**DRAFT TANZANIA STANDARD**

# Baker's Yeast- Specification



**TANZANIA BUREAU OF STANDARDS**

**Baker's Yeast- Specification**

**0. Foreword**

Baker's yeast are strains of yeast, essential for regulating the fermentation and aromatic activity of fermented doughs. These yeasts play three major roles; (i) increasing the volume of dough by producing carbon dioxide via alcoholic fermentation of sugars present in the dough, (ii) bringing about change in the structure and texture of the dough because of the carbon dioxide bubbles, and (iii), adding flavor to baked product.

In preparation of this draft Tanzania standard assistance was drawn from India standard (IS 1320:2010) Specification for sucralose.

Development of this Tanzania standard was necessitated by the need to ensure the safety and quality of Baker's Yeast being produced and or marketed in Tanzania as well as for import and export markets.

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 Draft Tanzania Standard specifies the requirements and the methods of sampling and test for baker's yeast.

## 2 Normative references

The following referenced 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.

Codex Stan 192, General Standard for Food Additives

TZS 116, Labelling of food additives when sold as such — General requirements

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

CAC/GL 50, General guidelines on sampling

TZS 439, Wheat flour – Specification

TZS 538, Labelling of pre-packaged foods — General requirements

ISO 4832, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coliforms — Colony-count technique

ISO 6579, Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Salmonella spp.

ISO 6888, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species)

ISO 7251, Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive Escherichia coli — Most probable number technique

The Weights and Measures (Sales and Labelling of goods) Rules, 2007

## 3 Terms and definitions

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

### 3.1 baker’s yeast

cells of one or more strains of the yeast *Saccharomyces cerevisiae* that aid the fermentation and aromatic activity of fermented doughs.

### 3.2 dry baker’s yeast

baker’s yeast that consist of living but inactive cells of *Saccharomyces cerevisiae*

### 3.3 fresh baker’s yeast

Baker’s yeast that consist of living cells of *Saccharomyces cerevisiae*.

### 3.4 food grade material

a material, made of substances that are safe and suitable for their intended use and which will not impart any toxic substance or undesirable odor or flavor to the product.

**4. Types of baker's yeast**

Baker's yeast shall can be categorized in two types:

**4.1 Fresh baker's yeast**

Fresh Baker's Yeast shall be in three major forms;
(a) block or compressed this shall be in the form of a block.
(b) granulated this shall be in the form of small granules and
(c) liquid this shall be a liquid suspension of yeast cells in water with a cream-like consistency .

**4.2 Dry baker's yeast**

Dry Baker's Yeast shall be in two forms either active or instant.
(a) active dry yeast requires reactivation by rehydration using warm water between 38 °C – 45 °C prior to use.
(b) instant dry yeast does not require rehydration to facilitate reactivation.

**5 Requirements**

**5.1 General Requirements**

5.1.1 Fresh Baker's Yeast (FBY)

(a) Baker's yeast shall be manufactured, packaged and stored under hygienic conditions in certified premises. Its distribution shall be under hygienic conditions. Bacteriologically free air filters shall be used for filtering the air required to aerate the fermenters.

(b) Fresh Baker's Yeast shall consist of living cells of Saccharomyces cerevisiae. Fresh Baker's Yeast It shall be ivory in colour, with an odour typical of yeast and free of extraneous materials. It shall not be slimy or mouldy and shall not show any signs of deterioration or decomposition.

(c ) Fresh baker's yeast shall be in three major forms; block or compressed yeast, granulated yeast or liquid yeast.

**(i) Block or compressed baker's yeast**

This shall be in the form of a block. The texture or consistency shall be either high plasticity (kneadable, deformation possible without breakage) or friable/crumbly (blocks easily broken into small pieces). Edible starch may be added in a quantity not exceeding 7 % (m/m) on dry basis. Permissible edible binders and fillers may be added in accordance to Codex Stan 192.

**(ii) Granulated baker's yeast**

This shall be in the form of small granules conform to the general requirement of fresh baker's yeast as described in 5.1.1

**(iii) Liquid baker's yeast**

This shall be a liquid suspension of yeast cells in water with a cream -like viscosity and conform to the general requirement of fresh baker's yeast as described in 5.1.1

**5.1.2 Dry Baker's Yeast (DBY)**

(a) Dry baker's yeast shall consist of living but inactive cells of Saccharomyces cerevisiae. It shall be in the form of powder, small granules, pellets or flakes, dried to a low moisture content that stops the yeasts' metabolic activity. It shall be ivory in colour, with an odour characteristic of yeast and free from adulterants and other extraneous materials. It shall not be mouldy and shall not show any sign of deterioration or decomposition. Edible starch may be added in a quantity not exceeding 10 % (m/m) of the product.

