CODEX STAN 244: *Standard for salted herring and sprats;*

MS 1241: *Guidelines for the sensory evaluation of fish and shellfish in laboratories;*

CAC/GL 61: *Application of general principles of food hygiene to the control of *Listeria monocytogenes* in ready to eat foods;*

CAC/GL 68: *Code of practice for the reduction of contamination of food with polycyclic aromatic hydrocarbons (PAH) from smoking and direct drying processes;*

ISO 4833: *Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of microorganisms – Colony-count technique at 30 degrees;*

ISO 6579: *Microbiology of food and animal feeding stuffs – Horizontal method for the detection of Salmonella spp.*;

ISO 6888: *Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species)*;

ISO 7251: *Microbiology of food and animal feeding stuffs – Horizontal method for the detection and enumeration of presumptive Escherichia coli – Most probable number technique*;

ISO 7937: *Microbiology of food and animal feeding stuffs – Horizontal method for the enumeration of Clostridium perfringens – Colony-count technique*;

ISO 11290: *Microbiology of the food chain – Horizontal method for the detection and enumeration of Listeria monocytogenes and of Listeria spp.*;

ISO 21807: *Microbiology of food and animal feeding stuffs – Determination of water activity*;

ISO 21872: *Microbiology of food and animal feeding stuffs – Horizontal method for the detection of potentially enteropathogenic Vibrio spp.*

AOAC, 937.09, 952.08: *Determination of water phase salt*;

AOAC 950.46.A: *Determination of moisture in meat*;

AOAC 977.13: *Determination of histamine*;

AOAC 977.26: *Determination of Clostridium botulinum*; and

AOAC 983.18: *Determination of moisture in meat and meat products - preparation of sample procedure*

3 TERMS AND DEFINITIONS

For the purpose of this draft standard, the following definitions shall apply:

3.1

dried salted fish

salted fish which have been dried

3.2

food grade material

packaging material, made of substances which are safe and suitable for their intended use and which will not impart any toxic substance or undesirable odour or flavour to the product

3.3

foreign matter

any material which is not of fish origin e.g. sand, stones, metallic chips, plant parts etc

3.4

fresh whole fish

fish harvested while alive from culture, immediately cleaned and/or chilled to preserve freshness

3.5

veterinary drug

any substance applied or administered to fish, whether used for therapeutic, prophylactic, or diagnostic purposes or for modification of physiological functions or behavior

3.6

lot

fish from the same origin and harvest

3.7

sound

free from physiological deterioration or adulteration/contamination, that appreciably affects their appearance, edibility and the keeping quality of the dried fish

3.8

salted fish

fish that has undergone salt treatment

3.9

smoke condensates

are products obtained by controlled thermal degradation of wood in a limited supply of oxygen (pyrolysis), subsequent condensation of the resultant smoke vapours, and fractionation of the resulting liquid products

3.10

smoke flavours

are either smoke condensates or artificial flavour blends prepared by mixing chemically-defined substances in known amounts or any combination of both (smoke-preparations)

3.11

smoked finfish

finfish that has undergone a hot or cold smoking process

3.12

smoke-flavoured finfish

finfish that has been treated with smoke flavours, without undergoing a smoking process

3.13

smoke-dried finfish

finfish that has undergone a combined smoking and drying process and may include a salting process

4 PROCESS DESCRIPTION

4.1 Smoking is a process of treating fish by exposing it to smoke from smouldering wood or plant materials. This process is usually characterized by an integrated combination of salting, drying, heating and smoking steps in a smoking chamber.

4.2 Smoking by regenerated smoke is a process of treating fish by exposing it to smoke which is regenerated by atomizing smoke condensate in a smoking chamber under the time and temperature conditions similar to those for hot or cold smoking.

4.3 Hot smoking is a process in which fish is smoked at an appropriate combination of temperature and time sufficient to cause the complete coagulation of the proteins in the fish flesh. Hot smoking is generally sufficient to kill parasites, to destroy non-sporulated bacterial pathogens and to injure spores of human health concern.

4.4 Cold smoking is a process of treating fish with smoke using a time/temperature combination that will not cause significant coagulation of the proteins in the fish flesh but that will cause some reduction of the water activity.

4.5 Salting is a process of treating fish with salt of food grade quality to lower water activity in fish flesh and to enhance flavour by any appropriate salting technology (e.g. dry salting, brining, injection salting).

4.6 Drying is a process in which the moisture content in the fish is decreased to appropriate required characteristics under controlled hygienic conditions.

4.7 Smoke flavouring is a process in which fish or fish preparations are treated with smoke flavour. The smoke flavour can be applied by any technology (e.g. dipping, spraying, injecting, soaking).

4.8 Smoke drying is a process in which fish is treated by combined smoking and drying steps to such an extent that the final product can be stored and transported without refrigeration and to achieve a water activity of 0.75 or less (10 % moisture content or less), as necessary to control bacterial pathogens and fungal spoilage.

5 ESSENTIAL COMPOSITION AND QUALITY FACTORS

5.1 The raw material

Smoked finfish, smoke-flavoured finfish and smoke-dried finfish shall be prepared from sound and wholesome finfish, which may be fresh, chilled or frozen, and of a quality to be sold for human consumption after appropriate preparation.

