DRAFT EAST AFRICAN STANDARD

Baker’s yeast — Specification

EAST AFRICAN COMMUNITY
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East African Community
P.O. Box 1096,
Arusha
Tanzania
Tel: + 255 27 2162100
Fax: + 255 27 2162190
E-mail: eac@eachq.org
Web: www.eac-quality.net

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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 005, Food additives.

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

Strains of yeast, essential for regulating the fermentation and aromatic activity of fermented doughs are known as baker’s yeast. These yeasts play three major roles:

- increasing the volume of dough by producing carbon dioxide via alcoholic fermentation of sugars present in the dough;
- bringing about change in the structure and texture of the dough because of the carbon dioxide bubbles; and
- adding flavour to baked product.

In the EAC, different types of baker’s yeast are available, most of which are imported, for both commercial bakeries and home use.

This Draft Standard has been developed to ensure the safety and quality of baker’s yeast produced and/or traded in the EAC.
Baker’s yeast — Specification

1 Scope

This Draft East African Standard specifies requirements, sampling and test methods for baker’s yeast.

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.

CODEX STAN 107, General standard for the labelling of food additives when sold as such

CODEX STAN 192, General standard for food additives

CAC/GL 50, General guidelines on sampling

EAS 1, Wheat flour – Specification

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

ISO 6579-1, Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp.

ISO/TS 6579-2, 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

ISO 6888-1, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium

ISO 6888-2, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium

ISO 6888-3, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 3: Detection and MPN technique for low numbers

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

EAS 39, Hygiene in the food and drink manufacturing industry — Code of practice

ISO 15914, Animal feeding stuffs — Enzymatic determination of total starch content
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

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 Fresh Baker’s Yeast (FBY)
baker’s yeast consisting of living cells of *Saccharomyces cerevisiae*

3.3 Dry Baker’s Yeast (DBY)
baker’s yeast consisting of living but inactive cells of *Saccharomyces cerevisiae*

3.2 food grade material
material, made of substances that 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 Types of baker’s yeast

4.1 Baker’s yeast shall be categorised in two types:

a) Fresh Baker’s Yeast; and

b) Dry Baker’s Yeast.

4.2 Dry Baker’s Yeast may be in the following forms;

a) powder;

b) small granules; and

c) pellets or flakes.

4.3 Fresh Baker’s Yeast may be in three major forms:

a) block or compressed yeast;

b) granulated yeast; or

c) liquid yeast.

5 Requirements

5.1 General requirements

Baker’s yeast shall:

a) be ivory in colour;
b) have an odour typical of yeast;
c) be free of extraneous materials;
d) not be slimy or mouldy; and
e) not show any signs of deterioration or decomposition.

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>
<thead>
<tr>
<th>S/N</th>
<th>Characteristic</th>
<th>Requirement</th>
<th>Test method</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Moisture, % (m/m), max.</td>
<td>FBY 73</td>
<td>DBY 8</td>
</tr>
<tr>
<td>ii)</td>
<td>Edible starch, % (m/m), max.</td>
<td>FBY 7</td>
<td>DBY 10</td>
</tr>
<tr>
<td>iii)</td>
<td>Dispersibility in water</td>
<td>FBY No yeast cell deposits</td>
<td>DBY No yeast cell deposits</td>
</tr>
<tr>
<td>iv)</td>
<td>Fermenting power (ml), min.</td>
<td>FBY 1 000</td>
<td>DBY 350</td>
</tr>
<tr>
<td>v)</td>
<td>Dough-raising capacity</td>
<td>FBY To satisfy the test</td>
<td>DBY To satisfy the test</td>
</tr>
</tbody>
</table>

5.2.1 Fresh Baker’s Yeast (FBY)

5.2.1.1 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). Permissible edible binders and fillers may be added in accordance to Codex Stan 192.

5.2.1.2 Granulated (crumbled) baker’s yeast

This shall be in the form of small granules.

5.2.1.3 Liquid baker’s yeast

This shall be a liquid suspension of yeast cells in water with a cream-like viscosity.

5.2.2 Dry baker’s yeast may be in two forms:

a) active dry yeast-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; and

b) instant dry yeast-yeast dried in a way that rehydration is not necessary to facilitate reactivation. It shall consist of porous cylindrical yeast particles with an approximate diameter of 0.5 mm and length up to a few millimetres.

6 Hygiene

Bakers yeast shall be manufactured and handled in accordance with EAS 39.
6.1 Microbiological requirements

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

<table>
<thead>
<tr>
<th>S/N</th>
<th>Characteristic</th>
<th>Limits</th>
<th>Test method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FBY</td>
<td>DBY</td>
</tr>
<tr>
<td>i)</td>
<td>Coliform count, cfu/g, max.</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>ii)</td>
<td><em>Escherichia coli</em>, MPN/g</td>
<td></td>
<td>Absent</td>
</tr>
<tr>
<td>iii)</td>
<td><em>Salmonella</em> in 25 g</td>
<td></td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv)</td>
<td><em>Staphylococcus aureus</em> cfu/g, max.</td>
<td>10</td>
<td></td>
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<tr>
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<td></td>
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<tr>
<td>v)</td>
<td>Rope spore count, cfu/g, max.</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

7 Packaging

Baker’s yeast shall be securely packaged in containers made of food grade materials. The packages shall preserve the safety and quality of the product, prevent entry of light and preclude contamination from the external environment.

8 Weights and measures

The products shall comply with the Weights and Measures Regulations in the respective Partner States.

