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Biofortified Orange Fleshed Sweetpotato (OFSP) flour— Specification

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Contents

Page

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 639 was prepared by Technical Committee RSB/TC 22, *Nutrition and Foods for Special Dietary Uses.*

Committee membership

The following organizations were represented on the Technical Committee on *Nutrition and Foods for Special Dietary Uses (*RSB/TC 22) in the preparation of this standard.

Africa Improved Foods (AIF)

Alpha Natural Resources Company (ANARECO Ltd)

Amazon Nutrition Cabinet

Farmfresh Company Ltd

Global Alliance for Improved Nutrition (GAIN)

ISHYO FOODS ltd

MINIMEX Ltd

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National Industrial Research and Development Agency (NIRDA)

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The International Potato Center (CIP)

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Biofortified Orange Fleshed Sweetpotato (OFSP) flour— Specification

1 Scope

This Draft Rwanda Standard specifies requirements, sampling and test methods for flour obtained from the processing of Biofortified Orange Fleshed Sweetpotato from varieties of *Ipomoea batatas* Lam intended for human consumption.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

AOAC 2016.13, *Determination of Lutein, β-Carotene, and Lycopene in Infant Formula and Adult Nutritionals by Ultra-High-Performance Liquid Chromatography*

AOAC 925.10, *Solids (Total) and moisture in flour. Air oven method*

AOAC 965.22, *Sorting corn grits, Sieving method*.

AOAC 999.11, *Lead, Cadmium, Copper, Iron and Zinc in Foods. Atomic absorption Spectrophotometry after dry ashing*

ISO 23719, *Cereals and cereal products — Determination of 17 mycotoxins by ultra-high-performance liquid chromatography and tandem mass spectrometry method (UHPLC-MS/MS)*

RS CXC 44, *Code of Practice for Packaging and Transport of Fresh Fruit and Vegetables*

RS CXC 53, *Code of Hygienic Practice for Fresh Fruits and Vegetables*

RS CXS 192, *General standard for food additives*

RS CXS 193, *Codex general standard for contaminants and toxins in food*

RS EAS 38, *Labelling of pre-packaged foods — General requirements*

RS EAS 900, *Cereals, pulses and their products — Sampling*

RS ISO 16050, *Foodstuffs — Determination of aflatoxin B1, and the total content of aflatoxins B1, B2, G1 and G2 in cereals, nuts and derived products — High-performance liquid chromatographic method*

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RS ISO 16649-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of beta-glucuronidase-positive Escherichia coli Part 2: Colony-count technique at 44 degrees C using 5-bromo-4-chloro-3-indolyl beta-D-glucuronide*

RS 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*

RS ISO 2171, *Cereals, pulses and by-products — Determination of ash yield by incineration*

RS ISO 4833-1, *Microbiology of the food chain — Horizontal method for the enumeration of microorganisms Part 1: Colony count at 30 °C by the pour plate technique*

RS ISO 5498, *Agricultural food products — Determination of crude fibre content — General method*

RS ISO 5985, *Animal feeding stuffs — Determination of ash insoluble in hydrochloric acid*

RS ISO 6579-1, *Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella Part 1: Detection of Salmonella spp.*

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply.

3.1

Biofortified Orange Fleshed Sweetpotato (OFSP)

highly nutritious biofortified root crop obtained from a plant of the *Ipomoea batatas* (L.) Lam that is conventionally bred to contain high levels of beta-carotene

3.2

Biofortified orange fleshed sweet potato flour

flour obtained from OFSP as defined under 3.1

3.3

foreign matter

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

3.4

extraneous matter

organic matter of plant origin other than the OFSP flour

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3.5

food grade packaging material

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

4 Requirements

4.1 General requirements

Biofortified orange-fleshed sweet potato flour shall

a) be produced from biofortified orange-fleshed sweet potato complying with DRS 638;

b) exhibit a uniform orange colour;

c) be free from off-flavours and odours; and

d) be practically free from any living insects and foreign matter.

