

SWAZILAND NATIONAL STANDARD

Fortified wheat flour

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Clause Changed	Date	Change

NATIONAL FOREWORD

This Swaziland National Standard was prepared by Technical committee *SWASA/TC 24 Bakery Products* in accordance with procedures of the Swaziland Standards Authority, in compliance with Annex 3 of the WTO/TBT Agreement.

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Fortified wheat flour

1 Scope

This Swaziland National Standard gives specifications for the rational addition of essential micronutrients to wheat flour. This standard does not contain all requirements which may be required for regional certification.

2 Normative references

The following referenced document is indispensable for the application of this document. The latest edition of the referenced document (including any amendments) applies.

SZNS CODEX STAN 1: 1985, *Standard for labelling of pre-packaged foods*

ISO 13690:1999, *Cereals, pulses and milled products — sampling of static batches*

CAC/GL 23-1997, *Guidelines for use of nutrition and health claims*

CODEX STAN 152: 1985, *Standard for wheat flour*

CODEXSTAN 192-1995, *General standard for food additives*

3 Terms and definitions

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

3.1

electrolytic iron

elemental iron powder as per specification in the latest edition of Food Chemical Codex

3.2

fortificant

micronutrient or micronutrient mix the foodstuff is fortified with

3.3

fortification

addition of one or more nutrient(s) to a food whether or not it is normally contained in the food for the purpose of preventing or correcting a demonstrated deficiency in one or more nutrients in the population or specific population group(s)

3.4

food vehicle

foodstuff identified to be fortified with the prescribed micronutrients

3.5

micronutrient

natural or synthesised vitamin, mineral, or trace element that is essential for normal growth, development and maintenance of life and of which a deficit will cause characteristic biochemical or physiological changes

3.6

micronutrient mix

blend of vitamins, mineral or trace elements in determinable amounts

NOTE The terms 'fortificant' and 'micronutrient mix' are used interchangeably throughout the document and they have the same meaning.

3.7

premix

mixture of a micronutrient(s) and another ingredient, often the same food that is to be fortified, that is added to the food vehicle to improve the distribution of the micronutrient mix within the food matrix and to reduce the separation between the food and micronutrient particles

3.8

qualitative test

test that simply shows the presence or absence of an added micronutrient

3.9

quantitative test

test that gives an actual value for the level of micronutrient in the sample

NOTE quantitative tests generally measure total content or both the natural and added levels.

3.10

quality control

measures applied and the steps taken by the manufacturer of wheat foodstuffs to ensure that the correct procedures are being followed and the set criteria is being met in administering fortificants to food vehicles

3.11

self-raising flour

white wheat flour obtained by milling a blend of soft and hard wheat to which raising agents are added

3.12

semiquantitative test

test that give a rough indication of the level of an added nutrient

3.13

wheat flour

product prepared from grain of common wheat *Triticum aestivum* L, by grading or milling processes in which the bran and germ are partly removed and the remainder is comminuted to a suitable degree of fineness

3.14

wheat foodstuffs

wheat products made from wheat flour and meal, that are used to produce bread and similar products

4 Fortification provisions

4.1 There shall be policies and procedures for the procurement of the premix.

4.2 The fortification mix shall be covered by a Certificate of Analysis to prove specification.

4.3 The fortification process shall be documented, and displayed, and shall cover the following;

- a) The stage of the milling process where the fortificant has to be added;
- b) The micronutrient mix addition rate.

4.4 The final levels of fortificants in the fortified wheat foodstuff shall not be less than the levels shown in Table 1, Clause 5.3.2.1.

5 Quality control

5.1 Raw material

5.1.1 It is recommended that fortified wheat flour be produced from wheat flour conforming to the requirements of CODEX STAN 152.

5.1.2 In addition to the requirements of CODEX STAN 152, self-raising flour may contain edible acid salt. Monocalcium Phosphate or Sodium Acid Pyrophosphate shall be used.

5.2 Quality programme

5.2.1 There shall be an active quality assurance or quality control program that may include the following:

- a) A quality control manager or employee with quality control responsibilities;
- b) A laboratory or designated space for testing wheat and wheat flour; and
- c) Wheat flour and wheat testing equipment.

