

DRAFT TANZANIA STANDARD

Biofortified bean flour - Specification

TANZANIA BUREAU OF STANDARDS

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National Foreword

This Tanzania Standard was published under the authority of the Board of Director of Tanzania Bureau of Standards.

Tanzania Bureau of Standards (TBS) is the statutory national standards body for Tanzania established under the Standards Act No. 3 of 1975, which was amended by Act No. 1 of 1977 and subsequently repealed and replaced by the Standards Act No. 2 of 2009.

Tanzania Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. The Technical Committees work under the supervision of Divisional (sectoral) Committees. The Standards are developed and finalized in accordance with the Guide and Procedure for Development of Standards.

Tanzania Standards are subject to review, to keep pace with technological advances. Users of the Tanzania Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

This Tanzania Standard was developed under the supervision of the Agriculture and Food Divisional Standards Committee (AFDC). The Technical Committee responsible for the standard is Nutrition and Foods for Special Dietary Uses Technical Committee (AFDC06).

The reporting of the result of a test or analysis made in accordance to this Tanzania Standard, if the final value, observed or calculated is to be rounded off, shall be done in accordance with TZS 4 (see Clause 2).

Introduction

The primary goal of bio fortification is to improve the nutritional quality of staple crops to combat micronutrient deficiencies in populations that rely heavily on these staples for their diet.

Bio fortified dry beans are a crucial innovation aimed at improving the nutritional status of populations, particularly in developing countries, by enhancing the nutrient content of a staple food through breeding or biotechnological methods. For instance, the iron-bio fortified dry beans, developed through conventional breeding, contains significantly higher iron content than traditional bean varieties

Bio fortified bean flour is processed from beans that have been conventionally bred to naturally contain higher levels of essential micronutrients particularly iron and zinc without the use of genetic modification. The approach emphasizes sustainability, affordability, and wide reach, as nutrient-rich traits are embedded in the seed and passed on through successive harvests.

The main key features of bio fortified bean flour include:

- a) Increased Nutrient Content of the flour processed from bio fortified dry beans which contain higher levels of essential micronutrients, such as iron and zinc, which are vital for preventing deficiencies and associated health problems.
- b) Enhanced Health Benefits: consumption of bio fortified beans flour can help improve overall health, reduce the risk of anemia and other nutrient deficiencies, and enhance cognitive and physical development, particularly in children.

The following are the benefits of consuming bio fortified bean flour which can be incorporated into common foods such as porridges, breads, and snacks, making it a convenient and affordable option for;

- a) Addressing micronutrient deficiencies in populations with limited access to diverse diets.
- b) Offer a sustainable solution to malnutrition by enhancing the nutrient profile of a commonly consumed staple food.
- c) Provide a cost-effective and culturally acceptable way to improve nutrition, as dry beans are already widely consumed in many regions.

Bio fortified bean flour - Specification

1 Scope

This Tanzania Standard specifies requirements, sampling and test methods for bio fortified bean flour obtained from biofortified beans (*Phaseolus vulgaris* L.) intended for human consumption.

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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.

TZS 109, Hygiene in the food and drink manufacturing industry — Code of practice

TZS 122-2, Microbiology of food and animal feed - Horizontal method for the detection, enumeration and serotyping of Salmonella - Part 2: Enumeration by a miniaturized most probable number technique

TZS 125-1, Microbiology of the food chain - Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) - Part 1: Method using Baird-Parker agar medium

TZS 330, Cereal, Pulses and their products - Sampling

TZS 331, Cereal, Pulses and their products - Testing

TZS 481, Nutrition labelling — Requirements

TZS 482, Claims on foods — General requirements

TZS 550, Use of nutrition and health claims — Requirements

TZS 538, Labeling of pre-packaged food – Requirements

TZS 729, Microbiology of food and animal feeding stuffs -Horizontal method for the enumeration of coliforms - Colony count technique

TZS 731, Microbiology of food and feeding-stuffs - Horizontal method for the detection and enumeration of presumptive Escherichia Coli - Most Probable Number Technique

TZS 963-3, Starch and derived products – Heavy metals content – Part 3 – Determination of lead content by atomic absorption spectrometry with electro-thermal atomization

TZS 963-4, Starch and derived products – Heavy metals content – Part 4 – Determination of cadmium content by atomic absorption spectrometry with electro-thermal atomization

TZS 2426, Microbiology of food and animal feedstuffs — 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

TZS 2564, Bio fortified beans – Specification

TZS/ISO 21424, milk products, infant formula and adult nutritional's — Determination of minerals and trace elements — Inductively coupled plasma mass spectrometry (ICP-MS) method

3 Terms and definitions

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

3.1

bio fortified bean flour

is a milled product obtained from biofortified beans (*Phaseolus vulgaris*) that have been produced through conventional breeding techniques or modern biotechnology to increase iron and zinc content.