4.2 Specific requirements

4.2.1 Biofortified orange-fleshed sweet potato flour shall comply with specific requirements given in Table 1 when tested in accordance with test methods specified therein.

Table 1 — Specific requirements for Biofortified orange-fleshed sweet potato flour

S/N	Characteristic	Requirement	Test method
i.	Moisture, % by mass, max.	12	AOAC 925.10
ii.	Total ash content, %, by mass, max.	2	RS ISO 2171
iii.	Crude fibre, % by mass on dry weight basis, max.	2.0	RS ISO 5498
iv.	Acid insoluble ash, % by mass, max.	0.15	RS ISO 5985
v.	Residues on sieving through 600-micron sieve, %, m/m, min.	0.1	AOAC 965.22
vi.	Beta-carotene (provitamin A), mg/100g, min.	3	AOAC 2016.13/Annex A

5 Hygiene

5.1 Biofortified orange-fleshed sweet potato flour shall be prepared and handled in a hygienic manner in accordance with RS CXC 1.

5.2 Biofortified orange-fleshed sweet potato flour shall not exceed microbiological limits specified in Table 2 when tested in accordance with test methods specified therein.

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Table 2 — Microbiological limits in Biofortified orange-fleshed sweet potato flour

S/N	Microorganism	Maximum limit	Test method
i.	Total viable count, CFU/g, max	10^5	RS ISO 4833-1
ii.	*Escherichia coli* per g	Absent	RS ISO 16649-2
iii.	*Salmonella* spp, per 25g	Absent	RS ISO 6579-1
iv.	Yeasts and moulds, CFU/g	10^3	RS ISO 21527-2

6 Contaminants

6.1 Pesticide residues

Biofortified orange-fleshed sweet potato flour shall comply with maximum residue limits for pesticide residues established by the Codex Alimentarius Commission for this commodity.

6.2 Heavy metals

Biofortified orange-fleshed sweet potato flour shall not exceed maximum levels for heavy metals in table 3 when tested in accordance with test methods specified therein.

Table 3— Maximum Levels for heavy metals in Biofortified orange-fleshed sweet potato flour

S/N	Heavy metal	Maximum Level, mg/kg	Test method
i.	Lead (Pb)	0.1	AOAC 999.11
ii.	Cadmium (Cd)	0.1	

6.3 Mycotoxin

Biofortified orange-fleshed sweet potato flour shall not exceed maximum levels for mycotoxins

Table 4—Maximum levels for mycotoxins

S/N	Mycotoxin	Maximum Level, µg/kg	Test method
i.	Aflatoxins B1	5	RS ISO 16050
ii.	Total aflatoxin	10	
iii.	Fumonisins	2000	RS ISO 23719

7 Packaging

Biofortified orange-fleshed sweet potato flour shall be packaged in food grade packaging materials that safeguard the hygienic, nutritional, technological and organoleptic qualities of the produce in accordance with RS CXC 44.

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8 Labelling

8.1 General

8.1.1 In addition to any other requirements of RS EAS 38; the following labelling requirements shall apply and shall be legibly and indelibly marked:

e) name of the product as “Biofortified orange-fleshed sweet potato flour”;

f) micronutrient content eg. Beta-carotene (provitamin A)

g) name and physical address of the manufacturer/distributor;

h) net content;

i) country of origin;

j) batch number;

k) date of manufacture;

l) expiry date;

m) preservatives, when used;

n) variety

o) instructions for use;

p) storage conditions;

q) instructions on disposal of used package; and

r) indication “For human consumption”.

8.1.2 When labelling non-retail packages, information for non-retail packages shall either be given on the packages 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 packages.

8.2 Nutritional labelling and health claims

8.2.1 Nutritional labelling shall be done in accordance with RS EAS 803.

8.2.2 Nutritional and health claims shall be declared in accordance with RS EAS 804 and RS EAS 805

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9 Sampling

Sampling of Biofortified orange fleshed sweet potato flour shall be done in accordance with RS EAS 900.

