DEAS 1235: 2024

ICS 67.060

DRAFT EAST AFRICAN STANDARD

Iron bio fortified dry beans — Specification

EAST AFRICAN COMMUNITY

First Edition 2024

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Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

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

The committee responsible for this document is Technical Committee EASC/TC 018, *Nutrition and Foods for Special Dietary Uses.*

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

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

The main key features of bio fortified dry beans include:

a) Increased Nutrient Content: bio fortified dry beans 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 dry beans can help improve overall health, reduce the risk of anemia and other nutrient deficiencies, and enhance cognitive and physical development, particularly in children.

c) Conventional Breeding: this method involves selecting and cross-breeding bean varieties with naturally higher nutrient levels over several generations to achieve the desired nutrient content.

d) Genetic Modification: in some cases, genetic engineering techniques are used to introduce genes that boost nutrient levels.

The following are the benefits of bio fortified beans among others. They:

a) Address 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) May provide a cost-effective and culturally acceptable way to improve nutrition, as dry beans are already widely consumed in many regions.

Iron bio fortified dry beans — Specification

1 Scope

This Draft East African Standard specifies the requirements, sampling and test methods for iron bio-fortified dry beans (Phaseolus vulgaris 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 999.11, *Lead, Cadmium, Copper, Iron, and zinc in foods. Atomic absorption spectrophotometry after dry ashing*

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

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

EAS 901, *Cereals, pulses and their products — Test methods*

ISO 24333, *Cereals and cereal products — Sampling*

ISO 24557, *Pulses — Determination of moisture content — Air-oven method*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
iron bio-fortified dry beans
dry beans that have been produced through conventional breeding techniques or modern biotechnology to increase their iron content higher than that of regular beans

3.2
dry beans (dry common beans)
dry threshed field and garden beans of the species *Phaseolus vulgaris* L.

3.3
broken/split beans
beans whose cotyledons are separated or one or both of the cotyledons have been broken

3.4
germinated beans
beans which have sprouted

3.5
mouldy beans
beans with visible mycelial growth on their surface

3.6
immature/shrivelled beans
beans which are under-developed and wrinkled over their entire surface

3.7
rotten and diseased 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

3.8
discoloured beans
beans which are damaged, by heat, frost or water

3.9
defective/damaged beans
beans that have been broken, pest damaged, shrivelled, immature, rotten, mouldy, diseased, germinated, discoloured and heat damaged

3.10
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

3.11
clean
practically free from visible soil, dust, or other visible foreign matter

3.12
foreign matter
all organic and inorganic material other than beans, broken kernels and other grains

3.13
inorganic matter
stones, glass, pieces of soil and other mineral matter

3.14
organic matter
any animal or plant matter (seed coats, straws, weeds) other than beans, damaged beans, inorganic extraneous matter and harmful/toxic seeds

3.15
filth
impurities of animal origin including dead insects

3.16
pest damaged 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 beans of the designated variety

3.18
other edible grains
grains other than common bean (Phaseolus vulgaris), whole or broken such as maize, sorghum, wheat

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 i.e. Crotolaria (Crotalaria spp.), Corn cockle (Agrostemma githago L.), Castor bean (Ricinus communis L.), Jimson weed (Datura spp.)

3.20
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

Iron Bio-fortified dry beans shall be:

a) produced from one variety;

b) the dried mature grains of the species Phaseolus vulgaris L.;

c) well-filled, clean, wholesome, uniform in size, colour and shape;

d) free from substances which render them unfit for human consumption;

e) free from abnormal flavours, musty, sour or undesirable odour, obnoxious smell and discolouration; and

f) free from moulds, live pests, harmful/toxic or noxious weed seeds and other injurious contaminants as determined from samples representative of the lot.

4.2 Specific requirements

Bio-fortified dry beans shall comply with the requirements given in Table 1 when tested in accordance with test methods specified therein.

Table 1 — Specific requirements for Iron Bio-fortified dry beans

S/N	Characteristics	Maximum limit %, m/m			Test method
		Grade 1	Grade 2	Grade 3	
1.	Moisture content	14			ISO 24557
2.	Foreign matter	0.5	0.75	1	EAS 901
3.	Filth	0.1			

4.	Other edible grains	0.1	0.2	0.5	
5.	Pest damaged grains	1	2	3	
6.	Contrasting varieties	1.5	3	5	
7.	Broken/split	1	2	3	
8.	Shrivelled/diseased and discoloured	3	5	7	
9.	Total defective beans	3.5	6.3	9.1	

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.

4.3 Iron content requirements

Iron bio-fortified dry beans 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 iron bio-fortified dry beans

S/N	Class	Iron content limit, mg/kg	Test method
1.	Class I (C1)	**[≥ 90]**	AOAC 999.10
2.	Class II (C2)	**[≥ 80 to < 90]**	
3.	Class III (C3)	**[≥ 60 to < 80]**	

5 Hygiene

Iron Bio-fortified dry beans shall be produced, handled and stored in accordance with EAS 39

6 Contaminants

6.1 Pesticide residues

Iron Bio-fortified dry beans shall comply with maximum pesticide residue limits established by the Codex Alimentarius Commission.

6.2 Heavy metals

Iron Bio-fortified dry beans shall not exceed heavy metal limits given in Table 3 when tested in accordance with test methods specified therein.

Table 3 — Heavy metals limits in iron bio-fortified dry beans

S/N	Heavy metal	Maximum limit, mg/kg	Test method
1.	Lead	0.1	AOAC 999.11
2.	Cadmium	0.1	

7 Packaging

Iron Bio-fortified dry beans shall be packaged in food grade packaging materials that do not affect the quality of the product.

8 Labelling

8.1 General

In addition to the requirements in EAS 38 and EAS 803, each package shall be legibly and indelibly labelled with the following:

a) product name as “iron bio-fortified dry beans”

b) grade;

c) Micronutrient content eg. iron content;

d) class;

e) crop year;

f) packing date;

g) colour and variety/common name;

h) name and address of the producer/packer/distributor/ importer/exporter/vendor;

i) batch/lot number;

j) net content shall be declared in the metric system;

k) storage instructions;

l) instructions on disposal of used package;

m) country of origin; and

n) declaration “Food for Human Consumption”.

8.2 Labelling of non-retail containers

Information in 8.1 shall be given either on the container or in accompanying documents, except that the name of the product, class, grade, 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 Nutrition and health claims

The product may have claims on nutrition and health. Such claims when declared shall comply with EAS 804 and EAS 805.

10 Sampling

Sampling shall be done in accordance with the EAS 900.

Bibliography

[1] RS 350: 2023 *Iron bio-fortified dry beans — Specification (Second edition)*