NOTE These tests typically include protein or gluten, moisture or water content, ash content and/or colour, amylase enzyme activity (falling number) and wheat flour properties.

5.2.2 There shall be training of employees on the importance and requirements of food fortification at least annually.

5.2.3 There shall be documented inventory control policies and procedures. Fortificant to be used shall have not exceeded its shelf life as specified by the manufacturer.

5.2.4 There shall be daily checking of the fortification steps and technical specification of the fortification at production.

5.2.5 All test methods performed and their results shall be recorded and documented.

5.2.6 The amount of micronutrient mix used shall be recorded and documented and these shall correspond with production records.

5.2.7 The correct dosage levels shall be maintained through any of or a combination of the following measures;

- a) Visual checks at least every six hours to ensure that micronutrient mix is being used;
- b) Monitoring of micronutrient mix feeders shall be done hourly; and
- c) Spot checks shall be performed to ensure that the product has been dosed correctly by determining one of the components of the micronutrient mix according to the appropriate analytical method and these shall be recorded and documented.

5.2.8 Micronutrient mixes shall be stored according to manufacturer's specification.

5.2.9 Micronutrient mixes or fortificants shall be ordered from a World Food Programme (WFP) approved supplier.

5.2.10 Calibration schedule and records of equipments used shall be kept.

5.2.11 There shall be a well documented procedure for corrective actions in case of over dosage or under dosage of fortificant to the food vehicle.

5.3 Final Product

5.3.1 Contaminants

Requirements of CODEX STAN 152 shall apply for maximum limits of heavy metals, pesticide residue and mycotoxins.

5.3.2 Food additives

The product may contain only permitted additives complying with CODEXSTAN 192-1995.

5.3.2.1 Fortificant

Fortificant levels in the fortified wheat flour shall be as indicated in Table 1 below:

TABLE 1: FORTIFIED FOOD VEHICLE STANDARDS

Fortificant	Unit	Wheat foodstuffs
-------------	------	------------------

Vitamin A	IU/kg	5400.00
Thiamine	Mg/kg	3.60
Riboflavin	Mg/kg	2.00
Niacin	Mg/kg	31.00
Folic acid	Mg/kg	1.50
Pyridoxine	Mg/kg	3.20
Iron	Mg/kg	43.00
Zinc	Mg/kg	20.00

NOTE For the recommended fortification micronutrient mix specification to cover the minimum fortification levels, see Annex A

5.3.2.2 Improvers

Improvers may be added singly or in combination, including but not limited to:

Maximum permitted level

- | | | |
|------|------------------------|--------------|
| i) | ascorbic acid | 200 mg/kg; |
| ii) | potassium persulphate | 100 mg/kg; |
| iii) | ammonium persulphate | 250 mg/kg; |
| iv) | mono calcium phosphate | 2 500 mg/kg; |
| v) | chlorine dioxide | 30 mg/kg. |

5.3.2.3 Bleachers (added singly)

Maximum permitted level

- | | | |
|-----|-------------------|-----------|
| i) | nitrogen peroxide | GMP; |
| ii) | benzoyl peroxide | 150 mg/kg |

5.3.2.4 Diastatically actives (singly or combined)

Maximum permitted level

fungus enzyme (amylolytic or MYL-X)	45 mg/kg
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5.3.2.5 Azodicarbonamide (ADA) and Potassium Bromate

Shall not be used at all.

6 Sampling

6.1 Sampling shall be done in accordance with ISO 13690. Sampling procedures shall be clearly defined and documented.

6.2 The sample shall represent the final mill product.

6.3 Samples shall not be exposed to direct sunlight or strong indoor lighting to prevent degradation of light sensitive micronutrients.

6.4 The sample data and results shall be recorded and well documented. A sample record book shall be maintained which will specify the name of the manufacturer (in case of a multi site), date of manufacture, expiry date, type of flour and whether the sample is a control or representative of the end product.

