



DRAFT TANZANIA STANDARD

Breadfruit — Specification

DRAFT FOR STAKEHOLDERS' COMMENTS

TANZANIA BUREAU OF STANDARDS

0 Foreword

Breadfruit is a versatile food and can be cooked and eaten at all stages of maturity, although it is most commonly harvested and consumed when mature, but still firm and used as a starchy staple.

The relatively bland fruit can form the basis for an array of dishes and it takes on the flavour of other ingredients in the dish. Very small fruits 2-6 cm or larger in diameter, can be boiled and have a flavour similar to that of artichoke hearts. Mature and almost mature breadfruit can be boiled and substituted for potatoes in many recipes. Ripe fruits are very sweet and used to make pies, cakes and other desserts.

The dried fruit has been made into flour and substituted in part for wheat flour in bread making. The combination has been found more nutritious than wheat flour alone. Breadfruit flour is much richer than wheat flour in lysine and other essential amino acids.

This Tanzania Standard has been prepared to ensure safety and quality of breadfruit produced and/ or traded in the country.

This third edition cancels and replaces the second edition TZS 1788: 2016.

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

1 Scope

This Tanzania Standard specifies requirements and method of sampling and test for breadfruit (*Artocarpus altilis* of the family L. *Moraceae*,) to be supplied fresh to the consumer and for industrial processing.

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.

TZS 4, *Rounding off numerical values*

TZS 109, *Code of hygiene for food processing unit - General*

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

TZS 538, *Packaging and labeling of foods*

TZS 1002, *Fresh fruits and vegetables - Sampling*

TZS 1003, *Guide to the pre-packaging of fresh fruits and vegetables*

TZS 1743, *National standard for Good Agricultural Practices and Good Handling Practices for fresh fruits and vegetables*

3 Terms and definitions

For the purpose of this Tanzania Standard, the following terms and definitions shall apply:

3.1 similar varietal characteristic

breadfruit in any lot have the same general shape, colour, characteristic of skin and flesh

3.2 clean

free from adhering soil, latex, pest and foreign matter

3.3 firm

neither soft, nor shriveled

3.4 maturity

breadfruits are at a stage of development that is suitable for the market requirement

3.5 disease

any visible defect or combination of defects caused by micro organisms

3.6 well shaped

breadfruits shall have the shape characteristic of the variety

3.7 fairly well shaped

eighty five percent (85 %) or more of breadfruits shall not be flat sided or any way abnormal in shape

3.8 damage

any defect or combination of defects of physical or physiological causes which detracts from the edible or marketing quality such as scars or bruises

3.9 serious damage

any defect or combination of defect of physiological or physical (external or internal) causes such as cuts punctures and internal dehydration which could lead to the abnormally quick deterioration of the fruit and cause rejection

3.10 latex

milky sap residue from the fruit or any other part of the plant.

3.11 well trimmed

breadfruits' stem is intact with length not greater than 2.5 cm above the shoulder of the fruit

3.12 fairly well trimmed

eighty five percent (85 %) or more of breadfruits in any lot shall have stems intact with length not greater than 2.5 cm long above the shoulder of the fruit

3.13 similar maturity

there shall be no very distinct visual difference in maturity between breadfruits in the same box or lot

3.14 major defects

- **Insects** With evidence of live insects or insect infestation.
- **Diseases** With evidence of fungal or bacterial rots.
With evidence of physical deformations caused by virus
- **Physical / pest damage** With unhealed cuts, holes or splits from physical or pest damage.
- With large areas of brown discolouration (latex leakage).
- **Physiological disorders** With evidence of dry hard flesh or flesh lifting from shell (dehydration).
With angular skin segments and glossy green skin colour (excessive immaturity)
With strong odour (excessive maturity).
- **Temperature injury** With skin browning/blackening and areas of softened flesh (chilling injury).

3.15 Minor defects

- physical/ pest damage — With superficial bruising greater than 2 square cm.
- Skin marks / blemishes — With healed scars greater than 2 square cm.

4 Requirements

4.1 General Requirement

4.1.1 The breadfruits shall be produced as per TZS 1743 (see clause 2) and shall have been carefully picked and have reached an appropriate degree of development and ripeness account being taken of the characteristics of the variety, the time of picking and the area in which they are grown.

4.1.2 In all classes, subject to the special provisions for each class and the tolerances allowed, the breadfruit shall meet the following minimum requirements:

- a) intact; firm and of similar varietal characteristics;
- b) sound; produce shall not be affected by rotting or deterioration such as to make it unfit for consumption;
- c) clean; practically free of any visible foreign matter;
- d) practically free of pests and damage caused by pests;
- e);
- f) free of abnormal external moisture, excluding condensation following removal from cold storage;

- g) free of any foreign smell and/or taste;
- h) free of damage caused by low and/or high temperatures;
- i) free of signs of internal shriveling; and
- j) practically free of bruising and/or extensive healed-over cuts.

