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Fruit chips and crisps — Specification



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Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Tourism, Trade and Industry established under Cap 327, of the Laws of Uganda. UNBS is mandated to co-ordinate the elaboration of standards and is

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

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of representatives of consumers, traders, academicians, manufacturers, government and other stakeholders.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

Committee membership

The following organisations were represented on the Technical Committee TC 2 on Agricultural and Food Products during the preparation of this standard:

- Africa 2000 Network
- Department of Food science and Technology, Makerere University
- Flona Commodities Limited
- Fruits of the Nile (U) Ltd
- Horticultural Exporters Association of Uganda
- National Organic Agricultural Movement of Uganda
- Uganda Export Promotion Board
- Uganda National Farmers Federation
- Ministry of Tourism, Trade and Industry
- Uganda Consumer Protection Association

Fruit chips and crisps fruits — Specification

1 Scope

This Uganda Standard specifies requirements and methods of sampling and test for fruits chips and crisps which have been suitably treated and which are offered for direct consumption or for further processing.

It also covers fruits chips and crisps which are packaged in bulk containers and which are intended for repackaging into consumer size containers or for direct sale to consumers.

It does not apply to dried fruits or crisps which have been produced by drying processes for which other standards apply.

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.

US 7, *General standard for labeling of prepackaged foods*

US 28, *Code of practice for hygiene in the food and drink manufacturing industry*

US 45, *General standard for food additives*

US 168, *Edible fats and oil — Specification*

US 217-2, *Methods for the Microbiological Examination of Foods — Part 2: General Guidance for the Enumeration of Micro-Organisms-Colony Count Technique at 30 °C*

US 500, *General requirements for nutrition labelling*

US 508, *General requirements for nutrition and health claims*

US 566, *Use of nutrition terms — Requirements*

US 738, *General standard for contaminants and toxins in foods*

US ISO 762, *Fruit and vegetable products — Determination of mineral impurities content*

US ISO 2447, *Fruit and vegetable products — Determination of tin content*

US ISO 3094, *Fruit and vegetable products — Determination of copper content — Photometric method*

US ISO 4125, *Dry fruits and dried fruits — Definitions and nomenclature*

US ISO 6633, *Fruit and vegetable products — Determination of lead content — Flameless atomic absorption spectrometric method*

US ISO 6634, *Fruit and vegetable products — Determination of arsenic content — Silver diethyldithiocarbamate spectrophotometric method*

US ISO 6636-3, *Fruit and vegetable products — Determination of zinc content — Dithizone spectrometric method*

US ISO 6637, *Fruit and vegetable products — Determination of mercury content — Flameless atomic absorption method*

US ISO 7251, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique*

US ISO 21527-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds — Part 2: Colony count technique in products with water activity less than or equal to 0.95*

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in US ISO 4125 shall apply.

4 Description

4.1 Fruit chips

Fruit chips are the products:

- a) prepared from sound ripe fruit of varieties characteristic of the named fruit; and
- b) processed by deep frying, with or without added sweetening agent and food additives, into a form of marketable fried product.

4.2 Fruit crisps

These are thin slices of peeled fruits, deep-fried or baked until crispy or brittle.

5 Requirements

5.1 Basic ingredients

Fruit to be used shall be fresh, sound, clean and at an appropriate level of maturity from any cultivated variety conforming to the characteristics of the fruits and of a quality suitable for human consumption.

Edible oil or fat used for deep frying shall conform to US 168.

5.2 Optional ingredients

These consist of other edible material as may be appropriate to stuffing the product provided it is suitable for consumption.

5.3 General quality requirements

5.3.1 Colour, odour and flavour

Fruit chips and crisps shall have the colour, odour and flavour characteristics of the fruit. They shall be free from off-odour, off-flavour and foreign taste including rancidity and mustiness.

5.3.2 Moulds and insects

Fruit chips and crisps shall be free from moulds and insect infestation when inspected visually.

5.3.3 Extraneous matter

Fruit chips and crisps shall be practically free from extraneous matter including clay pieces and loose stalks, when inspected visually.

5.4 Chemical requirements

Fruit chips and crisps shall conform to the requirements given in Table 1.