5.2 Ingredients

All ingredients used shall be of food grade quality and conform to MS 237.

5.3 Wood or other plant material for generation of smoke

Wood or other plant material used for the generation of smoke or smoke-condensates must not contain toxic substances either naturally or through contamination, or after having been treated with chemicals, paint or impregnating materials. In addition, wood or other plant material shall be handled in a way to avoid contamination, refer to the CAC/RCP 68.

5.4 Decomposition

The products shall be free from persistent and objectionable odours and flavours characteristic of decomposition

5.5 Presentation

Any presentation of the product shall be permitted provided that it meets all requirements of this draft standard, and it is adequately described on the label to avoid confusing or misleading the consumer.

5.6 Microbiological criteria

5.6.1 The products shall comply with any microbiological criteria established in accordance with the MS 935 and the microbial counts shall be within limits indicated in the Table 1 below.

Table 1 - Microbiological limits for smoked, smoke-flavoured and smoke-dried finfish

1	2	3	4
S/No	Micro-organisms	Maximum limits	Method of test
i)	<i>Salmonella</i> per 25 g	Absent	ISO 6579
ii)	<i>E. coli</i> per gram	Absent	ISO 7251
iii)	<i>Listeria monocytogenes</i>	Absent	ISO 11290 Part 1
iv)	<i>Staphylococcus aureus</i> cfu per gram	10 ²	ISO 6888
v)	<i>Clostridium perfringens</i> per gram	Absent	ISO 7937
vi)	<i>Vibrio Spp</i> per gram	Absent	ISO 21872
vii)	Total viable count per gram	10 ⁵	ISO 4833

5.6.2 Toxins of *Clostridium botulinum* shall not be allowed in smoked finfish, smoke-flavoured finfish and smoke-dried finfish products. The formation of *Clostridium botulinum* toxin can be controlled through an application of a combination of science-based options such as packaging type, storage temperature, and water activity, e.g. by use of salt in the water phase.

Note: These products shall require evisceration, either before or after processing, in such a way as to minimise the risk of *Clostridium botulinum*.

5.7 Final product

Products shall meet the requirements of draft standard when lots examined in accordance with section 11, comply with the provisions set out in section 10. Products shall be examined by the methods given in section 10.

6 FOOD ADDITIVES

6.1 For smoked finfish and smoke flavoured finfish food additives to be used shall comply with limits as indicated in Table 1.

Table 1: Food additives for smoked and smoke-flavoured finfish

1	2	3	4	5
S/No	Functional class	Name of additive	INS Number	Maximum level
1	Acidity regulators	Acetic acid	260	GMP
		Citric acid	330	GMP
		Sodium lactate	325	GMP
		Tartaric acid, L(+)	334	GMP
		Lactic acid, L-, D-, DL-	270	GMP
		Potassium lactate	326	GMP
		Calcium lactate	327	GMP
2	Anti-oxidants	Sodium ascorbate	301	GMP
		Sodium erythorbate (sodium isoascorbate)	316	GMP
		Sodium lactate	325	GMP
		Carbon dioxide	290	GMP
3	Packaging gases	Nitrogen	941	GMP
		Sorbate as sorbic acid	200 - 203	2000 mg/Kg
4	Preservatives (for reduced oxygen packaged products only)	Benzoates as benzoic acid	210 - 213	200 mg/Kg

6.2 No colour enhancing substance, colourants, shall be used in any of the product categories.

6.3 For Smoke dried finfish, no additives are permitted in smoke-dried finfish.

7 CONTAMINANTS

7.1 The products covered by this draft standard shall comply with the maximum levels of the MS 302.

7.2 Smoking of fish should be done in a manner that minimizes the formation of polycyclic aromatic hydrocarbons (PAH). This can be achieved by following the CAC/RCP 68.

7.3 The product shall not contain histamine than exceeds 20 mg/100g of fish flesh in any sample unit tested. This applies only to susceptible species (e.g. *Scombridae*, *Clupeidae*, *Engraulidae*, *Coryphaenidae*, *Pomatomidae*, *Scomberesocidae*).

8 HYGIENE

8.1 The products covered by the provisions of this draft standard shall be prepared and handled in accordance with the appropriate sections of the MS 21 and MS 790.

8.2 Products covered by this draft standard shall not contain living parasites and particular attention needs to be paid to cold smoked or smoke-flavoured products, which should be frozen before or after smoking if a parasite hazard is present (see Annex 1).

8.3 Viability of nematodes, cestodes and trematodes shall be examined according to clauses **10.9** and/or **10.10**.

8.4 Other substances

The products shall not contain any other substance in amounts, which may present a hazard to health and the final product shall be free from any foreign material that poses a threat to human health.

9 PACKAGING AND LABELLING

9.1 Packaging

Fish shall be packaged in food grade containers.