4.1.3 The development and condition of the breadfruits shall be such as to enable them to:

- a) withstand transport and handling pressure; and
- b) arrive in satisfactory condition at the place of destination.

4.1.4 Maturity criteria

The maturity of breadfruits is defined by the following parameters:

- Colour — Dark green to greenish yellow skin with light brown markings, cream to yellow flesh.
- General visual appearance — Smooth, pebbled skin composed of small rounded segments; skin often with brownish latex stains; short stem present with clean cut.
- Mature fruits show a dark green skin colour, a light browning and a lack of luster, the segments on the surface of the mature fruits are more rounded and smooth and they tend to be angular and ridged. Maturity is also indicated by the presence of latex stains on the surface of the fruit. Over-mature fruit are indicated by a slight yellowing of the skin, together with a yellowing of the stem. Breadfruits showing these characteristics should not be used for export.
- Shape — Generally round to oval, not badly misshapen
- Sensory — Firm fruit with moderately thin skin, flesh fairly soft, sweet and aromatic when fruit is fully ripe.

4.2 Specific requirements

4.2.1 Classes

Each class shall be graded according to its general appearance, quality and condition.

4.2.1.1 Extra Class

- The fruit is of similar varietal characteristics,
- similar maturity,
- not physiologically overripe,
- clean,
- well-trimmed,
- well formed
- free from soft bruises, decay, worm holes, growth cracks, cuts or other skin breaks, and
- damage caused by discoloration or scars, disease, insects, mechanical or other means.

4.2.1.2 Class I

- The fruit is of similar varietal characteristics,

- similar maturity,
- well-shaped,
- not physiologically overripe,
- fairly well trimmed,
- fairly clean and reasonably free from soft bruises, cuts and other skin damages, free from decay, worm holes and growth cracks.

4.2.1.3 Class II

The fruit is of similar varietal characteristics but not fit for inclusion in the extra class and class I,

4.2.2 Size requirements

Size is determined by the weight of the fruit as in the Table 1 below:

Table 1: Classification according to size

Size	Weight (g)
Large	> 2500
Medium	1500-2500
Small	< 1500

5 Tolerances

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated.

5.1 Quality tolerances

5.1.1 Extra Class

Not more than 5 % by number or weight of breadfruit shall fail to meet the specifications of this class but meet those of Class I. There shall be zero tolerance for damage at the dispatching stage.

5.1.2 Class I

Not more than 10 % by number or weight of breadfruit shall fail to meet the specifications of this class but meet those of Class II. Damage shall not exceed more than 2 % at the dispatching stage.

5.1.3 Class II

Not more than 10 % by number or weight of breadfruit shall fail to meet the minimum quality and class requirements.

5.2 Size tolerances

For all classes, ten percent (10 %) by number or weight of breadfruit corresponding to the size immediately below or above the size indicated on the package.

6 Contaminants

6.1 Heavy metals

Breadfruits shall comply with those maximum levels for heavy metals established by the CODEX Stan 193.

6.2 Pesticide residues

Breadfruits shall comply with those maximum residue limits established by the CODEX Pesticides Residues in Food Online Database.

7 Hygiene

It is recommended that the produce covered by the provisions of this Tanzania Standard shall be prepared and handled in accordance with the TZS 109 (see clause 2).

8 Sampling and test

Representative samples of the breadfruits shall be drawn as prescribed in TZS 1002 (see clause 2) and be tested in accordance with the methods described in this Tanzania Standard.

9 Packing, marking and labelling

9.1 Packing

9.1.1 Breadfruits shall be properly packed in such a way as to protect the produce. The materials used inside the package shall be, clean, and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

9.1.2 Breadfruit shall also be packed in containers in accordance with TZS 1003 and TZS 538 (see clause 2).

9.2 Description of containers

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the breadfruits. Packages must be free of all foreign matter and smell.

9.3 Marking and labelling

In addition to the requirements of the general Tanzania Standard TZS 538 (see clause 2); the following specific provisions apply for each package; legibly and indelibly marked.

- a) name, postal and physical address of the packer or dispatcher;
- b) name of the produce (breadfruit); including variety or commercial type if available;
- c) origin of the produce – name of the producing country, region and district or region where grown;
- d) commercial specification i.e. Class and variety, Number of fruit per container (count);

- e) net weight (kg);
- f) brand or trade mark, if any;
- g) identification code; and
- h) storage condition.

9.4 Standards Mark of Quality

Each container may also be marked with TBS Standards Mark of Quality.

NOTE — The TBS Standards Mark of Quality may be used by the manufacturers only under licence from TBS. Particulars of conditions under which the licences are granted may be obtained from TBS.

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