(b) Dry baker's yeast shall be in two forms; either active dry yeast or instant dry yeast.

(i) Active dry yeast

This is yeast that requires reactivation by rehydration using warm water between 38 °C – 45 °C prior to use. It shall be of spheroid particles, 0.2 mm – 3 mm in diameter.

(ii) Instant dry yeast

This is yeast dried in a way that rehydration is not necessary to facilitate reactivation. It shall consist of porous cylindrical yeast particles with an approximate average diameter of 0.5 mm and length up to a few millimeters .

**5.2 Specific requirements**

Baker's yeast shall comply with the physicochemical characteristics given in Table 1 when tested in accordance with the methods specified therein.

Table 1 — Physicochemical requirements for baker's yeast

| S/N | Characteristic | Requirement | | Test method |
|---|---|---|---|---|
| | | FBY | DBY | |
| 1 | Moisture, % (m/m), max. | 73 | 8 | Annex A |
| 2 | Dispersibility in water | No yeast cell deposits | No yeast cell deposits | Annex B |
| 3 | Fermenting power (ml), min | 1000 | 350 | Annex C |
| 4 | Dough-raising capacity | To satisfy the test | To satisfy the test | Annex D |

**6.0 Hygiene**

Baker's yeast shall be manufactured and handled in accordance to EAS 39 and

**6.1 Microbial requirements**

Baker's yeast shall comply with the microbial limits given in Table 2 when tested in accordance with the methods specified therein.

**Table 2 — Microbial requirements for baker's yeast**

| S/N | Characteristic | Requirement | | Test method |
|---|---|---|---|---|
| | | FBY | DBY | |
| | Coliform count, cfu/g,max | 1000 | 50 | ISO 4832 |
| | Escherichia coli, MPN cfu/g, max | Absent | | ISO 16649 |
| | Salmonella cfu/per 25 g | Absent | | ISO 6579-1, ISO 6579-2 |
| | Staphylococcus aureus cfu/g, max. | Absent | | ISO 6888-1, ISO 6888-2, ISO 6888-3 |
| | Rope spore count, cfu/g, max | 10 | 100 | Annex E |

**6 Contaminants**

The products shall comply with the contaminant limits cited in Codexstan 193.

**7 Sampling**

Representative samples for the products shall be drawn in accordance with CAC/GL 50.

## 8 Packaging

### 8.1 Fresh Baker's Yeast

Compressed and granulated baker's yeast shall be packaged in clean waxed paper or any other suitable food grade wrapping material or non-toxic wrappers to preserve its freshness and to prevent undue deterioration during storage and distribution. Liquid baker's yeast shall be packed in containers suitable for liquid food stuffs.

### 8.2 Dry Baker's Yeast

Dry baker's yeast shall be packaged in clean, sound, air-tight food grade containers, preferably tin containers in such a manner as to prevent the absorption of moisture and to prevent undue deterioration during storage and distribution.

## 9 Marking and Labelling

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

a) Name and type of the product. For example, "Baker's Yeast, Granulated", "Instant Baker's Yeast", "Granulated Baker's Yeast",

b) Name and physical address of the manufacturer/distributor,

c) Date of manufacture

d) Best before date

e) Net weight of the product in metric units,

f) The list of additives in descending order by quantity when used,

g) Declaration 'Contains edible starch', when edible starch is added

h) Instructions for storage, and,

i) Instructions of use

**9.2.2** The language on the label shall be "Kiswahili" or Kiswahili and English. A second language may be used depending on the designated market.

**9.2.3** The packages of the buns may also be marked with the TBS certification mark.

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

## Annex A

(normative)

## Determination of moisture

### A1 Apparatus

- Dish - With a cover, made of glass or aluminium; about 25 mm in diameter
- Glass stirring - Approximately 60 mm long, with a flattened end.
- Dessicator
- Oven

### A-2 Reagent

- Ethyl alcohol or rectified spirit with a purity of 99.9%.

### A-3 Procedure

Weigh the dish with the cover and stirring rod. Transfer to this, about 10 g of dry yeast or 2.5 g of fresh yeast and weigh accurately to the nearest milligram.

Remove the cover of the dish and add 5 ml of alcohol. Mix thoroughly using the stirring rod and leave the stirring rod in the weighing dish. Dry at 105 ± 1 °C for 4 hours for fresh baker's yeast and 6 hours for dry baker's yeast. Cool the dish in a desiccator and weigh

### A-4 Calculation

$$\text{The moisture, percent by mass} = \frac{100 \times (M1 - M2)}{M_1 - M}$$

where,

$M$ = mass, in grams of the dish, its cover and the stirring rod;

$M1$ = mass, in grams of the dish, its cover and the stirring rod with the sample before drying, and,

$M2$ = mass, in grams of the dish, its cover and the stirring rod with the sample after drying.

