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First edition

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Cereals, Pulses, Legumes and Vegetable Proteins

First edition

WORLD HEALTH ORGANIZATION

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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The Codex Alimentarius Commission is an intergovernmental body with over 170 members, within the framework of the Joint FAO/WHO Food Standards Programme established by the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO), with the purpose of protecting the health of consumers and ensuring fair practices in the food trade. The Commission also promotes coordination of all food standards work undertaken by international governmental and non governmental organizations.

The *Codex Alimentarius* (Latin, meaning Food Code) is the result of the Commission's work: a collection of internationally adopted food standards, guidelines, codes of practice and other recommendations. The texts in this publication are part of the Codex Alimentarius.

CEREALS, PULSES, LEGUMES AND VEGETABLE PROTEINS
First edition

Codex standards for cereals, pulses, legumes and vegetable proteins and other related texts such as the *Code of Practice for the Prevention of Mycotoxin Contamination in Cereals* are published in this compact format to allow their wide use and understanding by governments, regulatory authorities, food industries and retailers, and consumers. This first edition includes all texts adopted by the Codex Alimentarius Commission up to 2007.

Further information on these texts, or any other aspect of the Codex Alimentarius Commission, may be obtained from:

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First edition

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CODEX STANDARD FOR CERTAIN PULSES

CODEX STAN 171-1989 (Rev. 1-1995)

1. SCOPE

This Standard applies to the whole, shelled or split pulses defined below which are intended for direct human consumption. The Standard does not apply to pulses intended for factory grading and packaging, industrial processing, or to those pulses intended for use in the feeding of animals. It does not apply to fragmented pulses when sold as such, or to other legumes for which separate standards may be elaborated.

2. DESCRIPTION

2.1 Product definition

Pulses are dry seeds of leguminous plants which are distinguished from leguminous oil seeds by their low fat content. The pulses covered by this Standard are the following:

- Beans of *Phaseolus* spp. (except *Phaseolus mungo* L. syn. *Vigna mungo* (L.) Hepper and *Phaseolus aureus* Roxb. syn. *Phaseolus radiatur* L., *Vigna radiata* (L.) Wilczek);
- Lentils of *Lens culinaris* Medic. Syn. *Lens esculenta* Moench.;
- Peas of *Pisum sativum* L.;
- Chick peas of *Cicer arientinum* L.;
- Field beans of *Vicia faba* L.;
- Cow peas of *Vigna unguiculata* (L.) Walp., syn. *Vigna sesquipedalis* Fruhw., *Vigna sinensis* (L.) Savi exd Hassk.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Pulses shall be safe and suitable for human consumption.

3.1.2 Pulses shall be free from abnormal flavour, odours, and living insects.

3.1.3 Pulses shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content**

3.2.1.1 Two maximum moisture levels are provided to meet different climatic conditions and marketing practices. Lower values in the first column are suggested for countries with tropical climates or when long-term (more than one crop year) storage is a normal commercial practice. The values in the second column are suggested for more moderate climates or when other short-term storage is the normal commercial practice.

Pulse	Moisture content (percent)	
beans	15	19
lentils	15	16
peas	15	18
chick peas	14	16
cow peas	15	18
field beans	15	19

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.1.2 In the case of pulses sold without their seed coat, the maximum moisture content shall be 2 per cent (absolute) lower in each case.

3.2.2 **Extraneous matter** is mineral or organic matter (dust, twigs, seedcoats, seeds of other species, dead insects, fragments, or remains of insects, other impurities of animal origin). Pulses shall have not more than 1% extraneous matter of which not more than 0.25% shall be mineral matter and not more than 0.10% shall be dead insects, fragments or remains of insects, and/or other impurities of animal origin.

3.2.2.1 **Toxic or noxious seeds**

The products covered by the provisions of this standard shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health.

– Crotolaria (*Crotalaria* spp.), Corn cockle (*Agrostemma githago* L.), Castor bean (*Ricinus communis* L.), Jimson weed (*Datura* spp.), and other seeds that are commonly recognized as harmful to health.

4. CONTAMINANTS

4.1 Heavy metals

Pulses shall be free from heavy metals in amounts which may represent a hazard to health.

4.2 Pesticide residues

Pulses shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Pulses shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to these products.

5.2 To the extent possible in good manufacturing practice, the products shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the products:
- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Pulses shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be the commercial type of the pulse.

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
DEFECTS		Visual Examination
■ seeds with serious defects. Seeds in which the cotyledons have been affected or attached by pests; seeds with very slight traces of mould or decay; or slight cotyledon staining	MAX: 1.0%	
■ seeds with slight defects. Seeds which have not reached normal development; seeds with extensive seedcoat staining, without the cotyledon being affected; seeds in which the seedcoat is wrinkled, with pronounced folding, or broken pulses	MAX: 7.0% of which broken pulses must not exceed 3.0%	
■ broken pulses. Broken in whole pulses are pulses in which the cotyledons are separated or one cotyledon has been broken. Broken in split pulses are pulses in which the cotyledon has been broken		
SEED DISCOLORATION		Visual Examination
■ seeds of a similar colour but a different commercial type (except in beans with white seeds)	MAX: 3.0%	
■ seeds of different colour (other than discoloured seeds)	MAX: 6.0%	
■ discoloured seeds	MAX: 3.0%	
■ discoloured seeds of the same commercial type	MAX: 10.0%	
■ beans with green seed and peas with green seeds with slight discolouration of the seed	MAX: 20.0%	
PRESENTATION	Buyer Preference	Visual Examination
■ Shelled pulses. Pulses without their seedcoat, with the cotyledons not separated		
■ split pulses. Pulses without their seedcoat, with the two cotyledons separated one from the other		

CODEX STANDARD FOR COUSCOUS

CODEX STAN 202-1995

1. SCOPE

1.1 The term "couscous", as defined in Section 2 below, refers to processed couscous destined for direct human consumption.

1.2 Subject to the provision of Section 8.1.2 this standard does not apply to couscous intended for the same use but prepared from cereals other than durum wheat.

2. DESCRIPTION

2.1 This standard applies to couscous, i.e. the product prepared from durum wheat semolina (*Triticum durum*) the elements of which are bound by adding potable water and which has undergone physical treatment such as cooking and drying.

2.2 Couscous is prepared from a mixture of coarse and fine semolina. It can be prepared from "coarse medium" semolina.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Couscous shall be clean, safe and fit for human consumption.

3.1.2 All processes applied to materials used for the production of couscous must be carried out in order to:

(a) limit the reduction of nutritive value

(b) avoid undesirable modification of properties of couscous

3.2 Quality factors – specific

3.2.1 **Moisture content**

The moisture content of couscous shall not exceed 13.5%.

4. FOOD ADDITIVES

No food additives shall be added during the industrial processing of couscous.

5. CONTAMINANTS

5.1 Heavy metals

Couscous shall be free from heavy metals in amounts which may represent a hazard to health.

5.2 Pesticide residues

Couscous shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

5.3 Mycotoxins

Couscous shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

6. HYGIENE

6.1 It is recommended that the product covered by the provisions of this standard be prepared in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to the 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 micro-organisms capable of development in the food under normal conditions of storage; and

(b) shall not contain any substance originating from micro-organisms in amounts which may represent a health hazard.

7. PACKAGING

7.1 Couscous shall be packaged for retail sale in containers which will safeguard the hygienic, nutritional and technological qualities of the product.

7.2 Containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odour or flavour to the product.

8. LABELLING

In addition to the provisions of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

8.1 Name of the product

8.1.1 The name of the product to be shown on the label shall be "couscous".

8.1.2 Products intended for the same use but prepared from cereals other than durum wheat may be designated as "couscous" on condition that this appellation be immediately followed by a specification of the cereals used.

8.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9. METHODS OF SAMPLING AND ANALYSIS

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given, it is strongly recommended that users specify the appropriate limit and method of analysis.

1. SEMOLINA KERNEL SIZES

1.1 Coarse semolina is a semolina with a kernel diameter between 475 and 700 microns.

1.2 Fine semolina is a semolina with a kernel diameter between 130 and 183 microns.

1.3 "Coarse medium semolina" is a semolina with a kernel diameter between 183 and 700 microns.

1.4 Medium semolina is a semolina with a kernel diameter between 183 and 475 microns.

2. COMPOSITION

2.1 Semolina proportions in the mixture intended for the preparation of couscous are:

- 20–30% for fine semolina
- 70–80% for coarse semolina

"Coarse medium" semolina is a semolina obtained from a mixture of:

- 25–30% for coarse semolina
- 70–75% for medium semolina

3. QUALITY FACTORS

3.1 Granularity (microns) min. 630 microns to max. 2000 microns, with a tolerance of 6%.

3.2 Ash(%) maximum 1.1%

4. ANALYSIS

4.1 Ash

ISO 2171-1980, Cereals, Legumes and Derived Products – Determination of ash.

DEGERMED MAIZE (CORN) MEAL AND MAIZE (CORN) GRITS

CODEX STAN 155-1985 (Rev. 1-1995)

1. SCOPE

1.1 This standard applies to degermed maize (corn) meal and to degermed maize (corn) grits for direct human consumption milled from kernels of common maize, *Zea mays* L.

1.2 This standard does not apply to whole maize (corn) meal, maize (corn) flours, quick grits, hominy grits, self-rising maize (corn) meals, enriched maize (corn) meals, enriched maize (corn) grits, bolted maize (corn) meals, maize (corn) flakes, and alkaline treated maize (corn) products.

1.3 This standard does not apply to maize (corn) meals for use as a brewing adjunct, to maize (corn) meals used for manufacturing of starch and any industrial use, nor to maize (corn) meal for use as an animal feed.

2. DESCRIPTION

2.1 **Degermed maize (corn) meal** is the food prepared from fully mature, sound, degermed kernels of maize (corn), *Zea mays* L., cleaned from impurities, mould, seeds of weeds and other cereals by a grinding process in which the grain is comminuted to a suitable degree of fineness and from which bran and germ are removed. In its preparation, coarse particles of the ground maize kernel may be separated, reground and recombined with all of the material from which they were separated.

2.2 **Degermed maize (corn) grits** is the food prepared from fully mature, sound, degermed, kernels of maize (corn), *Zea mays* L., cleaned from impurities, mould, seeds of weeds and other cereals, by a grinding process in which the grain is comminuted to a suitable degree of fineness and from which bran and germ are almost completely removed.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Degermed maize meal and degermed maize grits shall be safe and suitable for human consumption.

3.1.2 Degermed maize meal and degermed maize grits shall be free from abnormal flavours, odours, and living insects.

3.1.3 Degermed maize meal and degermed maize grits shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 15.0% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

4. CONTAMINANTS

4.1 Heavy metals

Degermed maize (corn) meal and maize (corn) grits shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Degermed maize (corn) meal and maize (corn) grits shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Degermed maize (corn) meal and maize (corn) grits shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969) and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Degermed maize (corn) meal and maize (corn) grits shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex General *Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "degermed maize (corn) meal", or "maize (corn) grits".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
ASH	MAX: 1.0% on a dry weight basis	AOAC 923.03 ISO 2171:1980 ICC Method No. 104/1 (1990)
PROTEIN (N × 6.25)	MIN: 7.0% on a dry weight basis	ICC 105/l Method for the Determination of Crude Protein in Cereals and Cereal Products for Food and for Feed (Type I) Selenium/ Copper catalyst – or – ISO 1871:1975
CRUDE FAT	MAX: 2.25% on a dry weight basis	AOAC 945.38F; 920.39C ISO 5986:1983
GRANULARITY		
■ degermed maize meal	95% or more shall pass through a 0.85 sieve; – and – 45% or more shall pass through a 0.71 mm sieve; – and – 25% or less shall pass through a 0.210 sieve	AOAC 965.22 (Type I method with sieve specifications as in ISO 3310/l-1982 test sieves)
■ degermed maize grits	95% or more through a 2.00 mm sieve; and – 20% or less through a 0.71 mm sieve	AOAC 965.22 (Type I method with sieve specifications as in ISO 3310/l-1982 test sieves)

CODEX STANDARD FOR DURUM WHEAT SEMOLINA AND DURUM WHEAT FLOUR

CODEX STAN 178-1991 (Rev. 1- 1995)

1. SCOPE

1.1 This standard applies to durum wheat semolina, including whole durum wheat semolina and durum wheat flour for direct human consumption prepared from durum wheat (*Triticum durum* Desf.) which are prepackaged ready for sale to the consumer or destined for use in other food products.

1.2 It does not apply:

- to any product prepared from common wheat (*Triticum aestivum* L.) or club wheat (*Triticum compactum* Host.) or mixtures thereof, or to mixtures of these wheats in combination with durum wheat (*Triticum durum* Desf.)
- to durum wheat flour or semolina for non-food industrial or animal feed use.

2. DESCRIPTION

2.1 Product definition

Durum wheat semolina and durum wheat flour are the products prepared from grain of durum wheat (*Triticum durum* Desf.) by grinding or milling processes in which the bran and germ are essentially removed and the remainder is comminuted to a suitable degree of fineness. Whole durum wheat semolina is prepared by a similar comminuting process, but the bran and part of the germ are retained.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Durum wheat semolina and durum wheat flour and any added nutrients shall be safe and fit for human consumption.

3.1.2 Durum wheat semolina and durum wheat flour shall be free from abnormal flavours, odours, and living insects.

3.1.3 Durum wheat semolina and durum wheat flour shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 14.5% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

4. CONTAMINANTS

4.1 Heavy metals

Durum wheat semolina and durum wheat flour shall be free from heavy metals in amounts which may represent a hazard to health.

4.2 Pesticide residues

Durum wheat semolina and durum wheat flour shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Durum wheat semolina and durum wheat flour shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Durum wheat semolina and durum wheat flour shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "durum wheat semolina", "whole durum wheat semolina", or "durum wheat flour".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
ASH		AOAC 923.03 (Type I Method); – or – ISO 2171 (1980) – Cereals, Pulses, and Derived Products – Determination of Ash Method B –550^{0}C constant weight
■ durum wheat semolina	MAX: 1.3% on a dry basis	
■ whole durum wheat semolina	MAX: 2.1% on a dry basis	
■ durum wheat flour	MAX: 1.75% on a dry basis	
PROTEIN (N × 5.7)		ICC 105/l – Method for the Determination of Crude Protein in Cereals and Cereal Products for Food and for Feed. Selenium/Copper catalyst (Type I Method) – or – ISO 1871 (1975)
■ durum wheat semolina	MIN: 10.5% on a dry basis	
■ whole durum wheat semolina	MIN: 11.5% on a dry basis	
■ durum wheat flour	MIN: 11.0% on a dry basis	
NUTRIENTS	Conform with Legislation of the Country in Which the Product is Sold	None Defined
■ vitamins		
■ minerals		
■ amino acids		
PARTICLE SIZE		None Defined
■ durum wheat semolina	MAX: 79% shall pass through a 315 micron silk gauze or man-made textile sieve	
■ durum wheat flour	MIN: 80% shall pass through a 315 micron silk gauze or man-made textile sieve	

CODEX STANDARD FOR EDIBLE CASSAVA FLOUR

CODEX STAN 176-1989 (Rev. 1-1995)

1. SCOPE

This standard applies to cassava flour intended for direct human consumption which is obtained from the processing of edible cassava (*Manihot esculenta* Crantz).

2. DESCRIPTION

2.1 Definition of the product

Edible cassava (*Manihot esculenta* Crantz) flour is the product prepared from dried cassava chips or paste by a pounding, grinding or milling process, followed by sifting to separate the fibre from the flour. In case of edible cassava flour prepared from bitter cassava (*Manihot utilissima* Pohl), detoxification is carried out by soaking the tubers in water for a few days, before they undergo drying in the form of whole, pounded tuber (paste) or in small pieces.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Edible cassava flour shall be safe and suitable for human consumption.

3.1.2 Edible cassava flour shall be free from abnormal flavours, odours, and living insects.

3.1.3 Edible cassava flour shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 13% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standards are requested to indicate and justify the requirements in force in their country.

3.2.2 **Hydrocyanic acid content**

The total hydrocyanic acid content of edible cassava flour shall not exceed 10 mg/kg.