3.2

food grade packaging material

material which will safeguard the hygienic, nutritional, technological, and organoleptic qualities of the product

4 Requirements

4.1 Ingredients

Bio fortified bean flour shall be prepared from bio fortified beans complying with TZS 2564.

4.2 General Requirements

Bio fortified bean flour shall be;

- a) free from foreign matter;
- b) free from off-flavours and off-odours; and
- c) free from any living insects and filth;
- d) wholesome and fit for human consumption.

4.3 Specific Requirements

4.3 1 Bio fortified bean flour shall comply with the specific requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Specific Requirements for Bio fortified bean flour

S/N	Characteristic	Requirement	Test method
i.	Crude fat on moisture free basis, %, m/m, max	3.1	TZS 331
ii.	Moisture content, %, m/m, max.	13.5	

iii.	Total ash on moisture free basis, % m/m, max.	4.0	
iv.	Acid insoluble ash on moisture free basis, % m/m, max.	0.40	

4.3.2 When tested in accordance with TZS 331, not less than 90 % shall pass through a 0.60-mm sieve for fine flour and not less than 90 % shall pass through a 1.20-mm sieve for coarse flour.

5. Nutrient content

5.1 Iron content requirements

bio-fortified dry beans flour shall be classified and have iron content limits given in Table 2 when tested in accordance with the test method specified therein.

Table 2 — Levels of iron in bio-fortified dry beans flour

S/N	Class	Iron content limit, mg/kg	Test method
1.	Class I (C1)	≥ 90	TZS /ISO 21424
2.	Class II (C2)	≥ 80 to < 90	
3.	Class III (C3)	≥ 60 to < 80	

6.0 Hygiene

6.1 Bio fortified bean flour shall be processed, packed, stored, transported and handled under good hygienic conditions in accordance with TZS 109 to prevent contamination that may be harmful to consumers.

6.2 Bio fortified bean flour shall comply with the microbiological limits given in Table 3, when tested in accordance with the test methods specified therein

Table 3 — Microbiological limits for Bio fortified bean flour

S/N	Microorganism	Limit	Test method
i	Total aerobic count per g, max.	10 ⁵	TZS 729
ii	<i>Escherichia coli</i> per g	absent	TZS 731
iii	<i>Salmonella</i> per 25 g	Absent	TZS 122-2
iv	Yeast and moulds cfu/g, max.	10 ⁴	TZS 2426
v	<i>Staphylococcus aureus</i> per 25 g, max.	10 ²	TZS 125-2

7. Contaminants

7.1 Heavy metals

Bio fortified bean flour shall not contain any heavy metals and other contaminants in excess of the quantities specified in Table 4.

Table 4 — Maximum limits of heavy metals contaminants of Bio fortified bean flour

S/N	Heavy metal	Maximum limit mg/kg	Test method
i	Lead (Pb)	0.1	TZS 963-3
ii	Cadmium (Cd).	0.1	TZS 963-4

7.2 Mycotoxins

Bio fortified bean flour shall comply with mycotoxin levels given in Table 4 when tested in accordance with test methods specified therein.

Table 5 — Mycotoxin levels for biofortified bean flour

S/N	Mycotoxin	Maximum level µg/kg	Test method
i.	Total aflatoxins	10	EAS 901
ii.	Aflatoxins B ₁	5	
iii.	Fumonisin	2 000	

7.3 Pesticide residues

Bio fortified bean flour shall comply with the pesticide residue levels established by the Codex Alimentarius Commission for this commodity.

8.0 Packaging

Bio fortified bean flour shall be securely packaged in containers made of food grade packaging materials. The packages shall preserve the safety and quality of the product, prevent entry of light and preclude contamination from the external environment.

9.0 Labelling

9.1 In addition to the labelling requirements of TZS 538, the packages shall be legibly and indelibly labelled with the following information:

- a) name of the product., "Biofortified bean flour".

- b) name and physical address of the processor/packer/importer.
- c) date of manufacture;
- d) expiry date;
- e) net weight of the product in metric units;
- f) instructions for use

9.2 Nutrition labeling

The amount of iron and zinc in the bio fortified bean flour shall be declared on the label in accordance with TZS 481.

9.3 Nutrition and health claims

Bio fortified bean flour may have claims on the importance of the micronutrients in nutrition and health. Such claims when declared shall be consistent with TZS 482 and TZS 550.

9.4 Labelling of non-retail containers

Information detailed in 8.1 shall be given either on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the processor or packer as well as storage instructions, shall appear on the container.

However, lot identification and the name and address of the processor or packer may be replaced by an identification mark provided that such a mark is clearly identifiable with the accompanying documents.

9.5 The containers of the bio fortified bean flour may also be marked with the TBS Quality mark.

NOTE - The TBS Standards Mark of Quality may be used by the manufacturers only under licensed from TBS. Particulars of conditions under which the licenses are granted, may be obtained from TBS.

10. Sampling

Sampling shall be done in accordance with TZS 330.

Bibliography

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