**Annex B**

(normative)

**Test for dispersibility in water**

B-1

**B-1 Apparatus**

**Beaker 500mls and 50mls**

**Cylinder 100mls and 1000mls**

**Water bath, Thermometer**

**B-2 Reagent**

**Distilled water**

**B-1 Procedure**

Weigh 5 g of dry baker's yeast or 20 g of fresh baker's yeast into a 400 ml beaker and add 50 ml of distilled water at 40 °C. Leave the product undisturbed for 5 minutes and thereafter, stir for 2 minutes. Take into a one litre graduated cylinder, 900 ml of distilled water at 40 °C in the case of dry baker's yeast and at 30 °C for fresh baker's yeast. Pour the slurry from the beaker into the water in the graduated cylinder. Wash the beaker with 50 ml of distilled water, pour it into the cylinder and leave it undisturbed for 5 minutes. Check for any deposits at the bottom of the cylinder. If no deposits appear at the bottom of the cylinder, the material shall be considered to have passed the test.

Note – If starch was added to the yeast, it may form a sediment which may contain a few yeast cells.

## Annex C

(normative)

## Determination of fermenting power

### C-1.Apparatus

- Fermentometer

The assembly of the apparatus is illustrated in Fig. 1. It consists of a 250 ml flat-bottomed flask (A), whose mouth is fitted with a ground-glass joint having a glass delivery tube bent at right angle. It is connected to a three-way T-shaped stop-cock (B) which in turn is fitted on a 100 ml graduated tube (D) of the manometer. (E) is the manometer reservoir of 250 ml capacity. I is the iron stand. D and E are connected by a PVC tube F. G is a water bath.

- Barometer

- Thermometer

### C-2 Reagents

- Sugar phosphate mixture – Grind and mix thoroughly 400 g of sucrose, 25 g of diammonium hydrogen phosphate [(NH4)2 HPO4] and 25 g of dipotassium hydrogen phosphate (K2HPO4).

- Calcium sulphate solution – Dilute 30 g of saturated calcium sulphate solution (CaSO4 .2H20) with 70 g of distilled water.

- Manometer solution – Weigh 200 g of anhydrous calcium chloride and 10 g of cupric chloride and dissolve in distilled water. Add a little hydrochloric acid so that the final pH after making up the solution to 2 litres does not exceed 5·0.

**C-3 Procedure**

Mix 6.75 g of the sugar phosphate mixture with 75 ml of the calcium sulphate solution in the flask. Add to it, 3.67 g of fresh baker's yeast or 0.893 g of dry baker's yeast. Stir well to disperse the yeast. Keep the flask in the water-bath at 30 °C throughout the experiment. Bring the three-way T-shaped stop-cock of the manometer into a position which allows displacement of initial air (by the carbon dioxide evolved) to escape to the atmosphere without displacement of the manometer fluid. This displacement is allowed for the first 13 minutes after which the stop-cock position is altered to allow the carbon dioxide evolved to enter the manometer and bring about the displacement of the manometer fluid. Shake the contents of the flask every 10 minutes.

While taking the reading of the gas evolved, the level of the fluid in the manometer shall be adjusted by sliding the reservoir arm of the manometer and the volume of gas evolved at this pressure (which will now be equal to the atmospheric pressure) shall be recorded.

As soon as the reading is taken, the initial gas formed which has just been measured, is allowed to escape into the atmosphere by operating the three-way stop-cock and the stop-cock position is again adjusted to take the second reading. For fresh baker's yeast, readings should be taken every 10 minutes and for dry baker's yeast, readings shall be taken every 30 minutes. In both the cases, readings shall be taken for 3 hours,

The room temperature and the atmospheric pressure shall also be noted during the course of the experiment. The readings are recorded in a tabulated form (see Table 2) and the total volume of gas produced is calculated and corrected at 101 kPa pressure and 20 °C temperature by the formula given under C-4.