4. CONTAMINANTS

4.1 Heavy metals

Edible cassava flour shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Edible cassava flour shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Edible cassava flour shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Cassava flour shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "edible cassava flour."

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
CRUDE FIBRE	MAX: 2.0%	ISO 5498 (1981) – Determination of Crude Fibre Content– B.S. Separation by filtration through filter paper – General Method
ASH	MAX: 3.0%	ISO 2171 (1980) – Cereals, Pulses and Derived Products – Pulses and Derived Products – Determination of Ash (Type I Method)
FOOD ADDITIVES	Conform With Legislation of the Country in Which the Product is Sold	None Defined
PARTICLE SIZE		None Defined
■ fine flour	MIN: 90% shall pass through a 0.60 mm sieve	
■ coarse flour	MIN: 90% shall pass through a 1.20 mm sieve	

CODEX STANDARD FOR GARI

CODEX STAN 151-1989 (Rev. 1-1995)

1. SCOPE

This standard applies to gari destined for direct human consumption which is obtained from the processing of cassava tubers (*Manihot esculenta* Crantz).

2. DESCRIPTION

2.1 Definition of the product

Gari is the finished product obtained by artisanal or industrial processing of cassava tubers (*Manihot esculenta* Crantz). The processing consists of peeling, washing and grating of the tubers, followed by fermentation, pressing, fragmentation, granulation, drying if necessary, sifting and suitable heat treatment.[1] Gari is presented as flour of variable granule size.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Gari shall be safe and suitable for human consumption.

3.1.2 Gari shall be free from abnormal flavours, odours, and living insects.

3.1.3 Gari shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 12.0% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Cyanogenic glycosides and hydrocyanic acid**

Total hydrocyanic acid content shall not exceed 2 mg/kg determined as free hydrocyanic acid.

3.3 Extraneous matter

According to good manufacturing practices, gari shall be practically free from extraneous matter.

[1] Suitable heat treatment means toasting, grilling or any other method of cooking capable of producing the characteristic organoleptic properties of the product. During the heat treatment, there is a partial gelatinization of the starch and the dehydration of gari grains.

4. CONTAMINANTS

4.1 Heavy metals

Gari shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Gari shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this Commodity.

4.3 Mycotoxins

Gari shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969) and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Gari shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "gari".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
TOTAL ACIDITY	MIN: 0.6% determined as lactic acid – and – MAX: 1% determined as lactic acid	AOAC method 1975 14.064 – 14.065 – or – ISO/DP 7305
CRUDE FIBRE	MAX: 2%	ISO 5498:1981
ASH	MAX: 2.75%	ISO 2171 (1980) – Cereals, Pulses and Derived Products – Determination of Ash (Type I Method)
ENRICHMENT ■ vitamins ■ proteins ■ other nutrients	Conform with Legislation of the Country in Which the Product is Sold	None Defined
FOOD ADDITIVES	Conform with Legislation of the Country in Which the Product is Sold	None Defined
OPTIONAL INGREDIENTS ■ edible fats or oils ■ salt	Conform with Legislation of the Country in Which the Product is Sold	None Defined
CLASSIFICATION		ISO 2591-1973, test sieving. The sieves used are AFNOR sieves with square mesh
■ extra-fine gari	MIN: 100% by weight shall pass through a 0.50 mm sieve – and – MIN: 40% by weight shall pass through a 0.25 mm sieve	
■ fine grain gari	MIN: 100% by weight shall pass through a 1 mm sieve – and – MAX: 40% by weight shall pass through a 0.5 mm sieve	
■ medium grain gari	MIN: 100% by weight shall pass through a 1.25 mm sieve – and – MAX: 40% by weight shall pass through 1.00 mm sieve	
■ coarse grain gari	MIN: 100% by weight shall pass through a 2 mm sieve – and – MAX: 40% by weight shall pass through a 1.25 mm sieve	
■ unclassified gari	Buyer preference	

CODEX STANDARD FOR MAIZE (CORN)

CODEX STAN 153-1985 (Rev. 1-1995)

1. SCOPE

This standard applies to maize (corn) for human consumption, i.e., ready for its intended use as human food, presented in packaged form or sold loose from the package directly to the consumer. This standard specifies requirements for whole grain shelled dent maize, *Zea mays indentata* L., and/or shelled flint maize, *Zea mays indurata* L., or their hybrids. It does not apply to processed maize.

2. DESCRIPTION

2.1 Product definition

Maize (corn) is the shelled grains of the species defined in the scope.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Maize shall be safe and suitable for human consumption.

3.1.2 Maize shall be free from abnormal flavours, odours and living insects.

3.1.3 Maize shall be free from filth in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 15.5% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Extraneous matter** are all organic and inorganic materials other than maize, broken kernels, other grains and filth.

3.2.2.1 **Filth** are impurities of animal origin (including dead insects). 0.1% m/m max

3.2.2.2 **Toxic or noxious seeds**

The products covered by the provisions of this standard shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health.

- Crotolaria (*Crotalaria* spp.), Corn cockle (*Agrostemma githago* L.), Castor bean (*Ricinus communis* L.), Jimson weed (*Datura* ssp.), and other seeds are commonly recognized as harmful to health.

3.2.2.3 **Other organic extraneous matter** which is defined as organic components other than edible grams of cereals (foreign seeds, stems, etc.) (1.5% m/m max).

3.2.2.4 **Inorganic extraneous matter** which is defined as any inorganic component (stones, dust, etc.) (0.5% m/m max).

4. CONTAMINANTS

4.1 Heavy metals

Maize (corn) shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Maize (corn) shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Maize (corn) shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969) and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Maize (corn) shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

7.1.1 The name of the product to be shown on the label shall be "maize (corn)".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
KERNELS OF OTHER COLOURS		Visual Examination
■ in yellow maize. Maize grains which are yellow and/or light red in colour are considered to be yellow maize. Maize grains which are yellow and dark red in colour, provided the dark red colour covers less than 50% of the surface of the grain, are also considered to be yellow maize	MAX: 5.0% by weight of maize of other colours	
■ in white maize. Maize grains which are white and/or light pink in colour are considered to be white maize. White maize also means maize grains which are white and pink in colour, provided the prink colour covers less than 50% of the surface of the grain	MAX: 2.0% by weight of maize of other colours	
■ in red maize. Maize grains which are pink and white or dark red and yellow in colour are considered to be red maize, provided the pink or dark red colour covers 50% or more of the surface of the grain	MAX: 5.0% by weight of maize of other colours	
■ mixed maize		
KERNELS OF OTHER SHAPE		Visual Examination
■ in flint maize	MAX: 5.0% by weight of maize of other shapes	
■ in dent maize	MAX: 5.0% by weight of maize of other shapes	
■ flint and dent maize	RANGE: 5.0% to 95% by weight of flint maize	
DEFECTS		
■ blemished grains: grains which are insect or vermin damaged, stained, diseased, discoloured, germinated, frost damaged, or otherwise materially damaged	MAX: 7.0% of which diseased grains must not exceed 0.5%	Visual Examination
■ broken kernels	MAX: 6.0%	ISO 5223-1983 (4.50 mm metal sieve)
■ other grains	MAX: 2.0%	Visual Examination

CODEX STANDARD FOR OATS

CODEX STAN 201-1995

1. SCOPE

This standard applies to oat grains as defined in Section 2 intended for processing for direct human consumption. This standard does not apply to *Avena nuda* (hulless oats).

2. DESCRIPTION

Oats are defined as the grains of *Avena sativa and Avena byzantina.*

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Oats shall be safe and suitable for processing for human consumption.

3.1.2 Oats shall be free from abnormal flavours, odours, living insects and mites.

3.2 Quality and safety factors – specific

3.2.1 **Moisture content** 14.0% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Ergot**

Sclerotium of the fungus *Claviceps purpurea* 0.05% m/m max

3.2.3 **Toxic or noxious seeds**

The products covered by the provisions of this standard shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health.

- *Crotalaria (Crotalaria* spp.), Corn cockle (*Agrostemma githago* L.), Castor bean. (*Ricinus communis* L.), Jimson weed (*Datura* spp.), and other seeds that are commonly recognized as harmful to health.

3.2.4 **Filth**

Impurities of animal origin (including dead insects) 0.1% m/m max

3.2.5 **Other organic extraneous matter** 1.5% m/m max

which is defined as organic components other than edible grains of cereals (foreign seeds, stems, etc.).

3.2.6 **Inorganic extraneous matter** 0.5% m/m max

which is defined as any inorganic component (stones, dust, etc.).

4. CONTAMINANTS

4.1 Heavy metals

Oats shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Oats shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this commodity.

5.2 To the extent possible in good manufacturing practice, the cleaned product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product, after cleaning and sorting, and before further processing:

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms including fungi in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Oats shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy, and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "oats".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given it is strongly recommended that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
1. **Minimum test weight:** The weight of a hundred litre volume of oats expressed as kilograms per hectolitre.	At least 46 kg/hl	The test weight shall be the weight per ISO 7971-1986 or any other equipment giving equivalent results expressed as kilograms per hectolitre as determined on a test portion of the original sample
2. **Hull-less and broken kernels** (kernels with no hulls and broken of any size)	5% m/m max	To be developed
3. **Edible grains other than oats** (whole or identifiably broken)	3% m/m max	To be developed
4. **Damaged kernels** (including pieces of kernels that show visible deterioration due to moisture, weather, disease, insects, mould, heating, fermentation, sprouting or other causes.	3% m/m max	To be developed
5. **Wild oats:** *Aventa fatua* or *Aventa sterilis*.	0.2% m/m max	To be developed
6. **Insect bored kernels:** kernels which have been visibly bored or tunnelled by insects.	0.5% m/m max	To be developed
7. **Blemished grains,** i.e. grains with stained hulls due to the action of climatic factors.	To be decided	To be developed

CODEX STANDARD FOR PEANUTS

CODEX STAN 200-1995

1. SCOPE

This standard applies to peanuts as defined in Section 2 intended for processing for direct human consumption.

2. DESCRIPTION

2.1 Definition of the product

Peanuts, either in the pod or in the form of kernels, are obtained from varieties of the species *Arachis hypogaea* L.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Peanuts shall be safe and suitable for processing for human consumption.

3.1.2 Peanuts shall be free from abnormal flavours, odours, living insects and mites.

3.2 Quality factors – specific

3.2.1 **Moisture content**

	Maximum level
Peanuts in-pod	10%
Peanut kernels	9.0%

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Mouldy, rancid or decayed kernels** 0.2% m/m max

- **Mouldy kernels** are defined as kernels with mould filaments visible to the naked eye.
- **Decayed kernels** are defined as those showing visibly significant decomposition.
- **Rancid kernels** are defined as those which have undergone oxidation of lipids (should not exceed 5 meq active oxygen/kg) or the production of free fatty acids (should not exceed 1.0%) resulting in the production of disagreeable flavours.

3.2.3 Organic and inorganic extraneous matter: is defined as organic or inorganic components other than peanuts and includes stones, dust, seeds, stems, etc.

3.2.3.1 **Filth**
Impurities of animal origin (including dead insects) 0.1% m/m max

3.2.3.2 **Other organic and inorganic extraneous matter**
Peanuts in-pod 0.5% m/m max
Peanut kernels 0.5% m/m max

4. CONTAMINANTS[1]

4.1 Heavy metals

The products covered by the provisions of this standard shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Peanuts shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard should be prepared in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product:
- shall be free from micro-organisms in amounts which may represent a hazard to health.
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms, including fungi, in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Peanuts shall be packaged in such manner which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product. Packaging will be sound, clean, dry, and free from insect infestation or fungal contamination.

6.2 Packing material shall be made of substances which are safe and suitable for their intended use, including new clean jute bags, tinplate containers, plastic or paper boxes

[1] A Proposed Draft Guideline Level for Total Aflatoxin in Peanuts intended for further processing is under elaboration.

or bags. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy, and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 The name of the product

The name of the product to be shown on the label shall be "peanuts" or "peanuts in-pod" and type of peanuts.

7.2 Labelling of non-retail containers

Information for non-retail containers shall either 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given it is strongly recommended that users specify the appropriate limit and method of analysis.

Factor/Description		Limit	Method of analysis
1.	**In-Pod Defects**		
1.1	**Empty Pods:** pods containing no kernels.	3% m/m	To be determined
1.2	**Damaged Pods:** include:	10% m/m	To be determined
	a) shrivelled pods (pods which are imperfectly developed and shrunken); or		
	b) pods having cracks or broken areas which cause conspicuous openings or which seriously weaken a large portion of the pod, especially if the kernel inside the pod is easily visible without any pressure forced upon the edges of the crack.		
1.3	**Discoloured Pods:** pods having dark discolouration caused by mildew, staining, or other means affecting 50% or more of the pod surface.	2% m/m	To be determined
2.	**Kernel Defects**		
2.1	**Damaged Kernels** include:		To be determined
	a) those affected by freezing injury causing hard, translucent or discoloured flesh;	1% m/m	
	b) shrivelled kernels which are imperfectly developed and shrunken; and/or	5% m/m	
	c) those damaged by insects, worm cuts;	2% m/m	
	d) mechanical damage;	2%m/m	
	e) germinated kernels.	2% m/m	
2.2	**Discoloured Kernels**: kernels are not damaged but are affected by one or more of the following:	3% m/m	To be determined
	a) flesh (cotyledon) discolouration which is darker than a light yellow colour or consists of more than a slight yellow pitting of the flesh; and/or		
	b) skin discolouration which is dark brown, dark grey, dark blue, or black, and covers more than 25% of the kernel.		
2.3	**Broken and Split Kernels:** broken kernels are those from which more than a quarter has been broken off. Split kernels have been split into halves.	3% m/m	To be determined
3.	Peanuts other than the designated type.	5% m/m	To be determined

PEARL MILLET FLOUR

CODEX STAN 170-1989 (Rev. 1-1995)

1. SCOPE

1.1 This standard applies to flour destined for direct human consumption which is obtained from pearl millet *Pennisetum americanum* L., Senegalese varieties "souna" and "sanio".

1.2 This standard does not apply to grits or coarse grain obtained from pearl millet.

2. DESCRIPTION

The flour is the product destined for human consumption which is obtained from pearl millet grains (*Pennisetum americanum* L.) through a process of industrial milling during which the germ is removed to a large extent and the endosperm is reduced to a sufficiently fine powder.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Pearl millet flour shall be safe and suitable for human consumption.

3.1.2 Pearl millet flour shall be free from abnormal flavours, odours, and living insects.

3.1.3 Pearl millet flour shall be free from filth (impurities of animal origins, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 13.0% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

4. CONTAMINANTS

4.1 Heavy metals

Pearl millet flour shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Pearl millet flour shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Pearl millet flour shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Pearl millet flour shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "pearl millet flour".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container.

However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
PARTICLE SIZE		None Defined
■ fine flour	MIN: 100% shall pass through a 0.5 mm sieve	
■ medium flour	MIN: 100% shall pass through a 1 mm sieve	
ASH	RANGE: 0.8 to 1.0% on a dry matter basis	AOAC 923.03
PROTEIN (N × 5.7)	MIN: 8.0% on a dry matter basis	AOAC 920.87
FAT	MAX: 5.0% on a dry matter basis	AOAC 945.38F; 920.39C ISO 5986:1983
CRUDE FIBRE	MAX: 1.5 m/m on dry matter	ISO Standard 5498:1981 (Type I Method)
COLOUR	RANGE: 18 to 30 Kent-Jones units	*Modern Cereal Chemistry*, 6th Ed. D.W. Kent-Jones and A.J. Amos (Ed.), pp. 605–612, Food Trade Press Ltd, London, 1969
FOOD ADDITIVES	Conform with Legislation of the Country in Which the Product is Sold	None Defined

CODEX STANDARD FOR RICE

CODEX STAN 198-1995

1. SCOPE

This standard applies to husked rice, milled rice, and parboiled rice, all for direct human consumption; i.e., ready for its intended use as human food, presented in packaged form or sold loose from the package directly to the consumer. It does not apply to other products derived from rice or to glutinous rice.

2. DESCRIPTION

2.1 Definitions

2.1.1 ***Rice*** is whole and broken kernels obtained from the species *Oryza sativa* L.

2.1.1.1 ***Paddy rice*** is rice which has retained its husk after threshing.

