Nixtamalized maize products — Specification

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# Foreword

This draft Kenya Standard has been prepared by the Processed Cereals and Pulses Technical Committee under guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

Development of this Draft Kenyan Standard has been necessitated by the need to standardize nixtamalized maize products that are gaining popularity in Kenya. The standard elaborates the main requirements that must be considered for safe and quality nixtamalized maize products that have been shown to be generally safe compared to conventional products in the market.

This standard stipulates the specifications of products obtained from nixtamalization of maize grains. It is envisaged that through this standardization, nixtamalized products will be produced to diversify maize products, meet safety and quality requirements, as well as enhance trade of the products. Diversification of maize products will reduce the over reliance on wheat flour baked and fried products as well as improve both food security and nutritional qualities of the products.

During the development of this standard, reference was made to the following documents:

1. KS EAS 768:2019, Fortified milled maize (corn) products — Specification.
2. Technical Specifications for the manufacture of: Fortified Nixtamalized Maize Flour – Honduras and RBP, version 1, OSCQ, 2018
3. KS EAS 44-2019, Milled maize (corn) products — Specification

Acknowledgement is hereby made for the assistance derived from these sources.

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Nixtamalized maize products — Specification

1 Scope

This Draft Kenya Standard specifies the requirements, sampling and test methods for nixtamalized maize products prepared from the grains of common maize (*Zea mays* L.) 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 965.22, *Sorting Corn Grits Sieving Method Modified*

AOAC 2011.14, *Calcium, Copper, Iron, Magnesium, Manganese, Potassium, Phosphorus, Sodium and Zinc in fortified food products. Microwave Digestion and Inductively Coupled Plasma-Optical Emission Spectrometry*

CODEX STAN 192, *Codex general standard for food additives*

KS EAS 2, *Maize grains — Specification*

KS EAS 38, *Labelling of pre-packaged foods — Specification*

KS EAS 39, *Code of practice for hygiene in the food and drink manufacturing industry*

KS EAS 44, *Milled maize (corn) products — Specification*

KS EAS 768, *Fortified Milled Maize (corn) Products - Specification*

KS EAS 803, *Nutrition labelling — Requirements*

KS EAS 804, *Claims on food — General requirements*

KS EAS 805, *Use of Nutrition and Health Claims — Requirements*

KS EAS 900, *Cereals and Pulses – Sampling*

KS EAS 901, *Cereals and Pulses – Test Methods*

KS ISO 11085, *Cereals, cereals-based products and animal feeding stuffs — Determination of crude fat and total fat content by the Randall extraction method*

KS 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*

KS 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*

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

KS ISO 5498, *Agricultural food products — Determination Crude Fibre Content - General Method*

KS ISO 5985, *Animal feeding stuffs — Determination of Ash Insoluble in Hydrochloric Acid*

KS ISO 6561-1, *Fruits, vegetables and derived products — Determination of cadmium content — Part 1 — Method using graphite furnace atomic absorption spectrometry*

KS ISO 6561-2, *Fruits, vegetables and derived products - Determination of cadmium content - Part 2: Method using flame atomic absorption spectrometry*

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

KS ISO 6633, *Fruits, vegetables and derived products — Determination of lead content — Flameless atomic absorption spectrometric method*

KS ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (*Staphylococcus aureus *and other species) — Part 1: Technique using Baird-Parker agar medium*

KS ISO 7305, *Milled Cereal Products - Determination of Fat Acidity*

# 3 Terms and definitions

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

**Nixtamalization**

the process of preparing maize in which the grain is boiled and steeped in food grade calcium hydroxide, washed, and then dehulled.

**Steeping**

Soaking of maize grain in water containing Calcium Hydroxide

**Nixtamalized maize grains**

maize grains obtained from nixtamalization.

**Nixtamalized maize products**

products obtained from nixtamalization of maize grains and/or processing of nixtamalized maize grains.

**Dried Nixtamalized maize grains**

the product obtained from the drying of nixtamalized maize grains.

**Nixtamalized maize flour**

the product obtained from the milling of dried nixtamalized maize grains or drying of nixtamalized maize dough.

**Nixtamalized maize dough**

the product obtained from the wet grinding of nixtamalized maize grain or kneading of the nixtamalized maize flour. It is also known as *masa.*

**Nixtamalized fried/baked products**

fried/baked products made from nixtamalized maize grains.

**Food grade calcium hydroxide**

is high purity calcium hydroxide acceptable for use in food products.



**Food grade packaging materials**

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

# Requirements

## Raw materials

## 4.1.1 Maize

Nixtamalized maize products shall be prepared from maize complying with KS EAS 2.

### Calcium hydroxide

Nixtamalized maize products shall be prepared with food grade calcium hydroxide as guided in Annex A.

### Optional ingredients

In addition to the essential ingredients, optional food grade ingredients may be used. These may include but not limited to:

1. Salt
2. Edible fat/oil
3. Spices, herbs, and condiments

Where optional ingredients are used for fried/baked products, they shall comply with relevant standards.

## General requirements

Nixtamalized maize products shall:

1. have characteristic colour of maize grains from which they were prepared;
2. be free from foreign matter such as insects, fungi or dirt;
3. be free from foreign taste and odour;
4. be wholesome and fit for human consumption.