7 Testing

7.1 Testing for micronutrients shall be conducted using any validated method of test. Flour samples may be tested to verify that they have been fortified through;

- a) Qualitative tests;
- b) Semi-quantitative tests; and
- c) Quantitative tests

7.2 These methods shall be well documented and a quality control testing schedule shall be provided.

7.3 There shall be an online process control which shall indicate the spot test results and these shall be documented.

7.4 The test method used and results obtained shall be recorded and well documented.

7.5 An accredited laboratory shall be used for verification of nutritional levels at least four times a year.

8 Packaging and Labelling

8.1 Containers

8.1.1 The container material shall safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product.

8.1.2 The containers, including packaging material, shall be food grade.

8.2 Labelling

8.2.1 All relevant requirements of the SZNS CODEX STAN 1 shall apply.

8.2.2 In the list of ingredients, the micronutrient mix shall be indicated by listing individually the name of the vitamin or mineral compound.

8.2.3 Minerals of the fortification mix shall:

- a) Be identified individually by the compound names (electrolytic iron, zinc oxide); or
- b) Indicate the elemental mineral in the table with nutritional information.

8.2.4 The micronutrient composition per 100 g of the foodstuff shall be provided.

8.2.5 Information for the % Recommended Dietary Allowance (RDA) per daily serving shall be provided.

8.2.6 The following voluntary labelling shall be permitted;

- a) RDA information for individuals between 4 and 13.
- b) Use of the relevant fortification logo and claim.

8.2.7 For nutrition and health claims, the recommendations of CAC/GL 23-1997 shall be considered.

Fortification micronutrient mix specification

Fortificants	Wheaten flour (g/kg)
Vitamin A Palmitate, 250 000 IU/g	119.04 g
< SIZE=1 > Thiamin Mononitrate	12.34 g
Riboflavin	8.90 g
Nicotinamide	118.40 g
Folic acid	7.15 g
Pyridoxine HCL	16.24 g
Electrolytic iron	178.57 g
Zinc oxide (min. 80% activity)	93.40 g
Calcium carbonate (min. 40% activity), As carrier	To complete 1000 g

NOTE The dosage of 200g of micronutrient mix per ton of wheat or maize foodstuffs is necessary to cover the minimum fortification levels.

(informative)

Methods of analysis for fortificants**Table 2: Test methods for fortificants in wheat flours**

Fortificant tested for in wheat flours	Recommended test method
Vitamin A Palmitate 250 000 IU	Saponification, extraction, HPLC; (Official: Directive 2000/45/EC), or Swiss Food Book 311.510 (Schweizerisches Lebensmittelbuch)
Thiamin Mononitrate	Extraction, HPLC, post-column derivatisation (example VFHA method in Roche intranet: Vitamin B1 in Feed and Food) (or AOAC 942.23) or Swiss Food Book 311.510 (Schweizerisches Lebensmittelbuch)
Riboflavin	Extraction, HPLC (example VFHA method in Roche green book, page 30, to be published in Roche intranet) or microbiological (AOAC 940.33) or Swiss Food Book 311.510 (Schweizerisches Lebensmittelbuch)
Niacinamide	Extraction, HPLC (example VFHA method in Roche intranet: Vitamin PP in Feed and Food) or microbiological (AOAC 944.13) or Swiss Food Book 311.510 (Schweizerisches Lebensmittelbuch)
Pyridoxine HCL	Microbiological (AOAC 944.12) or Swiss Food Book 311.510 (Schweizerisches Lebensmittelbuch)
Folic acid	Microbiological (AOAC 961.15) or Swiss Food Book 311.510 (Schweizerisches Lebensmittelbuch)
Zinc oxide	AOAC
Electrolyte iron	AOAC

NOTE The AOAC official methods are available in bound format (*Official Methods of Analysis of AOAC International*) available online at www.aoac.org or from EBSCO subscription services at P.O. Box 749, Cresta, 2118, Tel: 011 678 4416, Fax: 011 678 4464.

Bibliography

1. CAC/GL 09-1987 (amended 1989, 1991), *General principles for the addition of essential nutrients to foods*
2. WHO/FAO, *Guidelines on food fortification with micronutrients*
3. CAC/GL 23-1997, *Guidelines for use of nutrition and health claims*
4. SANS 10049:2010, *Food hygiene management – requirements for prerequisite programs (PRPs)*
5. CODEX STAN 152:1995, *Codex Standard for wheat flour*
6. CAC/GL 50:2004, *General guidelines on sampling*
7. ISO 6540:1980, *Determination of moisture content (on milled grains and on whole grains)*