2.1.1.2 ***Husked rice*** (brown rice or cargo rice) is paddy rice from which the husk only has been removed. The process of husking and handling may result in some loss of bran.

2.1.1.3 ***Milled rice*** (white rice) is husked rice from which all or part of the bran and germ have been removed by milling.

2.1.1.4 ***Parboiled rice*** may be husked or milled rice processed from paddy or husked rice that has been soaked in water and subjected to a heat treatment so that the starch is fully gelatinized, followed by a drying process.

2.1.1.5 ***Glutinous rice; waxy rice:*** Kernels of special varieties of rice which have a white and opaque appearance. The starch of glutinous rice consists almost entirely of amylopectin. It has a tendency to stick together after cooking.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Rice shall be safe and suitable for human consumption.

3.1.2 Rice shall be free from abnormal flavours, odours, living insects and mites.

3.2 Quality factors – specific

3.2.1 **Moisture content** 15% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Extraneous matter**: is defined as organic and inorganic components other than kernels of rice.

3.2.2.1 **Filth**: impurities of animal origin (including dead insects) 0.1% m/m max

3.2.2.2 **Other organic extraneous matter** such as foreign seeds, husk, bran, fragments of straw, etc. shall not exceed the following limits:

	Maximum level
Husked Rice	1.5% m/m
Milled Rice	0.5% m/m
Husked Parboiled Rice	1.5% m/m
Milled Parboiled Rice	0.5% m/m

3.2.2.3 **Inorganic extraneous matter** such as stones, sand, dust, etc. shall not exceed the following limits:

	Maximum level
Husked Rice	0.1% m/m
Milled Rice	0.1% m/m
Husked Parboiled Rice	0.1% m/m
Milled Parboiled Rice	0.1% m/m

4. CONTAMINANTS

4.1 Heavy metals

The products covered by the provisions of this standard shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Rice shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product:
- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms, including fungi, in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Rice shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the food.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy, and strongly sewn or sealed.

7. LABELLING

In addition to requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be in accordance with the definitions given in Section 2.1. The alternative names given in parenthesis shall be used in accordance with local practice.

7.2 Labelling of non-retail containers

Information on non-retail containers 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

1. CLASSIFICATION

If rice is classified as long grain, medium grain or short grain, the classification should be in accordance with one of the following specifications. Traders should indicate which classification option is chosen.

OPTION 1: kernel length/width ratio

1.1 **Long grain rice**

1.1.1 Husked rice or parboiled husked rice with a length/width ratio of 3.1 or more.

1.1.2 Milled rice or parboiled milled rice with a length/width ratio of 3.0 or more.

1.2 **Medium grain rice**

1.2.1 Husked rice or parboiled husked rice with a length/width ratio of 2.1–3.0.

1.2.2 Milled rice or parboiled milled rice with a length/width ratio of 2.0–2.9.

1.3 **Short grain rice**

1.3.1 Husked rice or parboiled rice with a length/width ratio of 2.0 or less.

1.3.2 Milled rice or parboiled milled rice with a length/width ratio of 1.9 or less.

OPTION 2: the kernel length

1.1 **Long grain rice** has a kernel length of 6.6 mm or more.

1.2 **Medium grain rice** has a kernel length of 6.2 mm or more but less than 6.6 mm.

1.3 **Short grain rice** has a kernel length of less than 6.2 mm.

OPTION 3: a combination of the kernel length and the length/width ratio

1.1 **Long grain rice** has either:

1.1.1 a kernel length of more than 6.0 mm and with a length/width ratio of more than 2 but less than 3, or;

1.1.2 a kernel length of more than 6.0 mm and with a length/width ratio of 3 or more.

1.2 **Medium grain rice** has a kernel length of more than 5.2 mm but not more than 6.0 mm and a length/width ratio of less than 3.

1.3 **Short grain rice** has a kernel length of 5.2 mm or less and a length/width ratio of less than 2.

2. MILLING DEGREE

2.1 **Milled rice** (white rice) may be further classified into the following degrees of milling:

2.2 **Undermilled rice** is obtained by milling husked rice but not to the degree necessary to meet the requirements of well-milled rice.

2.3 **Well-milled rice** is obtained by milling husked rice in such a way that some of the germ and all the external layers and most of the internal layers of the bran have been removed.

2.4 **Extra-well-milled rice** is obtained by milling husked rice in such a way that almost all of the germ, all of the external layers and the largest part of the internal layers of the bran, and some of the endosperm, have been removed.

3. OPTIONAL INGREDIENTS

Nutrients

Vitamins, minerals and specific amino acids may be added in conformity with the legislation of the country in which the product is sold. (Governments accepting the Standard are requested to indicate the requirements in force in their country.)

Factor/Description		Limit	Method of analysis
4.	**OTHER QUALITY FACTORS** In those instances where more than one factor limit and/or method of analysis is given it is strongly recommended that users specify the appropriate limit and method of analysis.		
4.1	**Whole Kernel** is a kernel without any broken part.		
4.1.1	**Head Rice** is a kernel, the length of which is equal to or greater than three quarters of the average length of the corresponding whole kernel.	buyer preference	ISO 7301 (Annex A)
4.1.2	**Large Broken Kernel** are fragments of kernel, the length of which is less than three-quarters but greater than one-half of the average length of a corresponding whole kernel.	buyer preference	ISO 7301 (Annex A)
4.1.3	**Medium Broken Kernel** are fragments of kernel, the length of which is equal to or less than one-half but greater than one-quarter of the average length of a corresponding whole kernel.	buyer preference	ISO 7301 (Annex A)
4.1.4	**Small Broken Kernel** are fragments of kernel, the length of which is equal to or less than one-quarter of the average length of a corresponding whole kernel but which does not pass through a metal sieve with round perforation 1.4 mm in diameter.	buyer preference	ISO 7301 (Annex A)
4.1.5	**Chips** are fragments of kernel which pass through a metal sieve with round perforations 1.4 mm in diameter.	0.1% m/m	ISO 7301 (Annex A)

Factor/Description		Limit				Method of analysis
4.2	**Defective Kernels**	**Husked Rice**	**Milled Rice**	**Husked Parboiled Rice**	**Milled Parboiled Rice**	
4.2.1	**Heat-Damaged Kernels** are kernels, whole or broken, that have changed their normal colour as a result of heating. This category includes whole or broken kernels that are yellow due to alteration. Parboiled rice in a batch of non-parboiled rice is also included in this category.	4.0% m/m*	3.0% m/m	8.0% m/m*	6.0% m/m	ISO 7301 (Annex A)
4.2.2	**Damaged Kernels** are kernels, whole or broken, showing obvious deterioration due to moisture, pests, diseases, or other causes, but excluding heat-damaged kernels.	4.0% m/m	3.0% m/m	4.0% m/m	3.0% m/m	ISO 7301 (Annex A)
4.2.3	**Immature Kernels** are unripe and/or undeveloped whole or broken kernels.	12.0% m/m	2.0% m/m	12.0% m/m	2.0% m/m	ISO 7301 (Annex A)
4.2.4	**Chalky Kernels** are whole or broken kernels except for glutinous rice, of which at least three-quarters of the surface has an opaque and floury appearance.	11.0% m/m*	11.0% m/m	N/A	N/A	ISO 7301 (Annex A)
4.2.5	**Red Kernels** are whole or broken kernels with a red-coloured pericarp covering more than one-quarter of their surface.	12.0% m/m	4.0% m/m	12.0% m/m	4.0% m/m	ISO 7301 (Annex A)
4.2.6	**Red-Streaked Kernels** are kernels, whole or broken, with red streaks, the lengths of which may be equal to or greater than one-half of that of the whole kernel, but the surface area covered by these red streaks shall be less than one-quarter of the total surface.	N/A	8.0% m/m	N/A	8.0% m/m	ISO 7301 (Annex A)
4.2.7	**Pecks** are whole or broken kernels of parboiled rice of which more than one-quarter of the surface is dark brown or black in colour.	N/A	N/A	4.0% m/m*	2.0% m/m	ISO 7301 (Annex A)
4.3	**Maximum Recommended Levels of Other Types of Rice**					ISO 7301 (Annex A)
	Paddy Rice	2.5% m/m	0.3% m/m	2.5% m/m	0.3% m/m	
	Husked Rice	N/A	1.0% m/m	N/A	1.0% m/m%	
	Milled Rice	N/A	N/A	2.0% m/m	2.0% m/m%	
	Glutinous Rice	1.0% m/m	1.0% m/m	1.0% m/m	1.0% m/m	

* After milling for control purposes.

CODEX STANDARD FOR SORGHUM FLOUR

CODEX STAN 173-1989 (Rev. 1-1995)

1. SCOPE

1.1 This Standard applies to sorghum flour destined for direct human consumption as defined in Section 2.1 below.

1.2 This Standard does not apply to grits or meal obtained from *Sorghum bicolor* (L.) Moench.

2. DESCRIPTION

Sorghum flour is the product obtained from grains of *Sorghum bicolor* (L.) Moench through a process of industrial milling during which the seed coat is removed and the germ is removed to a large extent and the endosperm is comminuted to a suitable degree of fineness.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Sorghum flour shall be safe and suitable for human consumption.

3.1.2 Sorghum flour shall be free from abnormal flavours, odours, and living insects.

3.1.3 Sorghum flour shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 15.0% m/m max.
Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Tannin content**
The tannin content of sorghum flour shall not exceed 0.3% on a dry matter basis.

4. CONTAMINANTS

4.1 Heavy metals

Sorghum flour shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Sorghum flour shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Sorghum flour shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Sorghum flour shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be “sorghum flour”.

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
ASH	MIN: 0.9% on a dry matter basis – and – MAX: 1.5% on a dry matter basis	AOAC 923.03 ICC 104/1 – Method for the determination of ash in cereals and cereal products (Ashing at 900°C) (Type I Method) – or – ISO 2171:1980 – Cereals, pulses, and derived products – Determination of ash
PROTEIN (N × 6.25)	MIN: 8.5% on a dry matter basis	ICC 105/1 (1986) – Method for the Determination of Crude Protein in Cereals and Cereal Products for Food and for Feed using selenium copper catalyst (Type II method) – or – ISO 1871:1975
CRUDE FAT	MIN: 2.2% on a dry matter basis – and – MAX: 4.7% on a dry matter basis	AOAC 945.38F; 920.39C – or – ISO 5986:1983 – Animal feedstuffs – Determination of Diethyl Ether Extract
CRUDE FIBRE	MAX: 1.8% on a dry matter basis	ICC 113:1972 – Determination of Crude Fibre Value (Type I method) – or – ISO 6541:1981 – Agricultural food products – Determination of Crude Fibre Content – Modified Scharrer Method
COLOUR	RANGE: 18 to 30 units	Colorimetric Method of Kent Jones using Martincolor grader. In "Modern Cereal Chemistry", 6th ed. 1967, edited by Kent Jones-Amos, published by Food Trade Press Ltd., London, U.K. (Type I Method)
PARTICLE SIZE (GRANULARITY)	MIN: 100% of flour shall pass through a sieve the dimensions of the mesh being diameter of 0.5 mm for "fine" flour and a diameter of 1 mm for "medium" flour	AOAC 965.22 (Type I method with sieve specifications as in ISO 3310/I – 1982 Test sieves)

CODEX STANDARD FOR SORGHUM GRAINS

CODEX STAN 172-1989 (Rev. 1-1995)

1. SCOPE

This Standard applies to sorghum grains as defined in Section 2, for human consumption; i.e., ready for its intended use as human food, presented in packaged form or sold loose from the package directly to the consumer. It does not apply to other products derived from sorghum grains.

2. DESCRIPTION

2.1 Definition of the product

Sorghum grains are whole or decorticated grains obtained from species of *Sorghum bicolor* (L.) Moench. They may be suitably dried if necessary.

2.1.2 **Whole sorghum grains**

These are sorghum grains obtained as such after a complete threshing without any further treatment.

2.1.3 **Decorticated sorghum grains**

These are sorghum grains from which the external casings and whole or parts of the germ have been removed in an appropriate manner, using mechanical treatment.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Sorghum grains shall be safe and suitable for human consumption.

3.1.2 Sorghum grains shall be free from abnormal flavours, odours, and living insects.

3.1.3 Sorghum grains shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 14.5% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Definition of defects**

The product shall have not more than 8.0% total defects including extraneous matter, inorganic extraneous matter, and filth as contained in the standards and blemished grains, diseased grains, broken kernels, and other grains as contained in the Annex.

3.2.2.1 **Extraneous matter** is all organic and inorganic material other than sorghum, broken kernels, other grains and filth. Extraneous matter includes loose sorghum seedcoats. Sorghum grains shall have not more than 2.0% extraneous matter of which not more than 0.5% shall be extraneous inorganic matter.

3.2.2.2 **Filth** is impurities of animal origin including dead insects (0.1% m/m max).

3.2.3 **Toxic or noxious seeds**

The products covered by the provisions of this standard shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health.

— Crotolaria (*Crotalaria* spp.), Corn cockle (*Agrostemma githago* L.), Castor bean (*Ricinus communis* L.), Jimson weed (*Datura* spp.), and other seeds that are commonly recognized as harmful to health.

3.2.4 **Tannin content**

(a) For whole sorghum grains, the tannin content shall not exceed 0.5% on a dry matter basis.

(b) For decorticated sorghum grains, the tannin content shall not exceed 0.3% on a dry matter basis.

4. CONTAMINANTS

4.1 Heavy metals

Sorghum grains shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Sorghum grains shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Sorghum grains shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969) and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product:
- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Sorghum grains shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "sorghum grains".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
COLOUR ■ white, pink, red, brown, orange, yellow, or any mixture of these colours ■ abnormal colour. Grains whole natural colour has been modified by bad weather conditions, contact with the ground, heat, and excessive respiration. These grains may be dull, shrivelled, swollen, puffed, or bloated in appearance	Buyer Preference	Visual Examination
ASH ■ decorticated sorghum grains	MAX: 1.5% on a dry matter basis	AOAC 923.03 ICC No. 104/1 (1990) Method for the determination of ash in cereals and cereal products (Ashing at 900°C) (Type I method) – or – ISO 2171:1980 cereals, pulses and derived products
PROTEIN (N × 6.25)	MIN: 7.0% on a dry matter basis	ICC 105/l (1986) Method for the Determination of Crude Protein in Cereals and Cereal Products for Food and for Feed using selenium copper catalyst (Type I method) – or – ISO 1871:1975
FAT	MAX: 4.0% on a dry matter basis	AOAC 945.38F; 920.39C – or – ISO 5986:1983 – animal feedingstuffs – Determination of Diethyl Ether Extract
CRUDE FIBRE	Buyer Preference	ICC 113 Determination of Crude Fibre Value (Type I) – or – ISO 6541 (1981) Agricultural food products determination of crude fibre content-modified Scharrer method
DEFECTS (Total)		Visual Examination
■ blemished grains. Grains which are insect of vermin damaged, of abnormal colour, sprouted, diseased, or otherwise materially damaged	MAX: (Total) 8.0%[1]	
■ diseased grains. Grains made unsafe for human consumption due to decay, moulding, or bacterial decomposition, or other causes that may be noticed without having to cut the grains open to examine them	MAX: 3.0% of which diseased grains must not exceed 0.5%	

Factor/Description	Limit	Method of analysis
DEFECTS (cont.)		
■ insect or vermin damaged grains. Kernels with obvious weevil-bored holes or which have evidence of boring or tunnelling, indicating the presence of insects, insect webbing or insect refuse, or degermed grains, chewed in one or more than one part of the kernel which exhibit evident traces of an attack by vermin		
■ grains having an abnormal colour. Grains whose natural colour has been modified by bad weather conditions, contact with the ground, heat, and excessive respiration. These grains may be dull, shrivelled, swollen, puffed, or bloated in appearance		
■ sprouted grains. Grains exhibiting obvious signs of sprouting	MAX: 5.0%	
■ frost-damaged grains. Grains which are damaged by frost and may appear bleached or blistered and the seed coat may be peeling. Germs may appear dead or discoloured	MAX: 1.0%	
■ broken kernels. Sorghum and pieces of sorghum which pass through a 1.8 mm round-hole sieve		
■ other grains which are edible grains, whole or identifiable brokens, other than sorghum (i.e., legumes, pulses and other edible cereals)		

[1] The maximum amount of defects includes those from this Annex and Section 3.2.2 of the Standard.

