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FRESH SWEET POTATOES – SPECIFICATION

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Fresh sweet potatoes — Specification



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Introduction

Sweet potato (*Ipomoea batatas* L. Lam.), belonging to the family *Convolvulaceae*, is an important tuberous root crop having tremendous potential for utilization in food, feed and industrial sectors, especially for the production of starch, flour, bread, cookies, cakes, chips, crisps, jellies, noodles, natural colorants, candy, glucose, beer and alcohol [1–4]. The sweet potato is nutritionally rich and contains 28.2 g carbohydrates, 24 g sugars, 3.0 g dietary fibre and 46, 25, 50, 337, 0.3, 0.8, 24, 0.7 and 0.8 mg per 100 g fresh tuber in respect of Ca, Mg, P, K, Zn, Fe, Vitamin C, Niacin (Vitamin B3), Pantothenic acid (Vitamin B5) and 11 µg folate (Vitamin B9). The high nutrient content coupled with its anti-carcinogenic and cardio-vascular disease-preventing properties resulted in recognizing the crop as a health food.

Sweet potato is now cultivated in more than 100 developing countries. It is typically a smallholder crop grown on marginal soils with limited inputs. The sweet potato is a dry-land crop tolerant of a wide range of edaphic and climatic conditions. It is more tolerant of cold than other tropical root and tuber crops and therefore it can be grown at altitudes as high as 2500 m. In world crop statistics, the sweet potato is ranked seventh after wheat, rice, maize, potato, barley and cassava, with an annual production around 110 metric tonnes and a cultivated area of 110 Mha [1,3]. In monetary terms, it ranks thirteenth globally in the production value of commodities, and is fifth on the list of the developing countries' most valuable food crops. In most developing countries, it is a smallholder crop tolerant of a wide range of edaphic and climatic conditions and grown with limited inputs. It is also quite tolerant of cold and being cultivated at altitudes as high as 2,500 m. The average annual per capita consumption of fresh roots (FAO, 2007) is estimated at 10 kg in Africa, 20 kg in Asia, 5 kg in Latin America, 7 kg in Japan and only 2 kg in the USA, but is more than 75 kg in Oceania (PNG and the Pacific Islands). Within these geographic regions, however, consumption can vary greatly. In Africa, for example, the annual per capita consumption is estimated at more than 160 kg in Rwanda and more than 100 kg in Burundi. African farmers produce only about 7 million t of sweet potatoes annually and most of the crop is cultivated for human consumption [3].

The importance of sweetpotato as a food crop is growing rapidly in some parts of the world. In Sub-Saharan Africa, it is outpacing the growth rate of other staples.

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Fresh sweet potatoes — Specification

1 Scope

This African Standard specifies the requirements and methods of sampling and test for fresh sweet potatoes of varieties (cultivars) grown from *Ipomoea batatas* (L.) Lam. to be supplied fresh and either packaged or sold loose for human consumption.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

CAC/GL 21, *Principles for the establishment and application of microbiological criteria for foods*

CAC/RCP 44, *Recommended international code of practice for the packaging and transport of tropical fresh fruits and vegetables*

CAC/RCP 53, *Code of hygienic practice for fresh fruits and vegetables*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

ISO 874, *Fresh fruits and vegetables — Sampling*

3 Definitions

For the purpose of this standard the following definitions apply.

3.1

sweet potato

storage roots obtained from a plant of the species *Ipomoea batatas* (L.) Lam, primarily used for human consumption

3.2

fresh

storage roots obtained from a plant of the species *Ipomoea batatas* (L.) Lam having visual characteristics of colour, texture and firmness typical of just harvested sweet potato at the time of sale

3.3

similar varietal characteristics

the sweet potatoes have the same character of flesh and practically the same skin colour. For example, dry type shall not be mixed with semi-moist or moist type.

3.4

firm

not soft, flabby or shrivelled

3.5

smooth

the sweet potato is free from veining or other defects causing roughness which more than slightly detract from the appearance of the individual sweet potato or the general appearance of the lot

3.6

fairly clean

the individual sweet potato is not caked with dirt and that dirt or other foreign matter does not materially detract from the general appearance of the lot

3.7

fairly well shaped

the sweet potatoes are not so curved, crooked, constricted or otherwise misshapen as to materially detract from the appearance of the individual sweet potato or the general appearance of the lot

3.8

damage

any specific defect defined in this section; or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects, which materially detracts from the appearance, or the edible or shipping quality of the individual sweet potato or the lot as a whole; or which cannot be removed without a loss of more than 5 % of the total weight of the sweet potato including peel covering the defective area. The following specific defects shall be considered as damage:

- (a) Sprouts when more than 10 % of the sweet potatoes in the lot have sprouts over 19 mm in length;
- (b) Growth cracks when unhealed or which detract materially from the appearance of the individual sweet potato or general appearance of the lot;
- (c) Scurf when more than 15 % of the surface in the aggregate is affected by solid light brown discoloration. Speckled types of scurf, or lighter or darker shades of discoloration may be permitted over a greater or lesser area provided no discoloration detracts from the appearance more than the amount of solid light brown discoloration permitted;
- (d) Pox (soil rot) when materially detracting from the appearance of the individual sweet potato; and,
- (e) Wireworm, grass root or similar injury when any hole in a sweet potato ranging in size from 168 g to 224 g, is more than 19 mm long, or when the aggregate length of all holes is more than 32 mm, or correspondingly shorter or longer holes in smaller or larger sweet potatoes.

3.9

whole

fresh storage roots which have not been subjected to any mechanical damage or peeling of its initial harvested mass with the exemption of trimming

3.10

sound/wholesome

free from pests, diseases, serious deterioration (such as but not limited to decay, breakdown, freezing damage, or softness) or adulteration/contamination, that appreciably affects their appearance, edibility and the keeping quality of the produce or market value

3.11

practically free

produce without defects in excess of those that can be expected to result from, and be consistent with good cultural and handling practices employed in the production and marketing of the fresh sweetpotatoes

3.12

fairly smooth

the sweet potato is free from veining or other defects causing roughness which materially detract from the appearance of the individual sweet potato or the general appearance of the lot

3.13**serious damage**

any specific defect defined in this section; or an equally objectionable variation of any one of these defects, any other defect, or any combination of defects, which seriously detracts from the appearance or edible or shipping quality of the individual sweet potato or the lot as a whole; or which cannot be removed without a loss of more than 10 percent of the total weight of the sweet potato including peel covering the defective area. The following specific defects shall be considered as serious damage:

- (a) dirt or other foreign matter when the individual sweet potato is badly caked with dirt, or when seriously detracting from the appearance of the lot;
- (b) growth cracks when unhealed or when seriously detracting from the appearance of the individual sweet potato or general appearance of the lot;
- (c) pox (soil rot) when seriously detracting from the appearance of the individual sweet potato; and,
- (d) wireworm, grass root or similar injury when any hole in a sweet potato ranging in size from 168 g to 224 g, is more than 32 mm long, or when the aggregate length of all holes is more than 50 mm, or correspondingly shorter or longer holes in smaller or larger sweet potatoes.

3.14**food grade material**

material that is free from substances that are hazardous to human health

3.15**extraneous matter**

organic matter of plant origin other than the fresh sweet potato

3.16**foreign matter**

organic and inorganic materials (such as sand, soil, glass) other than extraneous matter in the sweet potato

4 Provisions concerning quality**4.1 General requirements**

Fresh sweet potatoes shall have reached an appropriate degree of physiological development taking into account the characteristics of the variety and the area in which they are grown. The sweet potatoes shall have been carefully harvested.

4.2 Minimum requirements

4.2.1 In all classes, subject to the special provisions for each class and the tolerances allowed, the sweet potatoes must be:

- a) firm;
- b) whole;
- c) fresh;
- d) wholesome/sound and fairly well-shaped;
- e) not affected by rot, mould or deterioration as to make it unfit for consumption;
- f) clean, and practically free of any visible extraneous matter or foreign matter, except permitted substances used to prolong its shelf life;

- g) of colour, taste and texture characteristic of variety;
- h) practically free of pests and damage caused by pests;
- i) free of excess external moisture, adequately surface dried if they have been washed;
- j) free from any foreign smell and/or taste with exception of preservation agents allowed in CODEX Stan 192;
- k) free from damage caused by secondary rootlets, sprouts, cuts, bruises, scars, growth cracks;
- l) practically free of mechanical damage and bruising; and
- m) free from greening and/or sprouting

4.2.2 The sweet potatoes must have been carefully harvested and have reached an appropriate degree of physiological development, account being taken of the characteristics of the variety and/or commercial type and the area in which they are grown.

The development and condition of the sweet potatoes must be such as to enable them:

- to withstand transport and handling; and
- to arrive in satisfactory condition at the place of destination.

4.3 Grading

4.3.1 Fresh sweet potatoes may be graded before marketing. Where grading is done the following classes shall be used in accordance with the requirements of each class and the quality tolerances in Clause 7.

- a) Extra Class;
- b) Class I; and
- c) Class II.

4.3.2 Extra Class

Extra class sweet potatoes shall meet the minimum requirements in Clause 4.2 and shall be:

- a) of superior quality in terms of texture and appearance; and
- b) of similar varietal characteristics and uniform in shape and size.