**Table 2 Recording Carbon dioxide evolved every 10/30 minutes**

| Time | Volume of CO2 evolved (ml) | Room temperature (°C) | Atmospheric pressure (mmHg) | Corrected volume (ml) |
|---|---|---|---|---|
| **08:00** | …….. | …….. | …….. | …….. |
| **08:10** | …….. | …….. | …….. | …….. |
| **08:20** | …….. | …….. | …….. | …….. |
| **08:30** | …….. | …….. | …….. | …….. |
| …….. | …….. | …….. | …….. | …….. |
| …….. | …….. | …….. | …….. | …….. |
| …….. | …….. | …….. | …….. | …….. |
| …….. | …….. | …….. | …….. | …….. |
| **11:00** | …….. | …….. | …….. | …….. |

**C-4. Calculations**

Fermenting power (corrected volume in ml) =

$$\frac{\textit{Observed volume} \times \textit{Observed average pressure} \times 293}{760 \times (273 + \textit{Average room tem perature})}$$

The mass of carbon dioxide evolved may be calculated from this corrected volume as

Mass of carbon dioxide evolved = $\frac{44 \times V}{22400}$ g, where $V$ is the corrected volume of carbon dioxide evolved.

## Annex D

(normative)

## Determination of dough raising capacity

### D-1. Materials

- Wheat flour conforming to TZS 439
- Sucrose
- D.2 Apparatus
- Beaker 500mls capacity
- Measuring Cylinder 100mls

### D·2. Procedure

Mix 4.0 g of fresh baker's yeast or 1.0 g of dry baker's yeast with 100 g of wheat flour. Add 1.0 to 1.5 g of sucrose and a suitable quantity of water (about 55 ml). Knead well. Press the resulting dough into a glass beaker. Note the level of the dough by means of a scale, from the bottom of the beaker. Keep it covered for one hour at 27 °C. At the end of this period, note the level again.

The product shall be deemed to have satisfied the test if the rise in level is at least 80 percent of the original for dry baker’s yeast and 110 percent for fresh baker’s yeast.

**Annex E**

(normative)

**Determination of bacterial rope spore count**

**F-1 Reagents**

- Sterilised peptone water - 0·1 percent.

- Tryptone glucose extract (TGE) Agar

  - Tryptone 5.0 g
  - Yeast extract 2.5 g
  - Sodium chloride 6.5 g
  - Final pH = 7.0 ± 0.1
  - Agar, bacteriological grade (see Note) 15.0 g
  - Distilled water 1 litre
  - Glucose (dextrose) 1.0 g

Note – Granulated or chopped shreds, practically free from thermophilic bacteria shall be used.

**F-2 Procedure**

Weigh 22 g of wheat flour in a suitable sanitised container and transfer to a conical flask containing 100 ml of sterile 0.1% peptone water and sterile sand or glass beads. Blend on a shaker for about two minutes. Dilute the blended mixture further; 1:10, 1:100, 1:1000, 1:10000, etc., by dilution technique, using sterile peptone water.

Prepare tryptone glucose extract (TGE) agar; 100 ml per 250 ml conical flask. Prepare one additional flask of medium to serve as sterility control. Sterilise at 121 °C for 15 minutes and then cool to 45 °C in a water-bath. Pipette volumes of the blended mixture into a series of TGE agar flasks while they are held in the water-bath; 10 ml into the first, 1 ml into the second and 1 ml of each dilution into the third, fourth and fifth TGE flask and so on. Gently agitate the flasks to disperse the blended mixture throughout the medium.

Transfer the flasks without delay to a water-bath adjusted to 65 °C to 90 °C and hold for 30 minutes with gentle shaking occasionally to assist heat distribution. After 30 minutes of heat treatment, cool the flasks to about 45 °C without allowing the agar to gelatinise. Pour 100 ml of the medium into each flask representing the product and sterility control into a set of 5 sterile petri dishes in approximately equal volumes of about 20 ml per plate. When agar has solidified, invert the plates and incubate at 35 °C for 48 hours.

Count the surface and sub-surface colonies. The sum of the colonies on the set of 5 plates poured from TGE agar, containing 10 ml of the blended mixture represents the number of aerobic and mesophilic spores per

gram of the product. Similarly, 1 ml of the blended and 1 ml of each dilution are equal to 0.01, 0.001, 0.0001 and 0.00001 of the number of spores per gram and shall be multiplied by the respective dilution factor.

Generally, the set of plates showing about 30–60 colonies per plate are to be chosen for the counting purposes.

**F-3. Precautions and Limitations**

The procedure permits enumeration of aerobic and mesophilic spores in food samples containing relatively higher number of spores by higher dilution of the samples prior to heat treatment.

Certain thermophilic strains may also be indicated in this method in which case a separate enumeration method for thermophiles may be adopted and their numbers subtracted from the spore count.

**Bibliography**

[1] COFALEC (2012): General characteristics of dry baker’s yeast

[2] COFALEC (2012): General characteristics of fresh baker’s yeast

[3] IS 1320 (1988) (Third Edition) – Specification for baker's yeast (Reaffirmed in 2010)