CODEX STANDARD FOR WHEAT AND DURUM WHEAT

CODEX STAN 199-1995

1. SCOPE

This standard applies to wheat grains and durum wheat grains as defined in Section 2 intended for processing for human consumption. It does not apply to club wheat (*Triticum compactum* Host.), red durum wheat, durum wheat semolina or products derived from wheat.

2. DESCRIPTION

2.1 Wheat is the grains obtained from varieties of the species *Triticum aestivum* L.

2.2 Durum wheat is the grains obtained from varieties of the species *Triticum durum* Desf.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality and safety factors – general

3.1.1 Wheat and durum wheat shall be safe and suitable for processing for human consumption.

3.1.2 Wheat and durum wheat shall be free from abnormal flavours, odours, living insects and mites.

3.2 Quality factors – specific

3.2.1 **Moisture content**

	Maximum level
Wheat	14.5% m/m
Durum Wheat	14.5% m/m

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Ergot**
Sclerotium of the fungus *Claviceps purpurea*

	Maximum level
Wheat	0.05% m/m
Durum Wheat	0.5% m/m

3.2.3 **Extraneous matter** are all organic and inorganic materials other than wheat and durum wheat, broken kernels, other grains and filth.

3.2.3.1 **Toxic or noxious seeds**

The products covered by the provisions of this standard shall be free from the following toxic or noxious seeds in amounts which may represent a hazard to human health.

– Crotolaria (*Crotalaria* spp.), Corn cockle (*Agrostemma githago* L.), Castor bean (*Ricinus communis* L.), Jimson weed (*Datura* spp.),and other seeds that are commonly recognized as harmful to health.

3.2.3.2 **Filth**

Impurities of animal origin, (including dead insects) 0.1% m/m maximum

3.2.3.3 Other Organic extraneous matter which is defined as organic components other than edible grains of cereals (foreign seeds, stems, etc.):

	Maximum level
Wheat	1.5% m/m
Durum Wheat	1.5% m/m

3.2.3.4 Inorganic extraneous matter which is defined as any inorganic component (stones, dust, etc.):

	Maximum level
Wheat	0.05% m/m
Durum Wheat	0.05% m/m

4. CONTAMINANTS

4.1 Heavy metals

The products covered by the provisions of this standard shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Wheat and durum wheat shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the cleaned product shall be free from objectionable matter.

5.3 When tested by appropriate methods of sampling and examination, the product, after cleaning and sorting, and before further processing:

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms, including fungi, in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Wheat and durum wheat shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy, and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "wheat" or "durum wheat" as applicable.

7.2 Labelling of non-retail containers

Information for non-retail containers 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given it is strongly recommended that users specify the appropriate limit and method of analysis.

Factor/Description	Limit		Method of analysis
	Wheat	Durum Wheat	
1. **Minimum test weight:** the weight of a hundred litre volume expressed in kilograms per hectolitre.	68	70	The test weight shall be the weight per ISO 7971-1986 expressed in kilograms per hectolitre as determined on a test portion of the original sample.
2. **Shrunken and broken kernels:** broken or shrunken wheat or durum wheat which will pass through a 1.7 mm x 20 oblong-holed metal sieve for wheat and through a 1.9 mm x 20 oblong-holed metal sieve for durum wheat.	5.0% m/m max	6.0% m/m max	ISO 5223-1983 "Test sieves for cereals".
3. **Edible Grains other than wheat and durum wheat** (whole or identifiably broken)	2.0% m/m max	3.0% m/m max	ISO 7970-1987: (Annex C)
4. **Damaged kernels** (including pieces of kernels that show visible deterioration due to moisture, weather, disease, mould, heating, fermentation, sprouting, or other causes.)	6.0% m/m max	4.0% m/m max	ISO 7970-1987: (Annex C)
5. **Insect bored kernels:** kernels which have been visibly bored or tunnelled by insects	1.5% m/m	2.5% m/m	To be developed

CODEX STANDARD FOR WHEAT FLOUR

CODEX STAN 152-1985 (Rev. 1-1995)

1. SCOPE

1.1 This standard applies to wheat flour for direct human consumption prepared from common wheat, *Triticum aestivum* L., or club wheat, *Triticum compactum* Host., or mixtures thereof, which is prepackaged ready for sale to the consumer or destined for use in other food products.

1.2 It does not apply:

- to any product prepared from durum wheat, *Triticum durum* Desf., singly or in combination other wheat;
- to whole meal, whole-wheat flour or semolina, farina milled from common wheat, *Triticum aestivum* L., or club wheat, *Triticum compactum* Host., or mixtures thereof;
- to wheat flour destined for use as a brewing adjunct or for the manufacture of starch and/or gluten;
- to wheat flour for non-food industrial use;
- flours whose protein content have been reduced or which have been submitted after the milling process to a special treatment other than drying or bleaching and/or to which have been added other ingredients than those mentioned under Sections 3.2.2 and 4.

2. DESCRIPTION

2.1 Product definition

Wheat flour is the product prepared from grain of common wheat, *Triticum aestivum* L., or club wheat, *Triticum compactum* Host., or mixtures thereof, by grinding or milling processes in which the bran and germ are partly removed and the remainder is comminuted to a suitable degree of fineness.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Wheat flour and any added ingredients shall be safe and suitable for human consumption.

3.1.2 Wheat flour shall be free from abnormal flavours, odours, and living insects.

3.1.3 Wheat flour shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 15.5% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.2.2 **Optional ingredients**

The following ingredients may be added to wheat flour in amounts necessary for technological purposes:

- malted products with enzymatic activity made from wheat, rye or barley;
- vital wheat gluten;
- soybean flour and legume flour.

4. FOOD ADDITIVES

4.1	Enzymes	Maximum level in finished product
4.1.1	Fungal amylase from *Aspergillus niger*	GMP
4.1.2	Fungal amylase from *Aspergillus oryzae*	GMP
4.1.3	Proteolytic enzyme from *Bacillus subtilis*	GMP
4.1.4	Proteolytic enzyme from *Aspergillus oryzae*	GMP

4.2	Flour treatment agents	Maximum level in finished product
4.2.1	L-ascorbic acid and its sodium and potassium salts	300 mg/kg
4.2.2	L-cysteine hydrochloride	90 mg/kg
4.2.3	Sulphur dioxide (in flours for biscuit and pastry manufacture only)	200 mg/kg
4.2.4	Mono-calcium phosphate	2 500 mg/kg
4.2.5	Lecithin	2 000 mg/kg
4.2.6	Chlorine in high ratio cakes	2 500 mg/kg
4.2.7	Chlorine dioxide for yeast raised bakery products	30 mg/kg
4.2.8	Benzoyl peroxide	60 mg/kg
4.2.9	Azodicarbonamide for leavened bread	45 mg/kg

5. CONTAMINANTS

5.1 Heavy metals

Wheat flour shall be free from heavy metals in amounts which may represent a hazard to human health.

5.2 Pesticide residues

Wheat flour shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

5.3 Mycotoxins

Wheat flour shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

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 the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969) 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:

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

7. PACKAGING

7.1 Wheat flour shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

7.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

7.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

8. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985) the following specific provisions apply:

8.1 Name of the product

8.1.1 The name of the product to be shown on the label shall be "wheat flour."

8.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
ASH	Buyer Preference	AOAC 923.03 ISO 2171:1980 ICC Method No. 104/1 (1990)
FAT ACIDITY	MAX: 70 mg per 100 g flour on a dry matter basis expressed as sulphuric acid – or – Not more than 50 mg of potassium hydroxide shall be required to neutralize the free fatty acids in 100 grammes flour on a dry matter basis	ISO 7305:1986 – or – AOAC 939.05
PROTEIN (N × 5.7)	MIN: 7.0% on a dry weight basis	ICC 105/l Method for the Determination of Crude Protein in Cereals and Cereal Products for Food and for Feed (Type I Method) Selenium/Copper catalyst. – or – ISO 1871:1975
NUTRIENTS ■ vitamins ■ minerals ■ amino acids	Conform With Legislation of the Country in Which the Product is Sold	None Defined
PARTICLE SIZE (GRANULARITY)	98% or more of flour shall pass through a 212 micron (No. 70 sieve)	AOAC 965.22

WHOLE AND DECORTICATED PEARL MILLET GRAINS

CODEX STAN 169-1989 (Rev. 1-1995)

1. SCOPE

This standard applies to whole and decorticated pearl millet destined for human consumption which is obtained from *Pennisetum americanum* L., Senegalese varieties "souna" and "sanio".

2. DESCRIPTION

2.1 Definition of the product

Pearl millet grains shall be whole or decorticated and suitable dried if necessary. They shall have the characteristics of the species *Pennisetum americanum* L.

2.1.2 **Whole grains**

These are grains of pearl millet obtained as such after proper threshing with no mechanical treatment.

2.1.3 **Decorticated grains**

These are grains of pearl millet from which outer parts, amounting to 20–22% of the weight of the whole grains have been removed in an appropriate manner using mechanical treatment (for example, simple abrasion).

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Pearl millet grains shall be safe and suitable for human consumption.

3.1.2 Pearl millet grains shall be free from abnormal flavours, odours, and living insects.

3.1.3 Pearl millet grains shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 13% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

3.3 Definition of defects

Extraneous matter is vegetable matter, shrivelled grains (grains which have not reached normal maturity), altered grains, etc.

3.4 Tolerances for defects

Extraneous matter – Whole pearl millet grains shall not have more than 2.0% of extraneous matter. Decorticated pearl millet grains shall not have more than 0.5% of extraneous matter. Also, whole and decorticated pearl millet grains shall be practically free from dirt, animal debris, mineral particles and diseased grains.

4. CONTAMINANTS

4.1 Heavy metals

Pearl millet grains shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Pearl millet grains shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Pearl millet grains shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Pearl millet grains shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

7.1.1 The name of the product to be shown on the label shall be "millet grains", or "decorticated millet grains".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
APPEARANCE		Visual Examination
■ brown, white or green	Buyer Preference	
1 000 KERNEL WEIGHT		None Defined
■ whole millet grains	RANGE: 5.0 to 10.0 g	
■ decorticated millet grains	RANGE: 4.0 to 8.0 g	
1 LITRE WEIGHT	RANGE: 750 to 820 g	None Defined
ASH		AOAC 923.03
■ decorticated millet grains	RANGE: 0.8 to 1.0% on a dry matter basis	
PROTEIN (N × 5.7)	MIN: 8.0% on a dry matter basis	AOAC 920.87
DECORTICATION	MAX: 20%	None Defined
CRUDE FIBRE		ISO 5498:1981
■ whole millet grains	RANGE: 3.0 to 4.5% on a dry matter basis	
■ decorticated millet grains	MAX: 2.0% on a dry matter basis	
FAT		AOAC 945.38F; 920.39C ISO 5986:1983
■ whole millet grains	RANGE: 3.5 to 6.0% on a dry matter basis	
■ decorticated millet grains	RANGE: 2.0 to 4.0% on a dry matter basis	

CODEX STANDARD FOR WHOLE MAIZE (CORN) MEAL

CODEX STAN 154-1985 (Rev. 1-1995)

1. SCOPE

1.1 This standard applies to whole maize (corn) meal for direct human consumption prepared from kernels of common maize, *Zea mays* L., as described in Section 2.1.

1.2 This standard does not apply to degermed maize (corn) meal, enriched maize (corn) meal, maize (corn) flours, maize (corn) grits, quick grits, hominy grits, self-rising maize (corn) meals, bolted maize (corn) meals, maize (corn) flakes and other maize (corn) based ready-to-eat cereals, maize (corn) flaking grits, and alkaline treated maize (corn) products.

1.3 This standard does not apply to maize meals for use as a brewing adjunct, to maize meals used for manufacturing of starch and any industrial use, nor to maize meal for use as an animal feed.

2. DESCRIPTION

Whole maize (corn) meal is the food prepared from fully mature, sound, ungerminated, whole kernels of maize, *Zea mays* L., by a grinding process in which the entire grain is comminuted to a suitable degree of fineness. In its preparation coarse particles of the ground maize kernel may be separated, reground and recombined with all of the material from which they were separated.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Quality factors – general

3.1.1 Whole maize meal shall be safe and suitable for human consumption.

3.1.2 Whole maize meal shall be free from abnormal flavours, odours, and living insects.

3.1.3 Whole maize meal shall be free from filth (impurities of animal origin, including dead insects) in amounts which may represent a hazard to human health.

3.2 Quality factors – specific

3.2.1 **Moisture content** 15.0% m/m max

Lower moisture limits should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standard are requested to indicate and justify the requirements in force in their country.

4. CONTAMINANTS

4.1 Heavy metals

Whole maize (corn) meal shall be free from heavy metals in amounts which may represent a hazard to human health.

4.2 Pesticide residues

Whole maize (corn) meal shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

4.3 Mycotoxins

Whole maize (corn) meal shall comply with those maximum mycotoxin limits established by the Codex Alimentarius Commission for this commodity.

5. HYGIENE

5.1 It is recommended that the product covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969) and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in good manufacturing practice, the product shall be free from objectionable matter.

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

- shall be free from micro-organisms in amounts which may represent a hazard to health;
- shall be free from parasites which may represent a hazard to health; and
- shall not contain any substance originating from micro-organisms in amounts which may represent a hazard to health.

6. PACKAGING

6.1 Whole maize (corn) meal shall be packaged in containers which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packaged in sacks, these must be clean, sturdy and strongly sewn or sealed.

7. LABELLING

In addition to the requirements of the *Codex General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), the following specific provisions apply:

7.1 Name of the product

The name of the product to be shown on the label shall be "whole maize (corn) meal".

7.2 Labelling of non-retail containers

Information for non-retail containers shall either be given 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 shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

ANNEX

In those instances where more than one factor limit and/or method of analysis is given we strongly recommend that users specify the appropriate limit and method of analysis.

Factor/Description	Limit	Method of analysis
ASH	MAX: 3.0% on a dry weight basis	AOAC 923.03 ISO 2171:1980 ICC Method No. 104/1 (1990)
PROTEIN (N × 6.25)	MIN: 8% on a dry weight basis	ICC 105/l Method for the Determination of Crude Protein in Cereals and Cereal Products for Food and Feed (Type I). Selenium/Copper catalyst – or – ISO 1871 (1975)
CRUDE FAT	MIN: 3.1% on a dry weight basis	AOAC 945.38F; 920.39C ISO 5986:1983
GRANULARITY	95% or more of the whole maize meal shall pass through a 1.70 mm sieve – and – 45% or more shall pass through a 0.71 mm sieve – and – 35% or less of the whole maize meal shall pass through a 0.212 mm sieve	AOAC 965.22 (Type I method with sieve specifications as in ISO 3310/l 1982 test sieve)

CODE OF PRACTICE FOR THE PREVENTION AND REDUCTION OF MYCOTOXIN CONTAMINATION IN CEREALS, INCLUDING ANNEXES ON OCHRATOXIN A, ZEARALENONE, FUMONISINS AND TRICOTHECENES

CAC/RCP 51-2003

1. The complete elimination of mycotoxin contaminated commodities is not achievable at this time. The elaboration and acceptance of a General Code of Practice by Codex will provide uniform guidance for all countries to consider in attempting to control and manage contamination by various mycotoxins. In order for this Code of Practice to be effective, it will be necessary for the producers in each country to consider the general principles given in the Code, taking into account their local crops, climate, and agronomic practices, before attempting to implement provisions in the Code. It is important for producers to realize that good agricultural practices (GAP) represent the primary line of defence against contamination of cereals with mycotoxins, followed by the implementation of good manufacturing practices (GMP) during the handling, storage, processing, and distribution of cereals for human food and animal feed.

2. The recommendations for the reduction of mycotoxins in cereals are divided into two parts: recommended practices based on Good Agricultural Practices (GAP) and Good Manufacturing Practice (GMP); a complementary management system to consider in the future is Hazard Analysis Critical Control Point (HACCP) principles.

