



DRAFT TANZANIA STANDARD

Biofortified dry beans - Specification

Draft for Stakeholders comment

TANZANIA BUREAU OF STANDARDS



0. Foreword

Biofortification is one among the interventions strategy proposed to combat micronutrient deficiencies among the society. It is a process of increasing the density of vitamins and minerals in a crop through conventional plant breeding, modern biotechnology, or agronomic practices. The identified staple crops include maize, beans, sweet potatoes, cassava, wheat, rice and pearl millet. Thus when bio fortified products are consumed regularly, will improve human health and nutrition significantly.

This standard of biofortified beans has been developed to keep up with advancements of the biofortification food crops and to ensure the safety and quality of the product traded in the markets in order to safeguard the health of the consumers.

In reporting the result of a test or analysis made in accordance with the Tanzania standard, if the final value observed or calculated is to be rounded off, it shall be done in accordance with TZS 4

1. Scope

This Tanzania Standard specifies requirements, sampling and test methods for iron and zinc biofortified dry beans (*Phaseolus vulgaris* L.) through conventional plant breeding intended for human consumption.

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.

CAC/RCP 1-1969, *General principles of food hygiene*

CODEX STAN 193, *General standard for contaminants and toxins in food and feed*

TZS 538/EAS38, *Labelling of pre-packaged foods — General Requirements*

TZS 330/EAS 900, *Cereals and pulses — Sampling*

TZS 331/EAS 901, *Cereals and pulses — Test methods*

TZS 875/EAS 46, *Dry beans – Specification*

TZS 4, *Rounding off numerical values*

3 Terms and definitions

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

3.1

biofortification

is a process that enhances the nutritional value of staple food crops by increasing the density of selected micronutrients in a crop through either conventional plant breeding, biotechnology, or agronomic practices.



3.2

conventional plant breeding

is the process of crop development that entails screening germplasm for available genetic diversity pre-breeding parental genotypes, developing and testing micronutrient dense germplasm, conducting genetic studies, and developing molecular markers to lower the costs and quicken the pace of breeding.

Define biotechnology

3.3

bio fortified dry beans

dry threshed field and garden beans of the species of *Pharsalus vulgaris* L that have been bio fortified through conventional plant breeding and contain high amount of iron and zinc compared to the common beans.

3.4

defective/damaged bio fortified beans

beans that have been broken, pest damaged, shriveled, immature, rotten, moldy, diseased, germinated, discolored and heat damaged

3.5

broken/split biofortified beans

whose cotyledons are separated or one or both of the cotyledons have been broken

3.6

germinated biofortified beans

beans which have sprouted

3.7

mouldy biofortified beans

beans with visible mycelial growth on their surface

3.8

immature/shriveled biofortified beans

beans which are under-developed and wrinkled over their entire surface

3.9

rotten and diseased biofortified beans

beans affected by mould growth or bacterial decomposition, or other causes that may be noticed without having to cut the grains to examine them and render them unsafe for human consumption.

3.10

discoloured biofortified beans

beans with change of colour due to heat, frost or water

**3.11****food grade packaging material**

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.

3.12**wholesome/sound**

free from disease, deterioration (such as but not limited to decay, breakdown) or adulteration/contamination, that appreciably affects their appearance, the keeping quality of the produce or market value

3.13**clean**

practically free from visible soil, dust, or other visible foreign matter

3.14**foreign matter**

all organic and inorganic material other than biofortified beans, broken kernels and other grains

3.14.1**inorganic matter**

stones, glass, sand and other mineral matter

3.14.2**organic matter**

any animal or plant matter (seed coats, straws, weeds) other than biofortified beans, damaged beans, inorganic extraneous matter and harmful/toxic seeds.

3.15**filth**

impurities of animal origin

3.16**pest damaged biofortified beans**

beans which show damage owing to attack by rodents, insects, mites or other pests

3.17**contrasting varieties**

other varieties that are of a different colour, size, or shape from the biofortified beans of the designated variety.

3.18**other edible grains**

grains other than biofortified bean (*Phaseolus vulgaris*), whole or broken such as maize, sorghum, wheat including other common dry bean (*Phaseolus vulgaris*).