Extra class sweet potatoes shall be free from defects, with the exception of defects on the surface affecting not more than 2 % of the sweet potatoes

4.3.3 Class I

Class I sweet potatoes shall meet the minimum requirements in Clause 4.2 and shall be;

- a) of good quality; and
- b) uniform in shape and size that are characteristic of the variety.

The following slight defects may be allowed, provided these do not affect the general appearance, the quality, the keeping quality and presentation of sweet potatoes:

- a) defects in shape not exceeding 5% of the sweet potatoes;

- b) bruising, not exceeding 10% of the surface area of the sweet potatoes;
- c) scraped areas, not exceeding 20% of the surface area of the sweet potatoes; and
- d) scarred and healed damage, not exceeding 5% of the surface area of the sweet potatoes.

4.3.4 Class II

Class II sweet potatoes shall meet the minimum requirements in Clause 4.2 but may not qualify for inclusion in the higher classes.

The following defects may be allowed:

- a) defects in shape not exceeding 10% of the sweet potatoes;
- b) bruising, not exceeding 20% of the surface area of roots
- c) scraped areas, not exceeding 30% of the surface area of sweet potatoes and
- d) scarred and healed damage, not exceeding 10% of the surface area of the sweet potatoes.

5 Provisions concerning sizing

Fresh sweet potatoes may be designated by size in accordance with Table 1. When the designations in Table 1 are used the sizes shall be within the specification in Table 1. Size is determined by weight.

Table 1 — Size for fresh sweet potatoes

Size code	Size	Weight, g
A	Large	>650
B	Medium	450 - 650
C	Small	<450

6 Provisions concerning tolerances

6.1 Class-specific tolerances

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated. The following tolerance limits may be allowed for specific classes:

- a) Extra class: 5% by weight of sweet potatoes not satisfying the requirements of extra class, but meeting those of Class I or exceptionally coming within the tolerances of Class I.
- b) Class I: 10% by weight of sweet potatoes not satisfying the requirements of Class I, but meeting those of Class II or exceptionally, coming within the tolerances of Class II.
- c) Class II: 20% by weight of sweet potatoes not satisfying the minimum requirements, with the exception of produce affected by rotting or any other deterioration rendering it unfit for consumption.

6.2 Quality tolerances

Tolerances for the quality requirements shall be such that:

- a) a total of no more than 10 % of the sweet potatoes in the lot may fail the requirements;
- b) no more than 3 % of the sweet potatoes may be affected by rot, mould or deterioration as to make it unfit for consumption;

- c) no more than 3 % of the sweet potatoes may be affected by damage caused by pests; and
- d) no more than 3 % of the sweet potatoes may be affected by rot, mould or deterioration; and damage caused by pests in combination.

6.3 Size tolerances

For all classes, 10% by number or weight of sweet potatoes corresponding to the size immediately above and/or below that indicated on the package.

7 Provisions concerning presentation

7.1 Uniformity

The contents of each package must be uniform and contain only sweet potatoes of the same origin, variety and/or commercial type, quality and size. The visible part of the contents of the package must be representative of the entire contents.

7.2 Packaging

7.2.1 Fresh sweet potatoes may be sold packaged or loose. Packaged sweet potatoes must be packed in such a way as to protect the produce properly. The materials used inside the package must be new¹, clean, and of a quality such as to avoid causing any external or internal damage to the produce and safeguard the hygienic, nutritional, and organoleptic qualities of the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

7.2.2 In order to maintain produce quality during transportation and marketing, fresh sweet potato shall be packaged and transported in accordance with the appropriate sections CAC/RCP 44.

7.2.3 The net weight of each package of fresh sweet potatoes shall be in accordance with the weights and measures requirements in the destination country.

7.2.1 Description of containers

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the sweet potatoes. Packages must be free of all foreign matter and smell.

7.3 Presentation

The visible part of the contents of the package must be representative of the entire contents. A special effort should be made to suppress camouflage, i.e. concealing in the lower layers of the package produce inferior in quality and size to that displayed and marked.

Similarly prohibited is any packaging method or practice intended to give a deceptively superior appearance to the top layer of the consignment.

8 Marking or labelling

8.1 Consumer packages

In addition to the requirements of ARS 56, the following specific requirements shall apply and shall be legibly and indelibly marked:

- a) name of the produce to be shown on the label shall be "Fresh sweet potatoes";

¹ For the purposes of this Standard, this includes recycled material of food-grade quality.

- b) name and location address of the vendor and/or packer shall be declared;
- c) country of origin of the produce;
- d) place of origin such as district, or region;
- e) commercial identification shall be declared by:
 - i) grade (only when classified);
 - ii) variety;
 - iii) size (size code); and
 - iv) net weight (in metric system).
- f) lot identification (batch number);
- g) declaration of preservatives, if used;
- h) date of harvest;
- i) packing date;
- j) storage conditions; and
- k) Indication "for human food".