3. This General Code of Practice contains general principles for the reduction of various mycotoxins in cereals that should be sanctioned by national authorities. National authorities should educate producers regarding the environmental factors that promote infection, growth and toxin production in cereal crops at the farm level. Emphasis should be placed on the fact that the planting, preharvest and postharvest strategies for a particular crop will depend on the climatic conditions of that particular year, taking into account the local crops, and traditional production conditions for that particular country or region. There is need to develop quick, affordable and accurate test kits and associated sampling plans that will allow testing of grain shipments without undue disruption of operations. Procedures should be in place to properly handle, through segregation, reconditioning, recall or diversion, cereal crops that may pose a threat to human and/or animal health. National authorities should support research on methods and techniques to prevent fungal contamination in the field and during harvest and storage.

I. RECOMMENDED PRACTICES BASED ON GOOD AGRICULTURAL PRACTICES (GAP) AND GOOD MANUFACTURING PRACTICES (GMP)

PLANTING

4. Consider developing and maintaining a crop rotation schedule to avoid planting the same commodity in a field in two consecutive years. Wheat and maize have been found to be particularly susceptible to *Fusarium* species and they should not be used in rotation with each other. Crops such as potato, other vegetables, clover and alfalfa that are not hosts to *Fusarium* species should be used in rotation to reduce the inoculum in the field.

5. When possible and practical**,** prepare the seed bed for each new crop by ploughing under or by destroying or removing old seed heads, stalks, and other debris that may have served, or may potentially serve as substrates for the growth of mycotoxin-producing fungi. In areas that are vulnerable to erosion, no-till practices may be required in the interests of soil conservation.

6. Utilize the results of soil tests to determine if there is need to apply fertilizer and/or soil conditioners to assure adequate soil pH and plant nutrition to avoid plant stress, especially during seed development.

7. When available, grow seed varieties developed for resistance to seed-infecting fungi and insect pests. Only seed varieties recommended for use in a particular area of a country should be planted in that particular area.

8. As far as practical, crop planting should be timed to avoid high temperature and drought stress during the period of seed development and maturation.

9. Avoid overcrowding of plants by maintaining the recommended row and intra-plant spacing for the species/varieties grown. Information concerning plant-spacing may be provided by seed companies.

PREHARVEST

10. Minimize insect damage and fungal infection in the vicinity of the crop by proper use of registered insecticides, fungicides and other appropriate practices within an integrated pest management program.

11. Control weeds in the crop by use of mechanical methods or by use of registered herbicides or other safe and suitable weed eradication practices.

12. Minimize mechanical damage to plants during cultivation.

13. If irrigation is used, ensure that it is applied evenly and that all plants in the field have an adequate supply of water. Irrigation is a valuable method of reducing plant stress in some growing situations. Excess precipitation during anthesis (flowering) makes

conditions favourable for dissemination and infection by *Fusarium* spp.; thus irrigation during anthesis and during the ripening of the crops, specifically wheat, barley, and rye, should be avoided.

14. Plan to harvest grain at low moisture content and full maturity, unless allowing the crop to continue to full maturity would subject it to extreme heat, rainfall or drought conditions. Delayed harvest of grain already infected by *Fusarium* species may cause a significant increase in the mycotoxin content of the crop.

15. Before harvest time, make sure that all equipment, which is to be used for harvesting and storage of crops, is functional. A breakdown during this critical period may cause grain quality losses and enhance mycotoxin formation. Keep important spare parts available on the farm to minimize time loss from repairs. Make sure that the equipment needed for moisture content measurements is available and calibrated.

HARVEST

16. Containers (e.g., wagons, trucks) to be used for collecting and transporting the harvested grain from the field to drying facilities, and to storage facilities after drying, should be clean, dry and free of insects and visible fungal growth before use and re-use.

17. As far as possible, avoid mechanical damage to the grain and avoid contact with soil during the harvesting operation. Steps should be taken to minimize the spread of infected seed heads, chaff, stalks, and debris onto the ground where spores may inoculate future crops.

18. During the harvesting operation, the moisture content should be determined in several spots of each load of the harvested grain since the moisture content may vary considerably within the same field.

19. Immediately after harvest, determine moisture levels of the crop; where applicable, dry the crop to the moisture content recommended for storage of that crop. Samples taken for moisture measurements should be as representative of the lot as possible. To reduce the variation of moisture content within a lot, the grain may be moved to another facility (or silo) after the drying process.

20. Cereals should be dried in such a manner that damage to the grain is minimized and moisture levels are lower than those required to support mould growth during storage (generally less than 15%). This is necessary to prevent further growth of a number of fungal species that may be present on fresh grains, especially *Fusarium* species.

21. Freshly harvested cereals should be cleaned to remove damaged kernels and other foreign matter. Kernels containing symptomless infections cannot be removed by standard cleaning methods. Seed cleaning procedures, such as gravity tables, may remove some infected kernels. More research is needed to develop practical procedures for separating symptomless infected kernels from those that are not infected.

STORAGE

22. Avoid piling or heaping wet, freshly harvested commodities for more than a few hours prior to drying or threshing to lessen the risk of fungal growth. Sun drying of some commodities in high humidity may result in fungal infection. Aerate the commodities by forced air circulation.

23. Make sure that the storage facilities include dry, well-vented structures that provide protection from rain, drainage of ground water, protection from entry of rodents and birds, and minimum temperature fluctuations.

24. Crops to be stored should be dried to safe moisture levels and cooled as quickly as possible after harvest. Minimize the amount of foreign materials and damaged kernels in stored grains. Refer to paragraph 29 to evaluate the use of approved pesticides.

25. The mycotoxin level in in-bound and out-bound grain should be monitored when warranted, using appropriate sampling and testing programs.

26. For bagged commodities, ensure that bags are clean, dry and stacked on pallets or incorporate a water impermeable layer between the bags and the floor.

27. Where possible, aerate the grain by circulation of air through the storage area to maintain proper and uniform temperature levels throughout the storage area. Check moisture content and temperature in the stored grain at regular intervals during the storage period.

28. Measure the temperature of the stored grain at several fixed time intervals during storage. A temperature rise of 2–3 °C may indicate microbial growth and/or insect infestation. Separate the apparently infected portions of the grain and send samples for analysis. When separated, lower the temperature in the remaining grain and aerate. Avoid using infected grain for food or feed production.

29. Use good housekeeping procedures to minimize the levels of insects and fungi in storage facilities. This may include the use of suitable, registered insecticides and fungicides or appropriate alternative methods. Care should be taken to select only those chemicals that will not interfere or cause harm based on the intended end use of the grains and should be strictly limited.

30. The use of a suitable, approved preservative (e.g., organic acids such as propionic acid) may be beneficial. These acids are effective in killing various fungi and thus prevent the production of mycotoxins in grains intended only for animal feed. The salts of the acids are usually more effective for long-term storage. Care must be taken because these compounds can negatively affect the taste and odour of the grain.

31. Document the harvesting and storage procedures implemented each season by making notes of measurements (e.g., temperature, moisture, and humidity) and any deviation or changes from traditional practices. This information may be very useful for

explaining the cause(s) of fungal growth and mycotoxin formation during a particular crop year and help to avoid similar mistakes in the future.

TRANSPORT FROM STORAGE

32. Transport containers should be dry and free of visible fungal growth, insects and any contaminated material. As necessary, transport containers should be cleaned and disinfected before use and re-use and be suitable for the intended cargo. The use of registered fumigants or insecticides may be useful. At unloading, the transport container should be emptied of all cargo and cleaned as appropriate.

33. Shipments of grain should be protected from additional moisture by using covered or airtight containers or tarpaulins. Avoid temperature fluctuations and measures that may cause condensation to form on the grain, which could lead to local moisture build-up and consequent fungal growth and mycotoxin formation.

34. Avoid insect, bird and rodent infestation during transport by the use of insect-and rodent proof containers or insect and rodent repellent chemical treatments if they are approved for the intended end use of the grain.

II. A COMPLEMENTARY MANAGEMENT SYSTEM TO CONSIDER IN THE FUTURE

35. The Hazard Analysis Critical Control Point (HACCP) system is a food safety management system that is used to identify and control hazards within the production and processing system. The general principles of HACCP have been described in several documents.[1, 2]

36. The HACCP concept is an all-encompassing integrated management system. When properly implemented, this system should result in a reduction of the levels of mycotoxins in many cereal grains. The use of HACCP as a food safety management system has many benefits over other types of management control systems in some segments of the food industry. At farm level, especially in the field, many factors that influence the mycotoxin contamination of cereals are environmentally related, such as weather and insects, and are difficult or impossible to control. In other words, critical control points often do not exist in the field. However, after harvesting, critical control points may be identified for mycotoxins produced by fungi during storage. For example, a critical control point could be at the end of the drying process and one critical limit would be the water content/water activity.

37. It is recommended that resources be directed to emphasizing Good Agricultural Practices (GAPs) at the preharvest level and Good Manufacturing Practices (GMPs) during the processing and distribution of various products. A HACCP system should be built on sound GAPs and GMPs.

[1] FAO. 1995. *The use of Hazard Analysis Critical Control Points (HACCP) principles in food control.* FAO Food and Nutrition Paper No. 58. Rome.

[2] ILSI. 1997. *A simple guide to understanding and applying the Hazard Analysis Critical Control Point concept.* ILSI Europe Concise Monograph series. 2nd edition, ILSI Europe, Brussels.

38. It is also recommended that before further consideration is given to the HACCP system, reference should be made to the Codex Annex to CAC/RCP 1-1969, Rev. 4 (2003) "Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Management".

39. Consideration should also be given to a HACCP manual for mycotoxin control recently published by FAO/IAEA.[3]

40. At the Third International Conference on Mycotoxins, which took place in Tunisia in March 1999, one of the general recommendations was that integrated mycotoxin control programs should incorporate HACCP principles in the control of risks associated with mycotoxin contamination of foods and feeds.[4] The implementation of HACCP principles will minimize mycotoxin contamination through applications of preventive controls to the extent feasible in the production, handling, storage and processing of each cereal crop.

[3] FAO/IAEA Training and Reference Centre for Food and Pesticide Control, 2001. *Manual on the application of the HACCP system in mycotoxin prevention and control.* FAO Food and Nutrition Paper No. 73. Rome.

[4] FAO. Preventing mycotoxin contamination. *Food, Nutrition and Agriculture,* No. 23, 1999. Food and Nutrition Division, FAO, Rome.

ANNEX 1

PREVENTION AND REDUCTION OF CONTAMINATION BY ZEARALENONE IN CEREAL GRAINS

Recommended practices based on Good Agricultural Practices (GAP) and Good Manufacturing Practice (GMP)

1. Good Agricultural Practices include methods to reduce *Fusarium* infection and zearalenone contamination of cereals in the field and during planting, harvest, storage, transport and processing.

Planting

2. Refer to paragraphs 4–9 in the General Code of Practice.

Preharvest

3. Refer to paragraphs 10–15 in the General Code of Practice.

4. The establishment of *Fusarium* infection in cereal heads during flowering should be monitored before harvest by sampling and determination of infection by standard microbiological methods. Also, mycotoxin content in representative preharvest samples should be determined. Utilization of the crop should be based on prevalence of infection and mycotoxin content of the grain.

Harvest

5. Refer to paragraphs 16–21 in the General Code of Practice.

Storage

6. Refer to paragraphs 22–31in the General Code of Practice.

Transport from storage

7. Refer to paragraphs 32–34 in the General Code of Practice.

Processing

8. Small, shrivelled grain may contain more zearalenone than healthy normal grain. Winnowing grains at harvest or later will remove shrivelled grain.

Zearalenone management system based on Hazard Analysis Critical Control Point System (HACCP)

9. Refer to paragraphs 35–40 in the General Code of Practice.

ANNEX 2

PREVENTION AND REDUCTION OF CONTAMINATION BY FUMONISINS IN CEREAL GRAINS

Recommended practices based on Good Agricultural Practices (GAP) and Good Manufacturing Practice (GMP)

1. Good Agricultural Practices include methods to reduce *Fusarium* infection and fumonisin contamination of cereals during planting, harvest, storage, transport and processing.

Planting

2. Refer to paragraphs 4–9 in the General Code of Practice.

Preharvest

3. Refer to paragraphs 10–15 in the General Code of Practice.

Harvest

4. Refer to paragraphs 16–21 in the General Code of Practice.

5. The time of harvest for maize should be carefully planned. It has been shown that maize grown and harvested during warm months may have fumonisin levels significantly higher than maize grown and harvested during cooler months of the year.

Storage

6. Refer to paragraphs 22–31 in the General Code of Practice.

Transport from storage

7. Refer to paragraphs 32–34 of the General Code of Practice.

Fumonisins management system based on Hazard Analysis Critical Control Point System (HACCP)

8. Refer to paragraphs 35–40 in the General Code concerning HACCP.

ANNEX 3

PREVENTION AND REDUCTION OF CONTAMINATION BY OCHRATOXIN A IN CEREALS

Recommended practices based on Good Agricultural Practices (GAP) and Good Manufacturing Practice (GMP)

1. Good Agricultural Practices include methods to reduce fungal infection and ochratoxin A contamination of cereals during harvest, storage, transport and processing.

Planting

2. Refer to paragraphs 4–9 in the General Code of Practice.

Preharvest

3. Refer to paragraphs 10–15 in the General Code of Practice.

4. Factors during preharvest that may affect levels of ochratoxin A in harvested grains include frost damage, presence of competitive fungi, excessive rainfall and drought stress.

Harvest

5. Refer to paragraphs 16–21 in the General Code of Practice.

Preservation

6. Grain should be allowed to dry as much as possible before harvest consistent with local environment and crop conditions. If unable to harvest the grain when it has a water activity below 0.70, then dry the grain to a moisture content corresponding to a water activity of less than 0.70 (less than 14% moisture content in small grain) as quickly as possible. To avoid ochratoxin A formation, start the drying process immediately after harvest and preferably use heated-air drying. In the temperate climate region, when intermediate or buffer storage is necessary because of low drying capacity, make sure that the moisture content is less than 16%, that the buffer storage time is less than 10 days, and the temperature is less than 20 °C.

Storage

7. Refer to paragraphs 22–31 in the General Code of Practice.

Transport

8. Refer to paragraphs 32–34 in the General Code of Practice.

Ochratoxin a management system based on Hazard Analysis Critical Control Points (HACCP)

9. Refer to paragraphs 35–40 in the General Code of Practice.

ANNEX 4

PREVENTION AND REDUCTION OF CONTAMINATION BY TRICOTHECENES IN CEREAL GRAINS

Recommended practices based on Good Agricultural Practices (GAP) and Good Manufacturing Practice (GMP)

1. Good Agricultural Practices include methods to reduce *Fusarium* infection and tricothecene contamination of cereals during planting, harvest, storage, transport and processing.

Planting

2. Refer to paragraphs 4–9 in the General Code of Practice.

Preharvest

3. Refer to paragraphs 10–15 in the General Code of Practice.

4. Do not permit mature grains to remain in the field for extended periods of time, particularly in cold, wet weather. T-2 and HT-2 toxins are not usually found in grains at harvest, but can result from grains that are water-damaged in the field or grains that become wet at harvest or during storage.

5. Refer to paragraph 4 in Annex 1.

6. Cereal growers should maintain close relations with local cereal trade groups. Such groups should be important sources of information and advice regarding choice of appropriate plan protection products, cultivars and strains that will take into account those resistant to *Fusarium* and are available for their location.

Harvest

7. Refer to paragraphs 16–21 in the General Code of Practice.

Storage

8. Refer to paragraphs 22–31 in the General Code of Practice.

9. Be aware that cereal grains may be contaminated by more than one tricothecene mycotoxin along with their derivatives; therefore simple, rapid screening methods should be available for the analysis of several tricothecenes. Zearalenone, which is not a tricothecene, has been noted to regularly co-occur in cereals contaminated with DON and other tricothecenes.

Transport from storage

10. Refer to paragraphs 32–34 in the General Code of Practice.

Tricothecene management system based on Hazard Analysis Critical Control Point System (HACCP)

11. Refer to paragraphs 35–40 in the General Code of Practice.

CODEX STANDARD FOR INSTANT NOODLES

CODEX STAN 249-2006

1. SCOPE

The standard shall apply to various kinds of noodles. The instant noodle may be packed with noodle seasonings, or in the form of seasoned noodle and with or without noodle garnish(s) in separate pouches, or sprayed on noodle and ready for consumption after dehydration process. This standard does not apply to pasta.