9.2 Labelling

In addition to the requirements in MS 19, the following specific labelling requirements shall apply and shall be legibly and indelibly marked:

9.2.1 Name of the food

The name of the food must be “smoked X” if treated by the processes described in paragraph **2.1**, “smoke flavoured X” if treated by the processes described in paragraph **2.2**, “smoke-dried X” if treated by the processes described in paragraph **2.3**, X being the common or usual name of the species of fish so as not to mislead the consumer.

9.2.2 Additional labelling

The use of regenerated smoke must be indicated on the label.

9.3 Storage and handling instructions

The label shall declare storage and handling instructions appropriate for the product.

9.4 Labelling of non-retail containers

9.4.1 Information specified above shall be given either on the container or in accompanying documents, except that the name of the product, lot identification, and the name and address of the manufacturer or packer, as well as storage instructions, shall appear on the container.

9.4.2 However, the name and address of the manufacturer or packer may be replaced by an identification mark (e.g. plant approval number) provided that such a mark is clearly identifiable with the accompanying documents.

10 METHODS OF SAMPLING AND TESTS

10.1 Sampling

The sampling plan shall be done in accordance with CODEX STAN 233.

10.2 Sensory and physical examination

Samples taken for sensory and physical examination shall be assessed by persons trained in such examination and in accordance with procedures elaborated in MS 1241.

10.3 Determination of histamine

Histamine shall be determined in accordance with AOAC 977.13

10.4 Determination of net weight

The net weight is determined as the weight of the product, exclusive of packaging material, interleaving material, etc.

10.5 Temperatures for thawing

Frozen samples of final products shall be thawed at refrigeration temperatures to maintain quality and microbiological criteria for products in which growth of *L. monocytogenes* can occur are based on the use of ISO 11290-1 method. Other methods that provide equivalent sensitivity, reproducibility, and reliability can be employed if they have been appropriately validated (e.g. based on ISO 16140).

10.6 Determination of *Clostridium botulinum*

AOAC 977.26 for the detection of *C. botulinum* and its toxins in foods or other scientifically equivalent validated method. This method is not routinely performed on the product, but may be used when there is a suspicion of the presence of toxins.

10.7 Determination of water phase salt

The percentage salt (NaCl) in the aqueous phase can be determined by the following calculation:

$$\% \text{ salt aqueous phase} = \frac{\% \text{ salt} \times 100}{\% \text{ water} + \% \text{ salt}}$$

where

% Moisture (water) is determined by AOAC, 952.08, Sec. 35.1.13, *Solids (Total) in Seafood*; and

% Salt by AOAC, 937.09, Sec. 35.1.18, *Salt (Sodium Chloride) in Seafood*.

10.8 Determination of water activity

Water activity is determined by ISO 21807:2004

10.9 Determination of the viability of parasites

Methods used for extracting and testing the viability of parasites could include the method set out in Annex I for nematodes in CODEX STAN 244.

10.10 Determination of visible parasites

The entire sample unit is examined for the presence of parasites non-destructively by placing appropriate portions of the thawed (if necessary) sample unit on a 5 mm thick acryl sheet with 45 % translucency and candled with a light source giving 1500 lux 30 cm above the sheet.

11 DEFECTS

A sample unit shall be considered as defective when it exhibits any of the properties defined below.

11.1 Foreign matter

The presence in the sample unit of any matter, which has not been derived from the fish, does not pose a threat to human health, and is readily recognised without magnification or is present at a level determined by any method including magnification that indicates non-compliance with good manufacturing practice.

11.2 Parasites

The presence of two or more visible parasites per kg of the sample unit detected by the method described in clause **10.10** with a capsular diameter greater than 3 mm or a parasite not encapsulated and greater than 10 mm in length.

11.3 Odour, flavour and texture

A sample unit affected by persistent and distinct objectionable odours, flavours, or textures indicative of decomposition, or rancidity, burning sensation or other sensorial impressions not characteristic of the product.

11.4 Lot acceptance

A lot will be considered as meeting the requirements of this standard when:

11.4.1 The total number of defects as classified according to section 10 does not exceed the acceptance number of an appropriate sampling plan (AQL-6.5) in the CAC/GL 50;

11.4.2 The average net weight of all sample units is not less than the declared weight, provided there is no unreasonable shortage in any container and no individual container is less than 95 % of the declared weight; and

11.4.3 The essential composition and quality factors, food additives, contaminants, hygiene and handling and labelling requirements of Sections **3, 4, 5, 6** and **7** are met. For histamine no sample unit shall exceed 20 mg/100 g of fish flesh as per the sampling plan chosen, refer to section **10.3**.

ANNEX
(Normative)

PROCEDURES SUFFICIENT TO KILL PARASITES

An acceptable method shall be used to kill parasites.

Where freezing is required to kill parasites (i.e. cold smoked fish and smoke-flavoured fish) the fish must be frozen either before or after processing to a temperature time combination sufficient to kill the living parasites.

Examples of freezing processes that may be sufficient to kill some or all parasites are:

- Freezing at -20 °C at the thermal centre of the product for 24 hours (for *Anisakis* species and *Pseudoterranova decipiens* only)¹;
- Freezing at -35 °C at the thermal centre of the product for 15 hours (all parasites);
- Freezing at -20 °C at the thermal centre of the product for 168 hours (7 days) (all parasites).

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