Table 1 — Requirement for fruit chips and crisps

Characteristic	Requirement		Method of test
	Chips	Crisps	
Moisture, % (m/m), max	-	5	Annex B
Acid insoluble ash, % (m/m), (on dry basis), max.	0.1	0.1	US ISO 762
Free fatty acids, %, by mass on dry weight basis, max.	0.5	0.5	Annex C
Peroxide value, meq/oxygen per gram	0.5	0.5	Annex D US " AOAC 965.33

6 Food additives

Food additives such as sweeteners, preservatives and nutritive carbohydrates may be used in accordance with US 45.

7 Contaminants

7.1 Heavy metals

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

7.2 Pesticide residue

Fruit chips and crisps shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

7.3 Mycotoxins

Fruit chips and crisps shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity, US 738.

8 Hygiene

Fruit chips and crisps shall be produced and handled in accordance with US 28. The products shall conform to the requirements for microbiological limits in Table 2.

Table 2 — Requirements for microbiological limits in fruit chips and crisps

Microbiological parameter	Required limit	Method of test
Total plate, cfu/g, max.	10 000	US 217
E coli, cfu/g, max.	< 1	US ISO 7251
Yeast and moulds, cfu/g, max	1 000	US ISO 21527-2

9 Packaging

Fruit chips and crisps shall be packed in clean food grade containers, made of a material which does not affect the products and which protects it from moisture and from loss of volatile matter. The container shall protect the product from any form of contamination.

10 Weights and measures

Containers shall be as full as practicable without impairment of quality and shall be consistent with a proper declaration of contents for the product.

11 Labelling

Fruit crisps and chips shall be labelled in accordance with the requirements of US 7. In addition, the name of the product as declared on the label shall be "XXX chips or XXX crisps", where XXX is the name of the fruit.

Nutritional labelling, nutrition and health claims may be made in accordance with US 500, US 508, US 566.

12 Sampling

Representative samples of the material shall be drawn and tested for conformity to this specification as prescribed in Annex A.

Annex A (normative)

Sampling of fruit chips and crisps

A.1 Definitions

A.1.1 Package

Individually packaged part of a lot, including contents so as to facilitate handling and transport of a number of sales units or of products loose or arranged, in order to prevent damage by physical handling and transport. Road, rail, ship and air containers are not considered as packages.

A.1.2 Sales package

Individually packaged part of a lot, including contents, which is so as to constitute a sales unit to the final user or consumer at the point of purchase

A.1.3 Pre-packages

Pre-packages are sales packages such as the packaging which encloses the foodstuff completely or only partially, but in such a way that the contents cannot be altered without opening or changing the packaging. Protective films covering single product are not considered as a pre-package.

A.1.4 Consignment

Quantity of product to be sold by a given trader found at the time of inspection and defined by a document. A consignment may consist of one or several types of product; it may contain one or several lots of dried fruit.

A.1.5 Lot

Quantity of product which, at the time of inspection at one place, has similar characteristics with regard to:

- a) packer and/or dispatcher;
- b) country of origin;
- c) nature of product;
- d) class of product;
- e) size (if the product is graded according to size);
- f) variety or commercial type (according to the relevant provisions of the standard); and
- g) type of packaging and presentation.

If it is difficult to distinguish between different lots and/or presentation of individual lots is not possible, all lots of a specific consignment may be treated as one lot if they are similar in regard to type of product, dispatcher, country of origin, class and variety or commercial type, if this is provided for in the relevant marketing standard.

A.1.6 Sampling

Collective samples taken temporarily from a lot during conformity check

A.1.6.1 Primary sample

Package taken at random from the lot, in case of packed product or, in case of bulk product (direct loading into a transport vehicle or compartment thereof), a quantity taken at random from a point in the lot

A.1.6.2 Bulk sample

Several primary samples supposed to be representative for the lot so that the total quantity is sufficient to allow the assessment of the lot with regard to all criteria

A.1.6.3 Secondary sample

An equal quantity of product taken at random from the primary sample. The secondary sample shall comprise 30 units, in case the net weight of the package is 25 kg or less and the package does not contain any sales packages. In certain cases this means that the whole content of the package has to be checked, if the primary sample contains not more than 30 units.