2. DESCRIPTION

Instant Noodle is a product prepared from wheat flour and/or rice flour and/or other flours and/or starches as the main ingredient, with or without the addition of other ingredients. It may be treated by alkaline agents. It is characterized by the use of pregelatinization process and dehydration either by frying or by other methods. The product should be presented as one of the following styles:

2.1 Fried noodles, or

2.2 Non-fried noodles

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Composition

3.1.1 **Essential ingredients**

(a) Wheat Flour and/or Rice Flour and/or other flours and/or starches;
(b) Water.

3.1.2 **Optional ingredients**

The optional ingredients shall be ingredient(s) which are commonly used.

3.2 Quality criteria

3.2.1 **Organoleptic**

Shall be acceptable in term of appearance, texture, aroma, taste and colour.

3.2.2 **Foreign matter**

The product shall be free from foreign matter.

3.2.3 **Analytical requirement for noodle block (noodle excluding seasonings)**

(a) Moisture Content
Maximum of 10% for fried noodles
Maximum of 14% for non-fried noodles
(b) Acid value: maximum of 2 mg KOH/g oil (applicable only to fried noodles)

4. FOOD ADDITIVES

The use of food additive(s) as well as food additive(s) carry-over shall comply with the maximum level permitted by the *General Standard for Food Additives (GSFA)*, CODEX STAN 192-1995. However, until the food additive provisions for the food category 06.4.3 "Pre-cooked pastas and noodles and like products" in the GSFA is finalized, the following listed food additives will apply.[1]

INS no.	Food additive	Maximum level
ACIDITY REGULATORS		
260	Acetic acid, glacial	GMP
262(i)	Sodium acetate	
270	Lactic acid (L-, D-, and DL-)	
296	Malic acid (DL-)	
327	Calcium lactate	
330	Citric acid	
331(iii)	Trisodium citrate	
334	Tartaric acid (L(+)-)	7 500 mg/kg
350(ii)	Sodium malate	GMP
365	Sodium fumarates	
500(i)	Sodium carbonate	
500(ii)	Sodium hydrogen carbonate	
501(i)	Potassium carbonate	
516	Calcium sulphate	
529	Calcium oxide	
ANTIOXIDANTS		
300	Ascorbic acid (L-)	GMP
304	Ascorbyl palmitate	500 mg/kg Singly or in combination as ascorbyl stearate
305	Ascorbyl stearate	
306	Mixed tocopherols concentrate	200 mg/kg Singly or in combination
307	Alpha-tocopherol	
310	Propyl gallate	200 mg/kg Singly or in combination expressed as a fat or oil basis
319	Tertiary butylhydroquinone (TBHQ)	
320	Butylated hydroxyanisole (BHA)	
321	Butylated hydroxytoluene (BHT)	
COLOURS		
100(i)	Curcumin	500 mg/kg
101(i)	Riboflavin	200 mg/kg Singly or in combination as riboflavin
101(ii)	Riboflavin 5'-phosphate, sodium	
102	Tartrazine	300 mg/kg
110	Sunset yellow FCF	300 mg/kg
120	Carmines	100 mg/kg

[1] This sentence and the food additive list which follows will be removed from the standard once the GSFA on the food category 06.4.3. "Pre-cooked pastas and noodles and like products" is completed.

INS no.	Food additive	Maximum level
123	Amaranth	100 mg/kg
141(i)	Chlorophyll copper complex	100 mg/kg
141(ii)	Chlorophyllin copper complex, sodium and potassium salts	100 mg/kg
143	Fast green FCF	290 mg/kg
150a	Caramel I-plain	GMP
150b	Caramel II-caustic sulphite process	50 000 mg/kg
150c	Caramel III-ammonia process	50 000 mg/kg
150d	Caramel IV-ammonia sulphite process	50 000 mg/kg
160a(i)	Beta carotene (synthetic)	1 200 mg/kg
160a(ii)	Carotenes, Vegetable	1 000 mg/kg
160a(ii)	Beta-carotene (Blakeslea trispora)	1 000 mg/kg
160e	Beta-apo-carotenal	200 mg/kg
160f	Beta-apo-8'-carotenic acid, methyl or ethyl ester	1 000 mg/kg
162	Beet red	GMP
FLAVOUR ENHANCERS		
620	Glutamic acid (L(+)-)	GMP
621	Monosodium glutamate, L-	GMP
631	Disodium 5'-inosinate,	GMP
627	Disodium 5'-guanylate	GMP
635	Disodium 5'-ribonucleotides	GMP
STABILIZERS		
170(i)	Calcium carbonate	GMP
406	Agar	GMP
459	Beta-cyclodextrin	1 000 mg/kg
THICKENERS		
400	Alginic acid	GMP
401	Sodium alginate	GMP
410	Carob bean gum	GMP
407	Carrageenan and its Na, K, NH_4 salts (includes furcellaran)	GMP
407a	Processed Eucheuma seaweed	GMP
412	Guar gum	GMP
414	Gum Arabic (acacia gum)	GMP
415	Xanthan gum	GMP
416	Karaya gum	GMP
417	Tara gum	GMP
418	Gellan gum	GMP
424	Curdlan	GMP
440	Pectins	GMP
466	Sodium carboxymethyl cellulose	GMP
508	Potassium chloride	GMP
1401	Acid treated starch	GMP
1402	Alkaline treated starch	GMP

INS no.	Food additive	Maximum level
1403	Bleached starch	GMP
1404	Oxdized starch	GMP
1405	Starches, enzyme-treated	GMP
1410	Monostarch phosphate	GMP
1412	Distarch phosphate esterified with sodium trimetaphosphate; esterified with phosphorous oxychloride	GMP
1413	Phosphated distarch phosphate	GMP
1414	Acetylated distarch phosphate	GMP
1420	Starch acetate	GMP
1422	Acetylated distarch adipate	GMP
1440	Hydroxypropyl starch	GMP
1442	Hydroxypropyl distarch phosphate	GMP
1450	Starch sodium octenyl succinate	GMP
1451	Acetylated oxidized starch	GMP
HUMECTANTS		
325	Sodium lactate	GMP
339(i)	Monosodium orthophosphate	2 000 mg/kg Singly or in combination as phosphorus
339(ii)	Disodium orthophosphate	
339(iii)	Trisodium orthophosphate	
340(i)	Monopotassium orthophosphate	
340(ii)	Dipotassium orthophosphate	
340(iii)	Tripotassium orthophosphate	
341(iii)	Tricalcium orthophosphate	
450(i)	Disodium diphosphate	
450(iii)	Tetrasodium diphosphate	
450(v)	Tetrapotassium diphosphate	
450(vi)	Dicalcium diphosphate	
451(i)	Pentasodium triphosphate	
452(i)	Sodium polyphosphate	
452(ii)	Potassium polyphosphate	
452(iv)	Calcium polyphosphates	
452(v)	Ammonium polyphosphates	
420	Sorbitol and sorbitol syrup	GMP
1520	Propylene glycol	10 000 mg/kg
EMULSIFIERS		
322	Lecithin	GMP
405	Propylene glycol alginate	5 000 mg/kg
430	Polyoxyethylene (8)stearate	5 000 mg/kg (dry basis) Singly or in combination
431	Polyoxyethylene (40)stearate	
432	Polyoxyethylene (20)sorbitan monolaurate	5 000 mg/kg Singly or in combination as total polyoxyethylene (20) sorbitan esters
433	Polyoxyethylene (20)sorbitan monooleate	
434	Polyoxyethylene (20)sorbitan monopalmitate	
435	Polyoxyethylene (20)sorbitan monostearate	
436	Polyoxyethylene (20)sorbitan tristearate	

INS no.	Food additive	Maximum level
471	Mono and di-glycerides of fatty acids	GMP
472e	Diacetyltartaric and fatty acid esters of glycerol	10 000 mg/kg
473	Sucrose esters of fatty acids	2 000 mg/kg
475	Polyglycerol esters of fatty acids	2 000 mg/kg
476	Polyglycerol esters of interesterified ricinoleic acids	500 mg/kg
477	Propylene glycol esters of fatty acids	5 000 mg/kg (dry basis)
481(i)	Sodium stearoyl lactylate	5 000 mg/kg
482(i)	Calcium stearoyl lactylate	5 000 mg/kg
491	Sorbitan monostearate	5 000 mg/kg (dry basis) Singly or in combination
492	Sorbitan tristearate	
493	Sorbitan monolaurate	
495	Sorbitan monopalmitate	
FLOUR TREATMENT AGENTS		
220	Sulphur dioxide	20 mg/kg Singly or in combination as sulphur dioxide
221	Sodium sulphite	
222	Sodium hydrogen sulphite	
223	Sodium metabisulphite	
224	Potassium metabisulphite	
225	Potassium sulphite	
227	Calcium hydrogen sulphite	
228	Potassium bisulphite	
539	Sodium thiosulphate	
PRESERVATIVES		
200	Sorbic acid	2 000 mg/kg Singly or in combination as Sorbic acid
201	Sodium sorbate	
202	Potassium sorbate	
203	Calcium sorbate	
ANTICAKING AGENT		
900a	Polydimethylsiloxane	50 mg/kg

5. CONTAMINANTS

The products covered by this Standard shall comply with the Maximum Levels of the *Codex General Standard for Contaminants and Toxins in Foods* (CODEX/STAN 193-1995).

6. CONTAINERS OR PACKING CONDITION

6.1 Instant noodles shall be packaged in containers which will safeguard the hygienic, nutritional, technological and organoleptic qualities of the product.

6.2 The containers, including the packaging materials, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substances or undesirable odour or flavour to the product.

7. FOOD HYGIENE

7.1 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969) and other relevant Codex texts such as codes of hygienic practice and codes of practice.

7.2 The products should comply with any microbiological criteria established in accordance with the *Principles for the Establishment and Application of Microbiological Criteria for Foods* (CAC/GL 21-1997).

8. LABELLING

The product covered by this Standard shall be labelled in accordance with the *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985).

8.1 Name of the food

The name of the food shall be "Instant Noodle(s)", or optionally as "Fried Noodle(s)" or "Non-fried Noodle(s)" in accordance to Subsections 2.1 and 2.2. Other names may be used if allowed by national legislation.

8.2 Labelling for "halal"

Claim on "Halal" Instant Noodles shall follow the appropriate section of the Codex *General Guidelines for Use of the Term "Halal"* (CAC/GL 24-1997)

9. METHODS OF ANALYSIS AND SAMPLING

9.1 Sampling

Sampling shall follow the *General Guidelines on Sampling* (CAC/GL 50-2004).

9.2 Determination of moisture

9.2.1 **Apparatus**

(a) Aluminium dish: diameter ≥55 mm, height ≥ 15 mm, and with inverted tight-fitting lid.
(b) Air-oven: with control accuracy ±1 °C.
(c) Air-tight desiccator: silica gel heated at 150 °C is satisfactory drying agent.

9.2.2 **Preparation of test sample**

Remove instant noodles from package, and leave garnishing and seasoning in package. Transfer the noodles to plastic bag to prevent moisture change, and then break these

into small fragments with hands or wooden hammer. Select broken noodles in the size range of 2.36 mm to 1.7 mm by using two sieves with 2.36 mm and 1.7 mm openings (mesh size 12–8), and mix well. Use these noodles for test sample. If noodles are too thin to screen with sieves, cut them into 1 to 2 cm lengths, mix well, and use these cut noodles for test sample.

9.2.3 **Determination**

9.2.3.1 **Fried noodles**

In cooled and weighed dish (with lid), previously heated to 105 °C, weigh ca 2 g well-mixed test portion to 1 mg. Uncover test portion and dry dish, lid, and contents 2 h in oven provided with opening for ventilation and maintained at 105 °C. (The 2 h drying period begins when oven temperature is actually 105 °C.) After drying period, cover dish while still in oven, transfer to desiccator, and weigh to 1 mg soon after reaching room temperature. Report loss in weight as moisture (indirect method).

9.2.3.2 **Non-fried noodles**

For non-fried noodles, follow the directions for fried noodles, but dry test portion for 4h.

9.2.4 **Calculation**

Calculate using the following equation:

Moisture (%) = {(g test portion before drying – g test portion after drying) / g test portion before drying} × 100

9.3 Extraction of oil from instant noodles

9.3.1 **Apparatus**

(a) Rotary evaporator
(b) Water bath

9.3.2 **Preparation of test sample**

Remove instant noodles from package, and leave garnishing and seasoning in package. Transfer the noodles to plastic bag to prevent moisture change, and then break these into small fragments with hands or wooden hammer. Select broken noodles in the size range of 2.36 mm to 1.7 mm by using two sieves with 2.36 mm and 1.7 mm openings, and mix well. Use these noodles for the test sample. If the noodles are too thin to screen with sieves, cut them into 1 to 2 cm lengths, mix well, and use these cut noodles for the test sample.

9.3.3 **Extraction**

Weigh 25 g test portion into 200 mL Erlenmeyer flask. Add 100 mL petroleum ether to the flask after replacing air in flask by N_2 gas. Stopper flask and leave for 2 hours. Decant supernatant through filter paper into separating funnel. Add 50 mL petroleum ether to residue and filtrate supernatant through filter paper into the separating funnel. Add 75 mL water to the separating funnel and shake well. Allow layers to separate and drain the lower aqueous layer. Add water, shake, and remove aqueous layer again as done previously. Decant the petroleum ether layer

after dehydration with Na2SO4 into pear-shaped flask. Evaporate petroleum ether in the flask on rotary evaporator at not over 40°C. Spray N2 gas on extract in the flask to remove all petroleum ether.

9.4 Determination of acid value

9.4.1 Definition and principle

Acid value of oil from fried instant noodles = mg KOH required to neutralize 1 g oil. Oil extracted from noodle is dissolved in alcohol-ether mixture and titrated with alcoholic KOH standard solution.

9.4.2 Apparatus

Air-tight desiccator: silica gel heated at 150°C is satisfactory drying agent.

9.4.3 Reagents

(a) Alcoholic potassium hydroxide standard solution: 0.05 mol/L. Dissolve 3.5 g potassium hydroxide in equal volume of water (CO2-free) and add ethanol (95%) to 1 L. After mixing, let solution stand for several days keeping the solution CO2-free. Use supernatant after standardization.

Standardization:

Weigh required quantity of amidosulfuric acid (certified reference material for volumetric analysis) and place it into desiccator (<2.0 kPa) for 48 hour. Next, accurately weigh 1 to 1.25 g (recording the weight to 0.1mg), dissolve in water (CO2-free), and dilute to 250 mL. Put 25 mL solution into Erlenmeyer flask, add 2 to 3 drops of bromothymol blue indicator and titrate with 0.05 mol/L alcoholic potassium hydroxide solution until colour of solution change to faint blue.

Calculation:

Factor of molarity = (g amidosulfuric acid × purity × 25) / 1.2136 / mL KOH

(b) Alcohol-ether mixture: equal volumes ethanol (99.5%) and ether.

(c) Phenolphthalein solution: 1% in alcohol.

9.4.4 Titration

Before sampling, liquefy extracted oil using water bath. Weigh 1 to 2 g liquefied test portion into Erlenmeyer flask. Add 80 mL alcohol-ether mixture and a few drops of phenolphthalein solution. Titrate with 0.05 mol/L alcoholic KOH until faint pink colour appears and retain for more than 30 s. Perform blank test using only alcohol-ether mixture and phenolphthalein solution.

9.4.5 Calculation

Calculate using following equation:

Acid value [mg/g] = (mL test portion – mL blank) × factor of molarity × 2.806 / g test portion

CODEX GENERAL STANDARD FOR SOY PROTEIN PRODUCTS

CODEX STAN 175-1989

1. SCOPE

This standard applies to Vegetable Protein Products (VPP) prepared from soybeans (seeds of *Glycine Max*.L.) by various separation and extraction processes. These products are intended for use in foods requiring further preparation and by the food processing industry.

2. DESCRIPTION

Soy Protein Products (SPP) covered by this standard are food products produced by the reduction or removal from soybeans of certain of the major non-protein constituents (water, oil, carbohydrates) in a manner to achieve a protein (N x 6.25) content of:

- in the case of soy protein flour (SPF) 50% or more and less than 65%;
- in the case of soy protein concentrate (SPC) 65% or more and less than 90%;
- in the case of soy protein isolate (SPI) 90% or more.