3.19

harmful and toxic seeds

seeds which, if present in quantities above a certain limit, can have a damaging or dangerous effect on health, sensory properties or technological performance e.g *Crotalaria (Crotalaria spp.)*, Corn cockle (*Agrostemma githago L.*), Castor bean (*Ricinus communis L.*), Jimson weed (*Datura spp.*)

4 Quality requirements

4.1 General requirements

Biofortified dry beans shall be:

- a) The dried mature seeds of *Phaseolus vulgaris* L
- b) well-filled, clean, wholesome, uniform in size, colour and shape;
- c) free from abnormal flavours, musty, sour or undesirable odour, obnoxious smell and discolouration; and
- d) free from genetically modified materials
- e) free from moulds, live pests, toxic or noxious weed seeds, other edible grains including dry beans (*Phaseolus vulgaris* L.) and other injurious contaminants as determined from samples representative of the lot.

4.2 Specific requirements

4.2.1 Physiochemical requirements

Biofortified dry beans shall comply with the maximum physiochemical limits given in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Physiochemical requirements for Biofortified beans

S/N	Characteristic	Maximum limits			Test method (TZS 331/EAS 901)
		Grade 1	Grade 2	Grade 3	
i.	Foreign matter, % m/m	0.5	0.75	1	Clause 4
ii.	Other edible grains, % m/m	0.1	0.2	0.5	
iii.	Pest damaged grains, % m/m	1	2	3	
iv.	Contrasting varieties, % m/m	1.5	3	5	
v.	Broken/split, % m/m	1	2	3	
vi.	Shrivelled/diseased and	3	5	7	



	discoloured, % m/m				
vii.	Total defective grains, % m/m	3.5	6.3	9.1	
viii.	Filth, % m/m	0.1			
ix.	Moisture % m/m	14			Clause 5
NOTE 1 The parameter, total defective grains is not the sum total of the individual defects. It is limited to 70 % of the sum total of individual defects.					
NOTE 2 Discolouration is limited to at least 25 % change in colour on both sides of the grain.					

4.2.2 Bio fortification requirements

Bio fortified dry beans shall comply with given limits in Table 2 when tested in accordance with the test methods specified therein.

Table 2 — Requirements for Biofortified beans

S/N	Characteristic	Target limits (ppm)	Test Method
1	Iron	74 - 92	AOAC 944.02
2	Zinc	26 – 43	AOAC 2011.14

5 Contaminants

5.1 Pesticide residues

Biofortified dry beans shall comply with pesticide residue limits established by the Codex Alimentarius Commission for this commodity.

5.2 Other contaminants

Bio fortified dry beans shall comply with limits for heavy metals specified in CODEX STAN 193 established by the Codex Alimentarius Commission.

6 Hygiene

Biofortified dry beans shall be produced, prepared and handled in accordance with CAC/RCP 1-1969.

7 Weights and measures

Bio fortified dry beans shall be packaged in accordance with the weights and measures regulations of the destination country.



8 Sampling

Sampling shall be done in accordance with TZS 330/EAS 900.

9 Packaging

9.1 Bio fortified dry beans shall be packed in food grade packaging materials which will safeguard the hygienic, nutritional and organoleptic qualities of the products.

9.2 Each package shall be securely closed and sealed.

10 Labelling

10.1 Labelling of retail containers

In addition to the requirements in TZS 538/EAS38 each package shall be legibly and indelibly labelled with the following:

- a) product name as “Biofortified iron/zinc/iron and zinc dry beans”;
- b) colour and variety/common name;
- c) grade;
- d) name, address and physical location of the producer/ packer/importer;
- e) lot/batch/code number;
- f) net weight, in kilograms;
- g) the declaration “Food for Human Consumption”;
- h) storage instruction as “Store in a cool dry place away from any contaminants”;
- i) crop year;
- j) packing date;
- k) instructions on disposal of used package; and
- l) country of origin. declaration that biofortified beans are not genetically modified

10.2 Labelling of non-retail containers

Information in 9.1 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.



Certification mark (tbs mark of quality)

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