A.1.6.4 Composite sample

A composite sample is a mix, weighing at least 3 kg, of all the secondary samples taken from the bulk sample. Product in the composite sample shall be evenly mixed.

A.1.6.5 Reduced sample

Quantity of product taken at random from the bulk or composite sample whose size is restricted to the minimum quantity necessary but sufficient to allow the assessment of certain individual criteria.

If the inspection method would destroy the product, the size of the reduced sample shall not exceed 10 % of the bulk sample. In the case of small dry or dried products (that is, 100 g include more than 100 units) the reduced sample shall not exceed 300 g.

Several reduced samples may be taken from a bulk or composite sample in order to check the conformity of the lot against different criteria.

A.2 Sampling method

A.2.1 Identification of lots and/or getting a general impression of the consignment

The identification of lots shall be carried out on the basis of their marking or other criteria. In the case of consignments which are made up of several lots it is necessary for the inspector to get a general impression of the consignment with the aid of accompanying documents or declarations concerning the consignments. The inspector shall then determine how far the lots presented comply with the information in these documents.

If the product is to be or has been loaded onto a means of transport, the registration number of the latter shall be used for identification of the consignment.

A.2.2 Presentation of product

The inspector shall decide which packages are to be checked. The presentation shall be made by the operator and shall include the presentation of the bulk sample as well as the supply of all information necessary for the identification of the consignment or lot.

If reduced or secondary samples are required, these shall be identified by the inspector from the bulk sample.

The inspector shall determine the size of the bulk sample in such way as to be able to assess the lot. The inspector selects at random the packages to be inspected or in the case of bulk product the points of the lot from which individual samples shall be taken.

Care shall be taken to ensure that the removal of samples does not adversely affect the quality of the product.

Damaged packages shall not be used as part of the bulk sample. They shall be set aside and may, if necessary, be subject to a separate examination and report.

The bulk sample shall comprise the following minimum quantities whenever a lot is declared unsatisfactory or the risk of a product not conforming to the standard has to be examined:

Number of packages in the lot	Number of packages to be taken (primary samples)
Packaged products	
Up to 100	5
From 101 to 300	7
From 301 to 500	9
From 501 to 1 000	10
More than 1 000	15 (minimum)
Product in bulk	
Quantity of lot in kg or number of bundles in the lot	Quantity of primary samples in kg or number of bundles
Up to 200	10
From 201 to 500	20
From 501 to 1 000	30
From 1 001 to 5 000	60
More than 5 000	100 (minimum)

In the case of bulky dried fruit and vegetables (over 2 kg per unit), the primary samples shall be made up of at least five units. In the case of lots comprising fewer than five packages or weighing less than 10 kg, the check shall cover the entire lot.

If the inspector discovers, after an inspection, that a decision cannot be reached, another physical check shall be undertaken and the overall result reported as an average of the two checks.

A.2.3 Control of product

In case of packed product, the primary samples shall be used to check the general appearance of the product, the presentation, the cleanliness of the packages and the labelling. In all other cases, these checks shall be done on basis of the lot or transport vehicle.

The product shall be removed entirely from its packaging for the conformity check. The inspector may only dispense with this where the sampling is based on composite samples.

The inspection of uniformity, minimum requirements, quality classes and size shall be carried out on the basis of the bulk sample, or on the basis of the composite sample.

Annex B (normative)

Determination of moisture content

B.1 Procedure

Weigh accurately 10 g of the material in a suitable moisture dish previously dried in an electric oven and weighed. Place the dish in an electric oven maintained at $105\text{ }^{\circ}\text{C} \pm 1\text{ }^{\circ}\text{C}$ for 5 h. Cool the dish in a desiccator and weigh with the lid on. Repeat the process of heating, cooling and weighing at half-hour intervals until the loss in weight between two successive weighing is less than 1 mg.

Record the lowest weight obtained.

B.2 Calculation and expression of results

$$\text{Moisture, percent by mass} = \frac{(M_1 - M_2) \times 100}{M_1 - M_3}$$

where,

M_1 is the mass, in grams, of the dish and sample before drying;

M_2 is the mass, in grams, of the dish and sample after drying;

M_3 is the mass, in grams, of the dish only.