The protein content is calculated on a dry weight basis excluding added vitamins, minerals, amino acids and food additives.

3. ESSENTIAL COMPOSITION AND QUALITY AND NUTRITIONAL FACTORS

3.1 Raw materials

Clean, sound, mature, dry seeds essentially free from other seeds and foreign matter in accordance with Good Manufacturing Practice, or SPP of lower protein content meeting the specifications contained in this standard.

3.2 SPP shall conform to the following compositional requirements:

3.2.1 **Moisture** content shall not exceed 10% (m/m).

3.2.2 **Crude protein** (N $\times$ 6.25) shall be:

- in the case of SPF, 50% or more and less than 65%
- in the case of SPC, 65% or more and less than 90%
- in the case of SPI, 90% or more

on a dry weight basis excluding added vitamins, minerals, amino acids and food additives.

3.2.3 **Ash**

The yield of ash on incineration shall not exceed 8% on a dry weight basis.

3.2.4 **Fat**
The residual fat content shall be compatible with Good Manufacturing Practices.

3.2.5 **Crude fibre** content shall not exceed:
- in the case of SPF, 5%
- in the case of SPC, 6%
- in the case of SPI, 0.5%

on a dry weight basis.

3.3 Optional ingredients

(a) carbohydrates, including sugars
(b) edible fats and oils
(c) other protein products
(d) vitamins and minerals
(e) salt
(f) herbs and spices

3.4 Nutritional factors

Processing should be carefully controlled and sufficiently thorough to secure optimum flavour and palatability, as well as to control such factors as trypsin inhibitor, hemaglutinins, etc., in accordance with intended use. Where it is necessary to control trypsin inhibitor activity in a food, the maximum level allowed should be defined in terms of the finished product. Certain SPP are produced under low temperature conditions to avoid loss of protein solubility or enzyme activity. The special purpose SPP shall be assayed for protein nutritive value after appropriate heat treatment. Processing must not be so severe as to appreciably impair the nutritive value.

4. FOOD ADDITIVES

During the course of manufacturing SPP the following classes of processing aids, as compiled in the advisory inventory of the Codex Alimentarius Commission, may be used:
- Acidity Regulators
- Antifoam Agents
- Firming Agents
- Enzyme Preparations
- Extraction Solvents
- Antidusting Agents
- Flour Treatment Agents
- Viscosity Control Agents.

5. CONTAMINANTS

SPP shall be free from heavy metals in amounts which may represent a hazard to health.

6. HYGIENE

6.1 It is recommended that the products covered by the provisions of this standard be prepared in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969).

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

6.3 When tested by appropriate methods of sampling and examination the product:
(a) shall be free from micro-organisms in amounts which may represent a hazard to health;
(b) shall not contain substances originating from micro-organisms in amounts which may represent a hazard to health; and
(c) shall not contain other poisonous substances in amounts which may represent a hazard to health.

7. PACKAGING

SPP shall be packed in suitable hygienic containers which will maintain the product during storage and transport in a dry and sanitary condition.

8. LABELLING

The provisions of the *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985) shall apply.

8.1 Name of the food

8.1.1 The name of the food to be declared on the label shall be:
- "Soy protein flour" or "soya protein flour" when the protein content is 50% or more and less than 65%.
- "Soy protein concentrate" or "soya protein concentrate" when the protein content is 65% or more and less than 90%.
- "Soy protein isolate" or "isolated soy protein" or "soya protein isolate" or "isolated soya protein" when the protein content is 90% or more.

8.1.2 The name may include a term which accurately describes the physical form of the product, e.g., "granules" or "bits",

8.1.3 When the SPP is subjected to a texturization process, the name of the product may include an appropriate qualifying term such as "textured" or "structured".

8.2 List of ingredients

A complete list of ingredients shall be declared on the label in descending order of proportion except that in the case of added vitamins and added minerals, these ingredients shall be arranged as separate groups for vitamins and minerals, respectively,

and within these groups the vitamins and minerals need not be listed in descending order of proportion.

8.3 Labelling of non-retail containers

Information for non-retail containers shall either be given on the container or in accompanying documents, except that the name of the product, lot identification and name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

CODEX GENERAL STANDARD FOR VEGETABLE PROTEIN PRODUCTS (VPP)

CODEX STAN 174-1989

1. SCOPE

This standard applies to vegetable protein products (VPP) intended for use in foods, which are prepared by various separation and extraction processes from proteins from vegetable sources other than single cell protein. The VPP are intended for use in foods requiring further preparation and for use by the food processing industry. This standard does not apply to any vegetable protein product which is the subject of a specific Codex Commodity Standard and is designated by a specific name laid down in such standards.

2. DESCRIPTION

VPP covered by this standard are food products produced by the reduction or removal from vegetable materials of certain of the major non-protein constituents (water, oil, starch, other carbohydrates) in a manner to achieve a protein (N × 6.25) content of 40% or more. The protein content is calculated on a dry weight basis excluding added vitamins, minerals.

3. ESSENTIAL COMPOSITION AND QUALITY AND NUTRITIONAL FACTORS

3.1 Raw materials

Clean, sound, plant material essentially free from foreign matter in accordance with Good Manufacturing Practice, or VPP of lower protein content meeting the specifications contained in this standard.

3.2 VPP shall conform to the following compositional requirements except in so far as certain requirements may be modified in specific types of VPP.

3.2.1 **Moisture**

The moisture content shall be sufficiently low as to ensure microbiological stability under the recommended conditions of storage.

3.2.2 **Crude protein**

(N × 6.25) shall not be less than 40% on a dry weight basis, excluding vitamins, minerals, amino acids and food additives.

3.2.3 **Ash**

The yield of ash on incineration shall not exceed 10% on a dry weight basis.

3.2.4 **Fat**

The residual fat content shall be compatible with Good Manufacturing Practice.

3.2.5 **Crude fibre**

For products not covered by a specific product standard, crude fibre shall not exceed 10% on a dry weight basis.

3.3 Optional ingredients

(a) carbohydrates, including sugars
(b) edible fats and oils
(c) other protein products
(d) vitamins and minerals
(e) salt
(f) herbs and spices

3.4 Nutritional factors

Processing shall be carefully controlled and sufficiently thorough to secure optimum flavour and palatability, as well as to control such anti-nutritional factors as trypsin inhibitor, hemagglutinins, glucosinolates, etc., in accordance with intended use. Where it is necessary to control trypsin inhibitor activity in a food, the maximum level allowed should be defined in terms of the finished product. Certain VPP are produced under low temperature conditions to avoid loss of protein solubility or enzyme activity. These special purpose VPP shall be assayed for protein nutritive value after appropriate heat treatment. Processing must not be so severe as to appreciably impair the nutritive value.

4. FOOD ADDITIVES

During the course of manufacturing VPP the following classes of processing aids, as compiled in the advisory inventory of the Codex Alimentarius Commission, may be used:

- Acidity Regulators
- Antifoam Agents
- Firming Agents
- Enzyme Preparations
- Extraction Solvents
- Antidusting Agents
- Flour Treatment Agents
- Viscosity Control Agents

5. CONTAMINANTS

VPP shall be free from heavy metals in amounts which may represent a hazard to health.

6. HYGIENE

6.1 It is recommended that the products covered by the provisions of this standard be prepared in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969).

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

6.3 When tested by appropriate methods of sampling and examination, the product:
(a) shall be free of micro-organisms which may represent a hazard to health;
(b) shall not contain any substances originating from micro-organisms in amounts which may represent a hazard to health; and
(c) shall not contain any other poisonous substances in amounts which may represent a hazard to health.

7. PACKAGING

VPP shall be packed in suitable hygienic containers which will maintain the product during storage and transport in a dry and sanitary condition.

8. LABELLING

The provisions of the *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985) shall apply.

8.1 Name of the food

8.1.1 The name of the food to be declared on the label shall be: "... Protein product". The blank is to be filled with the name of the specific source of the vegetable protein, e.g. groundnut, cottonseed, rapeseed.

8.1.2 The protein content of the VPP shall be declared on a dry weight basis.

8.1.3 The name may include a term which accurately describes the physical form of the product, e.g., "granules" or "bits".

8.1.4 When the VPP is subjected to a texturization process, the name of the product may include an appropriate qualifying term such as "textured" or "structured".

8.2 List of ingredients

A complete list of ingredients shall be declared on the label in descending order of proportion except that in the case of added vitamins and added minerals, these ingredients shall be arranged as separate groups for vitamins and minerals, respectively, and within these groups the vitamins and minerals need not be listed in descending order of proportion.

8.3 Labelling of non-retail containers

Information for non-retail containers shall either be given on the container or in accompanying documents, except that the name of product, lot identification and name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

9. METHODS OF ANALYSIS AND SAMPLING

See relevant Codex texts on methods of analysis and sampling.

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CODEX STANDARD FOR WHEAT PROTEIN PRODUCTS INCLUDING WHEAT GLUTEN

CODEX STAN 163-1987, Rev. 1-2001

1. SCOPE

This standard applies to Wheat Protein Products prepared from wheat by various processes. The products are intended for use in foods requiring further preparation and for use by the food processing industry. Wheat gluten or wheat protein products should not be used for technological reasons e.g. coating or processing aids for foods which are gluten-free by nature[1].

2. DESCRIPTION

2.1 Definitions

Wheat Protein Products (WPP) covered by this standard are food products produced by separation from wheat or wheat flour of certain non-protein constituents (starch, other carbohydrates).

- Vital wheat gluten is characterized by its property of high viscoelasticity as hydrated.
- Devitalized wheat gluten is characterized by its reduced property of viscoelasticity as hydrated due to denaturation.
- Solubilized wheat proteins are characterized by their reduced property of viscoelasticity as hydrated due to partial hydrolysis of wheat gluten.

3. ESSENTIAL COMPOSITION, QUALITY AND NUTRITIONAL FACTORS

3.1 Raw materials

Wheat or wheat flour essentially free from other seeds and foreign matter in accordance with Good Manufacturing Practice.

3.2 Compositional requirements

WPP shall conform to the following compositional requirements:

3.2.1 **Moisture** content shall not exceed 10% (m/m).

3.2.2 **Crude protein** (N × 6.25) shall be:

- in case of vital and devitalized wheat gluten, 80% or more
- in case of solubilized wheat proteins, 60% or more

[1] This does not preclude the use of these products as ingredients in composite pre-packaged foods provided that they are properly labelled as ingredients

On a dry weight basis excluding added vitamins, minerals, amino acids and optional ingredients as specified in Section 3.3.

3.2.3 **Ash**

The yield of ash on incineration shall not exceed:

- in case of vital and devitalized wheat gluten, 2.0%
- in case of solubilized wheat proteins, 10%

on a dry weight basis.

3.2. 4 **Crude fibre** content shall not exceed 1.5% on a dry weight basis.

3.3 Optional ingredients

No optional ingredients are permitted in vital and devitalized wheat gluten.

For solubilized wheat proteins, the following classes of ingredients may be used:

(a) carbohydrates, including sugars
(b) edible fats and oils
(c) other protein products
(d) amino acids, vitamins and minerals
(e) salt
(f) herbs and spices
(g) enzymes

3.4 Nutritional factors

Processing should be carefully controlled and sufficiently thorough to secure optimum flavour and palatability.

Processing must not be so severe as to appreciably impair the nutritive value.

4. FOOD ADDITIVES

No food additives are permitted in vital and devitalized wheat gluten and in solubilized wheat proteins.

5. CONTAMINANTS

The products covered by the provisions of this standard shall comply with those maximum limits established by the Codex Alimentarius Commission.

6. HYGIENE

6.1 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the *Recommended International Code of Practice – General Principles of Food Hygiene* (CAC/RCP 1-1969), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

6.2 The products should comply with any microbiological criteria established in accordance with the *Principles for the Establishment and Application of Microbiological Criteria for Foods* (CAC/GL 21-1997)

7. PACKAGING

WPP shall be packed in suitable hygienic containers which will maintain the product during storage and transport in a dry and sanitary condition.

8. LABELLING

In addition to the requirements of the *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985) the following specific provisions apply:

8.1 Name of the food

8.1.1 **Vital wheat gluten**
The name of the food shall be "vital wheat gluten" or "wheat gluten".

8.1.2 **Devitalized wheat gluten**
The name of the food shall be "devitalized wheat gluten" or "devital wheat gluten".

8.1.3 **Solubilized wheat proteins**
The name of the food shall be "solubilized wheat protein" or "soluble wheat protein".

8.2 Instructions for use

The manufacturer of WPP shall provide clear instructions for specific uses claimed on the label. Cautionary statements for gluten intolerant persons shall be on the label if required by national legislation.

8.3 Date marking

The "date of minimum durability" (preceded by the words "best before") shall be declared by the day, month and year in uncoded numerical sequence except that for products with a shelf-life of more than three months, the month and year will suffice. The month may be indicated by letters in those countries where such use will not confuse the consumer. In the case of products requiring a declaration of month and year only and the shelf-life of the product is valid to the end of a given year, the expression "end (stated year)" may be used as an alternative.

8.4 List of ingredients

A complete list of ingredients shall be declared on the label in descending order of proportion except that in the case of added vitamins and added minerals, these ingredients shall be arranged as separate groups for vitamins and minerals, respectively, and within these groups the vitamins and minerals need to be listed in descending order of proportion.

8.5 Labelling of non-retail containers

Information for non-retail containers shall either be given on the container or in accompanying documents, except that the name of the product, lot identification and name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark provided that such a mark is clearly identifiable with the accompanying documents.

8.6 Declaration of ingredients of animal origin

Optional ingredients of animal origin shall be declared on the label of the product to read as follows: **"Contains (state optional ingredient) of animal origin".**

9. METHODS OF ANALYSIS AND SAMPLING

9.1 Moisture content

According to AOAC 925-09.

9.2 Protein

Vital wheat gluten and devitalized wheat gluten
According to AOAC 979.09.

Solubilized wheat protein
According to AOAC 920.87.

9.3 Ash

According to AOAC 923.03 or ISO 2171 (1980, method B).

9.4 Crude fibre

According to AOAC 962.09.

9.5 Sampling

According to ISO 13690:1999.

CODEX GENERAL GUIDELINES FOR THE UTILIZATION OF VEGETABLE PROTEIN PRODUCTS (VPP) IN FOODS

CAC/GL 4-1989

1. PURPOSE

To provide guidance for the safe and suitable use of vegetable protein products (VPP) in foods by establishing:

(i) principles to ensure that the nutritional quality of the food containing VPP is appropriate to their intended use; and

(ii) principles for the appropriate labelling of foods containing VPP.

2. SCOPE

These general guidelines are intended to apply to all situations in which proteins derived from vegetable sources other than Single Cell Protein are utilized in foods.

3. DEFINITIONS

Available Amino Acids: Amino acids from food proteins that are absorbed and are available for metabolism.

Amino Acid Score (formerly chemical score): (mg of the limiting amino acid in 1.0 g of test protein)/(mg of the same amino acid in 1.0 g of protein as defined by the reference amino acid pattern).

Bioavailability: The extent to which an amino acid or other essential nutrient is absorbed and available for metabolism.

Complementation (of proteins): The increase in protein nutritional value achieved by mixing two proteins, which have different limiting amino acids, in those proportions which result in the protein quality of the mixture being higher than that of either of the component protein occurs when the first protein has an excess of the amino acid which is limiting in the second protein and *vice versa*.

Limiting amino acid: The essential amino acid of a food protein present in the lowest proportion relative to the amount of that amino acid in the Reference Amino Acid Pattern.

Net Protein Ratio (NPR): (weight gain of test group of rats plus weight loss of non-protein group)/(protein consumed by test group).

Nutritional Adequacy: See Section 7.2.

Protein Quality: The extent to which a protein source provides essential amino acids and indispensable nitrogen for meeting human requirements. Protein quality is primarily determined by the level, distribution and bioavailability of the essential amino acids in a protein source.

Reference Amino Acid Pattern: The levels and distributions of essential amino acids of an ideal protein specified by FAO/WHO/UNU (1985) for meeting the requirements of the 2–5 year old child when consumed at the level of safe protein intake.