9 Labelling

In addition to the labelling requirements of CODEX STAN 107, 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 processor/packer/importer;

c) date of manufacture;

d) expiry date;

e) net weight of the product in metric units;

f) list of ingredients in descending order by quantity when used; and

g) declaration ‘Contains edible starch’, when edible starch is added.

11 Sampling

Representative samples for the products shall be drawn in accordance with CAC/GL 50.
Annex A
(normative)

Determination of moisture

A.1 Apparatus

A.1.1 Dish, with a cover, made of glass or aluminium, about 25 mm in diameter

A.1.2 Glass stirring, approximately 60 mm long, with a flattened end

A.2 Reagent

Ethyl alcohol or rectified spirit.

A.3 Procedure

Weigh the dish with the cover and stirring rod ($M_1$). Transfer to this, add about 10 g of dry yeast or 2.5 g of fresh yeast and weigh accurately to the nearest milligram ($M_1$).

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. Place the cover on the dish and dry at 105 °C ± 1 °C for 4 h for fresh baker’s yeast and 6 h for dry baker’s yeast. Cool the dish in a desiccator and weigh ($M_2$).

A.4 Calculation

The moisture content, expressed as percent by mass, shall be calculated as follows:

$$\frac{100 \times (M_1 - M_2)}{M_1 - M}$$

where

- $M$ is the mass, in grams, of the dish, its cover and the stirring rod;
- $M_1$ is the mass, in grams, of the dish, its cover and the stirring rod with the sample before drying, and,
- $M_2$ is the 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 Apparatus

B.1.1 Beaker 400mL
B.1.2 Measuring cylinder 100mL and 1000mL
B.1.3 Thermometer

B.2 Reagent/material

Distilled water

B.3 Procedure

B.3.1 Dry baker’s yeast

Weigh 5 g of dry baker’s yeast into a 400-mL beaker and add 50 mL of distilled water at 40 °C. Leave the product undisturbed for 5 min and thereafter, stir for 2 min. To a one-litre graduated cylinder, add 900 mL of distilled water at 40 °C. Pour the slurry in 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 min. 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.

B.3.2 Fresh baker’s yeast

Weigh 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 min and thereafter, stir for 2 min. To a one-litre graduated cylinder, add 900 mL of distilled water at 30 °C. Pour the slurry in 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 min. 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

C.1.1 Fermentometer. The assembly of the apparatus is illustrated in Figure 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 waterbath.

C.1.2 Barometer

C.1.3 Thermometer

C.2 Reagents

C.2.1 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).

C.2.2 Calcium sulphate solution. Dilute 30 g of saturated calcium sulphate solution (CaSO₄ .2H₂O) with 70 g of distilled water.

C.2.3 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 two 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 waterbath 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 min 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 min.

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 min. In both the cases, readings shall be taken for 3 h.

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 C.1) 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.
Figure 1 — Assembly of a fermentometer

Table C.1 — Recording carbon dioxide evolved every 10/30 min

<table>
<thead>
<tr>
<th>Time</th>
<th>Volume of CO₂ evolved ml</th>
<th>Room temperature °C</th>
<th>Atmospheric pressure mmHg</th>
<th>Corrected volume ml</th>
</tr>
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<tbody>
<tr>
<td>08:00</td>
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<td>08:10</td>
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<td>08:20</td>
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<td>11:00</td>
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</tbody>
</table>

C.4 Calculation

The fermenting power, expressed as corrected volume in millilitres, shall be expressed as follows:
Corrected volume = \frac{\text{Observed volume} \times \text{Observed average pressure} \times 293}{760 \times (273 + \text{Average room temperature})}

The mass of carbon dioxide evolved, expressed in grams, may be calculated from this corrected volume as follows:

\text{Mass of carbon dioxide evolved} = \frac{44 \times V}{22400}

where

\( V \) is the corrected volume of carbon dioxide evolved.
Annex D
(normative)

Determination of dough raising capacity

D.1 Apparatus

D.1.1 Beaker 500 mL

D.1.2 Measuring cylinder 100 mL

D.2 Reagents

D.2.1 Wheat flour conforming to EAS 1

D.2.2 Sucrose

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 % for fresh baker’s yeast.
Annex E
(normative)

Determination of bacterial rope spore count

E.1 Apparatus
Flask 100 mL
Conical flask 250 mL
Water bath
Pipette 1 mL and 10 mL
Petri dishes

E.2 Reagents
E.2.1 Sterilised peptone water, 0.1 %
E.2.2 Tryptone glucose extract (TGE) Agar composed of:
- Tryptone 5.0 g;
- Agar, bacteriological grade, 15.0 g. Granulated or chopped shreds, practically free from thermophilic bacteria shall be used;
- Yeast extract 2.5 g;
- Distilled water, one litre;
- Sodium chloride 6.5 g;
- Glucose (dextrose) 1.0 g; and
- Final pH of 7.0 ± 0.1.

E.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, 1:1 000, 1:10 000, 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 min and then cool to 45 °C in a waterbath. Pipette volumes of the blended mixture into a series of TGE agar flasks while they are held in the waterbath; 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 waterbath adjusted to 65 °C to 90 °C and hold for 30 min with gentle shaking occasionally to assist heat distribution. After 30 min 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 five 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 h.

Count the surface and sub-surface colonies. The sum of the colonies on the set of five 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, 0.000 1 and 0.000 01 of the number of spores per gram and shall be multiplied by the respective dilution factor.

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

E.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