Annex C (normative)

Determination of acid value of extracted fat

C.1 Reagents

C.1.1 Benzene-alcohol-phenolphthalein stock solution — To one litre of distilled benzene, add one litre of alcohol or rectified spirit and 0.4 g of phenolphthalein. Mix the contents well.

C.1.2 Standard potassium hydroxide solution, 0.02 N

C.1.3 Standard potassium permanganate solution, 0.01 %

C.1.4 Potassium dichromate solution, 0.5 %

C.2 Procedure

Dissolve the residue in the extraction flask with 50 mL of the benzene-alcohol-phenolphthalein solution. Titrate the dissolved extract with standard potassium hydroxide solution to distinct pink colour, or in the case of yellow solution to orange pink colour. If an emulsion is formed during titration, dispel by adding a second 50-mL portion of the benzene alcohol-phenolphthalein solution. The endpoint should match colour of the solution made by adding 2.5 mL of standard potassium permanganate solution to 50 ml of potassium dichromate solution of proper strength to that of the original solution being titrated. (Add 0.5 % potassium dichromate solution dropwise to 50 mL of water until the colour matches. Then add 2.5 mL of standard potassium permanganate solution).

Make a blank titration on 50 mL of the benzene-alcohol-phenolphthalein solution and subtract this value from the titration value of the sample.

If the additional 50 mL portion of the benzene-alcohol-phenolphthalein solution is added, double the blank titration.

C.3 Calculation

$$\text{Acid value of extracted fat (as oleic acid)} = \frac{56.4 VN}{M}$$

where

V is the volume, in milliliters, of standard potassium hydroxide solution used;

N is the normality of standard potassium hydroxide solution; and

M is the mass, in grams, of the material taken for the test.

Annex D (normative)

Determination of peroxide value (Titration Method-Reference AOAC 965.33)

(NOTE Conduct analysis in diffuse day light or in artificial light shielded from direct light source.)

D.1 Reagents

D.1.1 Acetic acid-chloroform solution. Mix 3 volumes CH_3COOH with 2 volumes CHCl_3 , USP

D.1.2 Potassium iodide solution, saturated. Dissolve excess KI in freshly boiled H_2O . Excess solid must remain. Store in dark. Test daily by adding 0.5 mL to 30 mL $\text{CH}_3\text{COOH-CHCl}_3$. Then add two drops 1 % starch solution, (mix ca 1g soluble starch with enough cold H_2O to make thin paste, add 100 mL boiling H_2O , and boil ca 1 min while stirring). If solution turns blue, requiring more than one drop 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ to discharge colour, prepare fresh solution.

D.1.3 Sodium thiosulfate standard solutions, 0.1 and 0.01 M, for 0.01M, dilute 0.1M with freshly boiled and cooled H_2O .

D.2 Procedure

D.2.1 Extraction of oil

Extract 10.00 g \pm 0.01 g of the sample taken in a thimble with petroleum ether for about 4 h in a Soxhlet extraction apparatus. Completely evaporate the solvent from the extraction flask (weighed previously) on a steam bath, cool and weigh the extraction flask with the residue.

D.2.2 Determination of peroxide value of the oil

Add 30 mL $\text{CH}_3\text{COOH-CHCl}_3$,

(a) and swirl to dissolve. Add 0.5 mL saturated KI solution.

(b), from Mohr pipet, let stand with occasional shaking for 1 min, and add 30 mL H_2O . Slowly titrate with 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ with vigorous shaking until yellow is almost gone. Add ca 0.5 mL 1% starch solution, and continue titration, shaking vigorously to release all I_2 from CHCl_3 layer until blue just disappears. If less than 0.5 mL 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ is used, repeat determination with 0.01 M $\text{Na}_2\text{S}_2\text{O}_3$. Conduct blank determination daily (must be mL 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$). Subtract from test portion titration.

D.3 Calculation

Calculate the peroxide value from the following expression:

$$\text{Peroxide value (milliequivalents peroxide per gram of product)} = S \times M \times 1000/g$$

Where

S is the volume, in millilitres, $\text{Na}_2\text{S}_2\text{O}_3$ (blank corrected) and

M is the molarity of $\text{Na}_2\text{S}_2\text{O}_3$ solution

g is mass in grams, of sample used

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