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Annex A
(normative)

Determination of beta carotene in food by uv-vis spectrophotometric method

A.1 Principle

This method is based on solvent extraction followed by UV-Vis spectrometric detection. The sample is extracted using Acetone, filtered and the filtrate extracted using Petroleum ether, then the concentration of β-carotene is determined by reading the absorbance of standard and sample extract using petroleum ether as blank at 450nm using UV-Visible spectrophotometer.

A.2 Reagents and Apparatus

a) Acetone, AR grade 99.5% purity

b) Anhydrous Sodium Sulphate

c) β-Carotene standard ≥93% (UV), powder.

d) Petroleum Ether, Spectrophotometric grade

e) Distilled water

f) UV-Visible spectrophotometer

g) Blender

h) 100 ml Volumetric flask

i) 100ml Beaker

j) 100 ml Measuring cylinder

A.3 Extraction

A.3.1 Grind sample if it is in grains or pellets form and make sure almost 95% the powder can pass through 1mm sieve. Weigh 0.2-1.0 g of homogenized test portion into blender, then Add 50mls of cold acetone and mix/mill to extract for about 10 minutes.

A.3.2 Filter the sample using whatman filter paper No. 1 to obtain clear filtrate. Wash the residue on the filter paper three times or more until the residuals are white (free from carotenoids).

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A.3.3 Transfer the carotenoids extract into separating funnels containing 50ml of petroleum ether and 25 ml of distilled water, and extract by shaking the funnel for about five minutes, then wash the extract using 60mls portions of distilled water until it is free from acetone.

A.3.4 Prepare volumetric flask and glass funnel containing anhydrous dry Sodium Sulphate, pass the carotenoids extract through anhydrous Sodium Sulphate to dry it. Rinse the separating flask, Sodium Sulphate and funnel using petroleum ether but taking care not to exceed the mark of the volumetric flask.

A.4 Determination

A.4.1 Prepare 100µg/ml working standard solution from stock β-carotene standard, then prepare calibration standards by diluting it serially to obtain 0, 2, 4, 8, 16, 32, 64µg/ml beta carotene by taking appropriate volume of working standard solution into volumetric flask and diluting it with petroleum ether into 100ml volumetric flask.

A.4.2 Read the absorbance of standards and sample extract using petroleum ether as blank at 450nm using UV-Visible spectrophotometer. Use standard concentrations and the obtained absorbance to construct a standard calibration curve, from the curve obtain equation and calculate the beta carotene concentration in the samples

A.5 Calculation

$$\beta - \text{Carotene concentration } (\mu g/ml \text{ or } \mu g/g) = \frac{(A \pm K) x V1}{M \; x \; Sp\, wt}$$

where

A = Sample absorbance

K = Y-intercept of the standard calibration curve

V1 = Total volume of the sample extract

M = Slope of the standard plot

Sp wt. = Amount of sample taken for analysis

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Bibliography

[1] RS EAS 771: 2023, Fresh sweet potato — Specification

[2] RS EAS 773: 2012 Sweet potato flour — Specification

[3] Bechoff, A. 2010. Investigating carotenoid loss after drying and storage of orange-fleshed sweetpotato. PhD thesis. University of Greenwich. UK. 330pp.

[4] Bengtsson, A., A. Namutebi, M.L. Alminger and U. Svanberg 2008. Effects of various traditional processing methods on the all-trans-b-carotene content of orangefleshed sweet potato. Journal of Food Composition and Analysis 21: 134-143.

[5] Kósambo L., E.E. Carey, A.K. Misra, J. Wilkes and V. Hagenimana 1998. Influence of age, farming site, and boiling on pro-vitamin A content in sweet potato (Ipomoea batatas (L.) Lam.). Journal of Food Analysis 11: 305-321.

[6] Uganda-country-report_web_08.08_0.pdf

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