8.2 Non-retain containers

Each package must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside, or in the documents accompanying the shipment.

8.2.1 Identification

Name and address of exporter, packer and/or dispatcher. Identification code (optional).²

8.2.2 Nature of Produce

Name of the produce if the contents are not visible from the outside. Name of the variety and/or commercial type (optional).

8.2.3 Origin of produce

Country of origin and, optionally, district where grown or national, regional or local place name.

8.2.4 Commercial Identification

- Type (yellow or orange flesh with a white, yellow, orange or red skin);
- Class;
- Size (size code or minimum and maximum weight in grams);

² The national legislation of a number of countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference "packer and/or dispatcher (or equivalent abbreviations)" has to be indicated in close connection with the code mark.

— Net weight (optional).

8.2.5 Official Inspection Mark (optional)

9 Contaminants

9.1 Pesticide residues

Fresh sweet potatoes shall conform to those maximum residue limits for pesticide residues established by Codex Alimentarius Commission for this commodity.

9.2 Heavy metals

Sweet potatoes shall comply with those maximum levels for heavy metal contaminants established by the Codex Alimentarius Commission for this commodity.

9.3 Other contaminants

Fresh sweet potatoes shall conform to those maximum levels of the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193).

10 Hygiene

The produce covered by the provisions of this Standard shall be prepared and handled in accordance with the appropriate sections of ARS 53 and CAC/RCP 53.

11 Sampling and test

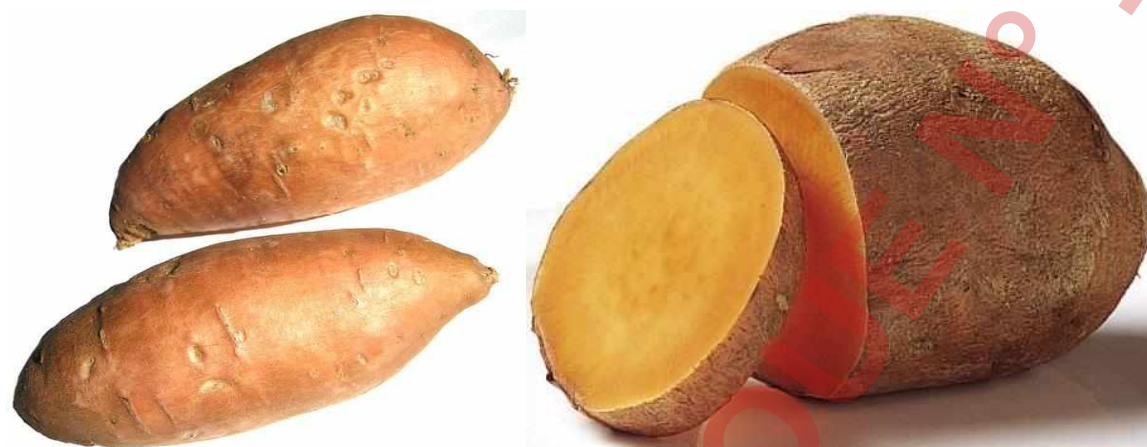
Sampling shall be done in accordance with ISO 874. Tests for pesticide residues, contaminants and toxins shall be conducted in accordance with the recommended methods of the Codex Alimentarius Commission.

12 Criteria for conformity

A lot shall be declared as conforming to this standard if samples inspected or analysed for quality requirements conform to the provisions of this standard.

Annex A
(informative)

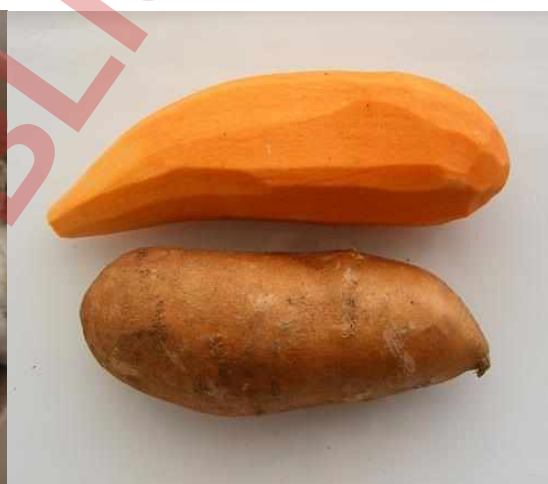
Sweet potatoes illustrations



Yellow fleshed sweet potatoes



Purple fleshed sweet potato



Sweet potato (orange kind)



Freshly dug sweet potatoes



Red sweet potatoes



Fresh yellow sweet potatoes

Purple skinned sweet potatoes



Fresh sweet potato harvest

Sweet potatoes in market

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