## Specific requirements

Nixtamalized maize products shall comply with the requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1: Specific quality requirement for nixtamalized maize products

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S/N** | **Characteristic** | **Product Type** | | | | **Test method** |
| **Dried nixtamalized maize grains** | **Nixtamalized maize flour** | **Nixtamalized maize dough** | **Nixtamalized fried/baked products** |
|  | Crude fibre, % m/m, max. | 3.0 | 3.0 | 3.0 | 3.0 | KS ISO 5498 |
|  | Crude fat on moisture free basis, % m/m, max. | 3.0 | 3.0 | 3.0 | N/Ib) | KS ISO 11085 |
|  | Moisture content, % m/m, max. | 13.5 | 14 | N/Aa) | N/Ib) | KS EAS 901, Clause 5 |
|  | Total ash, % m/m, max. | 3.0 | 3.0 | 3.0 | 3.0 | KS ISO 2171 |
|  | Acid insoluble ash, % m/m, max. | 0.4 | 0.4 | 0.4 | 0.4 | KS ISO 5985 |
|  | Fat acidity, mg KOH per 100 g of product, m/m, max. | 80 | 80 | 80 | 80 | KS ISO 7305 |
|  | Residue on sieving through 1000-micron sieve, % m/m, max | N/A a) | 0.5 | N/A a) | N/A a) | AOAC 965.22 |
|  | Calcium mg/kg max | 2,000 | 2,000 | 2,000 | 2,000 | AOAC 2011.14 |
| a) NA-Not Applicable. The parameter is not applicable to the product.  b) N/I – Not indicated. Maximum levels of the parameter vary widely based on the product | | | | | | |

# Fortification requirements

Nixtamalized maize flour may be fortified. When fortified, the nixtamalized maize flour shall comply with the levels of micronutrients provided in KS EAS 768 when tested in accordance with test methods specified therein.

# Food additives

Where food additives are used in nixtamalized maize products, they shall comply with KS CXS 192.

# Hygiene

* 1. Nixtamalized maize products shall be produced, prepared and handled in accordance with KS EAS 39.
  2. The products shall comply with microbiological limits given in Table 2 when tested in accordance with the test methods specified therein.

Table 2: Microbiological limits for nixtamalized maize products

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **Micro-organism** | **Maximum limit** | **Test method** |
|  | *Escherichia coli*, cfu/g | 102(a) | KS ISO 16649-2 |
|  | Salmonella *spp. in* 25 g | Absent | KS ISO 6579-1 |
|  | Yeast and moulds, cfu/g | 104 | KS ISO 21527-2 |
|  | *Staphylococcus aureus*, cfu/ g | 10(a) | KS ISO 6888-1 |
| (a) for ready to eat, the E.Coli and S. Aureus shall be absent | | | |

# Contaminants

## Heavy metals

Nixtamalized maize products shall comply with maximum limits for heavy metals as given in Table 3 when tested in accordance with the test methods specified therein.

Table 3: Heavy metals limits for nixtamalized maize products

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **Heavy metal** | **Limit, mg/kg** | **Test method** |
| i. | Lead (Pb) | 0.2 | KS ISO 6633 |
| ii. | Cadmium (Cd) | 0.1 | KS ISO 6561-1, KS ISO 6561-2 |

## Pesticide residues

Nixtamalized maize products shall comply with the maximum residue limits established by the Codex Alimentarius Commission for this commodity.

## Mycotoxins

Nixtamalized maize products shall comply with mycotoxin limits specified in Table 4 when tested in accordance with test methods specified therein.

Table 4: Mycotoxins limits for nixtamalized maize products

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **Mycotoxin** | **Maximum limit µg/kg** | **Test method KS EAS 901** |
| i. | Total aflatoxins | 10 | Clause 9  Clause 10 |
| ii. | Aflatoxin B1 | 5 | Clause 9 |
| iii. | Fumonisins | 2,000 | Clause 11  Clause 12 |

# Packaging

Nixtamalized maize products shall be packaged in food grade packaging materials that ensure safety and quality requirements specified in this standard are maintained throughout the shelf life of the product.

# Labelling

## General and nutritional labelling

In addition to the requirements in KS EAS 38 and KS EAS 803, the following shall apply:

1. Name of product such as "Nixtamalized Maize Grains, Nixtamalized Maize Flour, Nixtamalized Maize Dough, Nixtamalized Fried/Baked Product ";
2. name and address of the manufacturer/packer/importer;
3. brand name/registered trade mark, if any;
4. lot or batch number in code or in clear format;
5. net weight in metric units;
6. storage instructions
7. the declaration “Food for Human Consumption”
8. country of origin;
9. date of manufacture;
10. expiry date; and
11. instructions for disposal of used package.

## Nutrition and health claims

Nixtamalized maize products may have nutrition and health claims. Such claims when declared shall be in compliance with KS EAS 803, KS EAS 804 and KS EAS 805.

# Sampling

Sampling shall be done in accordance with KS EAS 900.

**Annex A**: Specifications of food grade calcium hydroxide

(Informative)

|  |  |
| --- | --- |
| Specification | Limit |
| Composition, Purity, min | 85% |
| Magnesium sulphate, max | 5% |
| Lead, max | 20 µg/kg |
| Fluoride, max | 1.5mg/kg |
| Arsenic, max | 5 µg/kg |
| Cadmium, max | 2 µg/kg |
| Chromium, max | 20 µg/kg |
| Mercury, max | 1 µg/kg |
| Nickel, max | 20 µg/kg |