Relative NPR (RNPR): NPR expressed relative to a standard protein.

Supplementation (in protein nutrition): The increase in protein quality achieved by the addition of a moderate amount of a protein having a high content of an essential amino acid to another protein in which that amino acid is limiting.

Utilizable Protein: Protein which is metabolically available for meeting human requirements for essential amino acids and indispensable nitrogen. Calculated as the product of crude protein in 100 grams of product (N × 6.25) × protein quality expressed as a fraction (maximum protein quality = 1.0).

Vegetable Protein Products (VPP): VPP are food products produced by the reduction or removal from vegetable materials of certain of the major non-protein constituents (water, oil, starch, other carbohydrates) in a manner to achieve a protein (N × 6.25) content of 40% or more. The protein content is calculated on a dry weight basis excluding added vitamins, minerals, amino acids and food additives.

4. BASIC PRINCIPLES

4.1 VPP intended for human consumption should not represent a hazard to health. The annex to these guidelines, which is based on revised PAG/UNU Guideline No. 6, should be consulted for testing the safety and nutritional quality of VPP.

4.2 The nutritional quality of the VPP should be appropriate for its intended use.

4.3 The presence of VPP in foods should be clearly indicated on the label.

In this connection foods containing vegetable protein products should be labelled in accordance with the Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1-1985), with the proviso that:

(a) A complete list of ingredients should be declared on the label in descending order of proportion except that, in the case of added vitamins and minerals, these should be arranged as separate groups and in these groups the vitamins and minerals need not be listed in descending order of proportion.

(b) The ingredient statement should contain the source (e.g., pea, groundnut), and where appropriate product type and processed form (e.g. textured, spun) of each vegetable protein ingredient in the food product.

(c) Any nutrient labelling should be in accordance with the Codex Guidelines on Nutrition Labelling.

5. USES OF VPP FOR FUNCTIONAL AND OPTIONAL PURPOSES

5.1 When VPP are used at low relative levels for functional purposes, or as optional ingredients, their use should not result in any replacement of principal protein and associated nutrients in the food to which they are added.

5.2 For the purpose of defining VPP as a functional or optional ingredient in Codex Standards the level of VPP should be calculated on a dry weight basis in the final product. The actual level of use will vary according to the nature of the protein and of the product concerned.

5.3 The use of VPP as a functional or optional ingredient should be regulated in the same way as other functional or optional ingredients with no required change in the name of the product. However, a declaration of the presence of VPP should be given in connection with the name of the product if its omission would mislead the consumer.

6. USES OF VPP TO INCREASE CONTENT OF UTILIZABLE PROTEIN

6.1 VPP may be used to improve the protein nutriture of populations by increasing the content of utilizable protein in the diet. This can be done by increasing the protein content of the diet or increasing the protein quality of the proteins in the diet, or a combination of both. It should be noted that increasing the protein quantity and/or quality of a diet will be ineffective if energy requirements are not met.

6.2 In general, the minimum aim of supplementation and/or complementation should be to increase utilizable protein by 20%.

6.3 For a significant degree of complementation in protein quality of diets deficient in lysine or in methionine + cysteine or in tryptophan, the complementary protein should contain at least 5.8% available lysine or 2.5% available methionine + cysteine or 1.1% available tryptophan, respectively.

6.4 Addition of amino acids should only be considered when the desired increase in utilizable protein cannot practicably be achieved by a suitable mixture of complementary or supplementary proteins. Only L forms of amino acids should be used.

6.5 Since a variety of VPP are available for use for this purpose, the choice of VPP should favour products which have been processed in such ways and to such extent as to optimize both the nutritional contributions and economic considerations.

6.6 The addition of vitamins and minerals should be in accordance with the Codex *General Principles for the Addition of Essential Nutrients to Foods*.

6.6.1 The need for fortification of VPP with vitamins and minerals should be considered in the following instances:

(i) when the VPP is a suitable vehicle for fortification in regions where there is a demonstrated need for increasing the intake of one or more vitamin(s) or mineral(s) in one or more population groups;

(ii) when the VPP contains anti-nutritional factors (e.g., phytate) which may interfere with the bioavailability or utilization of nutrients.

6.6.2 The need for nutritional adequacy of the VPP should be considered in those instances in which the VPP replaces staple ingredients which are higher in vitamins and minerals than the VPP.

6.7 When VPP is used in a food to increase the content of utilizable protein, its presence need not be indicated in the name of the food unless its omission would mislead the consumer.

6.8 The protein content of a food in which VPP has been added to increase the content of utilizable protein should be declared in accordance with the Codex *Guidelines on Nutrition Labelling*. Where claims are made with respect to the protein quality of the food, the protein nutritional value should be assessed according to the established methods for protein quality measurement.

7. USES OF VPP IN PARTIAL OR COMPLETE SUBSTITUTION OF THE ANIMAL PROTEIN IN FOODS

7.1 The use of VPP to substitute partially or completely for animal protein in foods should be permitted provided that the presence of VPP is clearly indicated on the label. Where the completely or partially substituted food is intended to replace a food which has been identified as a significant source of energy and/or essential nutrients in the food supply, consideration should be given to the nutritional adequacy of the partially or completely substituted food. Where there is demonstrated evidence of public health need, nutritional adequacy should be required.

7.2 The nutritional adequacy of a product can be defined in terms of protein quality and quantity and content of minerals and vitamins.

Such a product should be considered nutritionally equivalent if:

(i) its protein quality is not less than that of the original product or is equivalent to that of casein and

(ii) it contains the equivalent quantity of protein ($N \times 6.25$) and those vitamins and minerals which are present in significant amounts in the original animal products.

7.3 The nutritional adequacy of a partially substituted animal product can be achieved by any of the following three methods:

(a) By using a VPP which is nutritionally equivalent in terms of protein quantity and quality and levels of vitamins and minerals, or

(b) By using a VPP equivalent which is nutritionally adequate with respect to levels of vitamins and minerals, but placing the requirements for protein quantity and quality on the final product, or

(c) By the addition of the required nutrients to the partially substituted product (i.e., by placing all nutritional requirements on the partially substituted product).

The second approach is considered the most satisfactory because:

(i) The first method does not make allowance for the complementary effect of animal-VPP mixtures on protein quality. For example, according to its

amino acid score, wheat gluten (which would require the addition of several amino acids before it could meet the protein quality requirement for partial substitution) could be used to substitute meat protein up to 30% without any significant deleterious effect on adequacy of the final product in protein quality.

(ii) The third method would require that the vitamin and mineral content of the animal portion of the partially substituted product be known and accounted for in each instance. Moreover, the expertise and control facilities for ensuring proper addition of nutrients and stability of vitamins may not exist in places where VPP would be utilized in animal products such as retail outlets and meat packing plants.

7.4 In the case of completely substituted (simulated) animal products, all the nutritional adequacy requirements (i.e. protein quantity and quality as well as vitamins and minerals) should be placed on the final product.

7.5 When VPP partially substitutes for the protein of an animal product, the following nomenclature criteria should apply:

(i) The presence of the VPP should be indicated in the name of the food.

(ii) The name of the substituted product should describe the true nature of the product; it should not mislead the consumer; and it should enable the substituted product to be distinguished from products with which it could be confused.

(iii) In cases where the substitution results in an amount of the animal protein product lower than that required by a Codex or national standard, the name of the standardized animal food should not be used as part of the name of the substituted product unless properly qualified.

(iv) The provisions of a Codex Standard or a national compositional standard should be taken into full account when determining the name of the food.

7.6 In the case of a simulated animal product in which 100% of the protein is from VPP, the established or common name of the food should be the name of the VPP with appropriate flavour designation or other descriptive phrasing.

8. USES OF VPP AS SOLE PROTEIN SOURCE IN PRODUCTS WITH NEW IDENTITIES

There is an expanding group of foods made with VPP that are not intended to supplement utilizable protein or to replace traditional protein foods. Each of these foods will develop an identity of its own and will have its own nutrient composition. There need not be specific nutrient requirements for these foods. As with any other foods, these VPP foods should be safe, should be produced in accordance with Good Manufacturing Practices and should be labelled in accordance with the Codex *Standard for the Labelling of Prepackaged Foods*.

ANNEX

CODEX GUIDELINES FOR TESTING SAFETY AND NUTRITIONAL QUALITY OF VEGETABLE PROTEIN PRODUCTS[1]

Vegetable Protein Products (VPP) are vegetable products which have been processed in a manner which results in a significant degree of increase in the protein content in the final product. VPP have found significant uses as functional ingredients in food products and as protein extenders and replacements. Certain VPP, particularly those derived from soya beans, have been subjected to intensive investigation. From these investigations has come an appreciation of the technological properties which may be significant to the food use of VPP. As new sources of VPP are developed guidance is necessary on how these products should be tested for safety and nutritional quality.

The raw materials from which VPP are produced may contain naturally occurring toxic or anti-nutritional factors, e.g. glucosinolates in Brassica spp, gossypol in cottonseed, hemagglutins and trypsin inhibitors in legumes. Some of these factors may still be present in the VPP after processing. The processing involved in the preparation of VPP such as treatment with heat, organic solvents, acids, alkalis, salts and enzymes, etc. tends to increase the level of certain nutrients such as sodium and eliminate others such as vitamins. It may also result in changes in digestibility, absorption and protein quality. Furthermore, residual solvents or reaction products may be present in the VPP.

In the light of the above observations, it becomes important that prior to the use as human food, VPP be subjected to adequate testing to demonstrate safety and appropriate nutritional quality. In order to aid food manufacturers in determining what testing is required to evaluate safety and nutritional value of VPP, the Codex Committee on Vegetable Proteins (CCVP) has developed this guideline.

The purpose of this guideline is not to lay down a rigid plan or to cover all procedural details but to serve as a general recommendation for the testing of vegetable protein products. A distinct VPP needs to be tested pursuant to this guideline only once, that is, to obtain a toxicological and nutritional profile for the VPP. The guideline is not intended for use in production quality control testing on a lot-by-lot basis. Novel VPP, those processed by new techniques from commonly used sources and those produced from sources not previously used as human food, require thorough testing. VPP which are produced by minor processing variants from sources commonly used as food need not be tested so thoroughly. Prior history of safe use may be taken into account in evaluation of a novel VPP proposed for general consumption, but this alone is not necessarily sufficient to preclude adequate pre-clinical testing by currently available, more objective, laboratory animal feeding studies, and, where applicable, studies using human volunteers. Adequacy of history of safe use will have to be evaluated on a case-by-case basis. Applicable data in the available literature may be used in lieu of separate testing pursuant to this guideline. The content and depth of the investigations for a

[1] Modified version of the UNU/PAG Guideline No. 6 on preclinical testing of novel sources of food. *Food and Nutrition Bulletin,* Vol. 5 No. 1 (1983).

specific VPP will depend on the kind of process applied in its preparation, and the conditions of its intended use as prepared for consumption and the presence of known toxic or anti-nutritional factor(s) in the starting material.

1. CATEGORIES OF INFORMATION NEEDED

The following information is required for each novel VPP.

1.1 Specifications and process details

A general description of the process used to prepare the VPP and the specification of the VPP should be included. This description should be sufficient to enable those evaluating the product to identify potential problem areas, such as processing damage to the nutrient content.

1.2 Nutritional value

The nutritional value of the VPP should be predicted first from its amino acid content and then by means of (insert reference to method for determining protein quality as described in the applicable Codex standard).

1.3 Microbiological status

The procedures that are required to maintain adequate sanitation with respect to the sources of raw materials and conditions under which they are processed to produce the VPP should be included.

1.4 Toxicological safety

The safety of the VPP should be predicted from information concerning methods of production, chemical and physical properties, content of micro-organisms and their metabolites. This should be supported where necessary by safety data using laboratory animals.

2. EVALUATION

Each novel VPP should be subjected to the following analysis using procedures indicated in the Recommended General Standard for VPP unless otherwise specified.

2.1 Chemical

2.1.1 **Proximate composition**

Moisture, total solids, total nitrogen, crude protein (N × 6.25) fat (ether extract), ash, fibre, total carbohydrates, and indigestible carbohydrates (dietary fibre) (insert reference to the appropriate method).

2.1.1.1 **Nitrogenous components**

Amino acid composition should be expressed as g amino acid/16gN, and information on the recovery of amino acid nitrogen should be obtained. The presence and amount of non-protein nitrogenous components, if any, should be determined.

2.1.1.2 **Lipid**
The solvent extract should be analysed for the fatty acid profile by chromatography if the solvent extract is greater than 1 percent. The solvent extract should also be examined for the presence of unusual (e.g. cyclic) fatty acids.

2.1.1.3 **Mineral elements**
The material should be analysed for its content of metals or minerals or toxicological or nutritional significance (including arsenic, calcium, cadmium, copper, fluoride, iron, lead, magnesium, manganese, mercury, phosphorous, potassium, selenium, sodium and zinc).

2.1.1.4 **Carbohydrates**
Analysis should be carried out to characterize the available (digestible) carbohydrates.

2.1.1.5 **Vitamins**
Analysis should be conducted for all of the major vitamins except those for which low lipid content or instability under processing conditions indicate little likelihood of their presence in significant amounts.

2.1.2 **Solvent residues**
The product should be examined for the presence of potentially hazardous solvent residues.

2.2 Microbial

The VPP should be examined to determine numbers and types of micro-organisms to be expected under sanitary conditions of production or processing and to establish its freedom from microbial toxins and toxigenic organisms.

2.3 Nutritional

Nutritive value of VPP should be assessed by (insert reference to method for protein quality described in appropriate Codex Standard).

2.4 Toxicological

2.4.1 **Subacute toxicity studies**
The purpose of these studies is to delineate the toxic potential of VPP and to elucidate such problems as species sensitivity, the nature of gross and micro-pathological changes and the approximate dose level at which these effects occur. They also provide guidance for the selection of dosage for chronic toxicity tests and any functional or biochemical studies that may be necessary. They should be carried out in accordance with recognized codes of Good Laboratory Practice.

2.4.1.1 **Animals**
At least two species of healthy animals of both sexes, one rodent, preferably rats, and one non-rodent, should be used. Among the non-rodent species, beagle dogs, monkeys, and miniature pigs may be considered. If biochemical information is available

that indicates the species of animals most likely to elicit information simulating man, such species should be selected for these studies. Rodents are usually started on tests at or shortly after weaning and are assigned to groups of equal size balanced with respect to litter distribution, sex and average weight. Groups should be large enough to provide statistically adequate data.

2.4.1.2 **Diet**

The diet should be nutritionally adequate for all test groups. If the test product has been shown to be nutritionally complete, it may be fed as a replacement for basic protein in the diet. Particular attention should be paid to balancing the tests and control diets in respect to minor nutrients. It is not feasible to test a VPP at large multiples of the potential use level. Nevertheless, the highest practicable use level should be included and if feasible, grade levels of the VPP should be reflected in the experimental design. It is not realistic to establish a dose response curve.

2.4.1.3 **Length of study**

Subacute toxicity feeding trials should be of at least three months duration.

2.4.2 **Other studies**

Following an appraisal of the source and the method of manufacture of the VPP together with the results of nutritional and subacute toxicity studies, the need for further studies including chronic, reproduction, teratogenic and mutagenic studies will be evaluated.

2.5 Statistical

Reports of investigations must include complete details, data for control as well as test groups and appropriate statistical analysis of the findings.

For further information on the activities of the Codex Alimentarius Commission, please contact:

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Cereals, Pulses, Legumes and Vegetable Proteins

Codex standards for cereals, pulses, legumes and vegetable proteins and other related texts such as the *Code of Practice for the Prevention of Mycotoxin Contamination in Cereals* are published in this compact format to allow their wide use and understanding by governments, regulatory authorities, food industries and retailers, and consumers. This first edition includes texts adopted by the Codex Alimentarius Commission up to 2007.

The Codex Alimentarius Commission is an intergovernmental body with over 170 members, within the framework of the Joint FAO/WHO Food Standards Programme established by the Food and Agriculture Organization (FAO) of the United Nations and the World Health Organization (WHO). The main result of the Commissions' work is the *Codex Alimentarius,* a collection of internationally adopted food standards, guidelines, codes of practice and other recommendations, with the objective of protecting the health of consumers and ensuring fair practices in the food trade.

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