

**ETHIOPIAN
STANDARD**

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Baker's Yeast — Specification

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Foreword

This Ethiopian Standard has been prepared under the direction of Technical Committee for Starch and Derived Products (TC 24) and published by the Institute of Ethiopian Standards (IES). The standard has been developed to address observed needs and to support the local industry in order to make progress through uprisng competitiveness and maintain comparative market advantage both domestically and internationally.

Information has been gathered from various relevant resources in developing it.

Codex Stan 192, General standard for food additives

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

EPHI Data, Composition of Foods Commonly used in Ethiopia

Acknowledgement is made for the use of information from the above publication.

Baker's Yeast — Specification

1. Scope

This Ethiopian 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.

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

ES ISO 6637, Determination of mercury content - Flameless atomic absorption method

ES 2447, fruit and vegetable products -determination of tin content

ES ISO 16050, Foodstuffs – Determination of Aflatoxin B1, and the Total Content of Aflatoxins B1, B2, G1 and G2 in Cereals, Nuts and Derived Products — High- Performance Liquid Chromatographic method

ES 577, General Principles of Food Hygiene – Recommended Code of Practice

ES 929, Code of Practice – Food Hygiene Management

ES ISO 22002-1 ES ISO 22002-1, Prerequisite programmes on food safety — Part 1: Food manufacturing

ES ISO 4831, Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of coliforms — Most probable number technique

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

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

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

ES ISO 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

ES ISO 6888-1, Microbiology of the food chain — Horizontal method for the enumeration of coagulase-positive staphylococci (*Staphylococcus aureus* and other species) Part 1: Method using Baird-Parker agar medium

ES ISO 6888-2, Microbiology of the food chain — Horizontal method for the enumeration of coagulase-positive staphylococci (*Staphylococcus aureus* and other species) Part 2: Method using rabbit plasma fibrinogen agar medium.

ES ISO 6888-3, Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase-positive staphylococci (*Staphylococcus aureus* and other species)

CES 73, General Standard for Prepackaged Foods – Labelling

3. Terms and Definitions

For the purpose of this standard the terms and definitions in the following shall 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 dough's.

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*

3.4

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

Baker's yeast shall be categorized in two types:

4.1 Fresh Baker's Yeast

Fresh Baker's Yeast may be in three major forms:

4.1.1 block or compressed yeast;

4.1.2 granulated yeast; or

4.1.3 liquid yeast.

4.2 Dry Baker's Yeast

Dry Baker's Yeast may be in the following forms:

4.2.1 active dry yeast

4.2.2 instant dry yeast

5. Requirements

5.1 General Requirements

Baker's yeast shall:

5.1.1 be of characteristic color typical ivory or brown

5.1.2 Have an odour typical of yeast,

5.1.3 be free of extraneous materials,

5.1.4 not be slimy or mould, and

5.1.5 not show any signs of deterioration or decomposition

5.2 Specific Requirements

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/crumby (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:

5.2.2.1 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

5.2.2.2 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.

5.2.2.3 The product shall comply with the physico-chemical requirements specified in Table 1 below

Table 1 Physico-chemical Requirements for Baker's Yeast

Characteristic	Requirement		Test Methods
	FBY	DBY	
Moisture, % (m/m), Max.	73	8	Annex A
Edible starch, % (m/m), Max.	7	10	ES ISO 15914
Fermenting power (ml), Min.	1000	350	Annex B
Dough-raising capacity	Shall pass test	Shall pass test	Annex C

6. Contaminants

6.1 Metals Contaminants

The product shall comply with those maximum limits for heavy metal contaminants specified in Codex Stan. 193 and in particular listed in Table 2.

Table 2 Metal limits in baker's yeast

Characteristics	Maximum limit, mg/kg (ppm)	Test Methods
Lead	0.1	AOAC 999.10
Arsenic	0.2	AOAC 942.17
Mercury	0.1	ES ISO 6637
Cadmium	0.1	AOAC 999.10
Tin	250	ES 361

6.2 Pesticide residues

The product shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this or a related commodity.

6.3 Mycotoxins

The product shall comply with those maximum mycotoxin limits as established by the Codex Alimentarius Commission for food and feedstuffs. In particular total aflatoxins shall not exceed 10 µg/kg and 5µg/kg for aflatoxin B1 when tested in accordance with ES ISO 16050.

7. Hygiene

7.1 The product shall be produced, prepared, and handled in accordance with ES 577, ES 929, and ES ISO 22002-1.

7.2 The product shall be free from pathogenic microorganisms and shall comply with the microbiological limits indicated in Table 3 below.

Table 3 Microbiological limits for baker's yeast

Characteristic	Limits		Test Methods
	FBY	DBY	
Coliform count, cfu/g, Max.	50	100	ES ISO 4831 ES ISO 4832
<i>E. coli</i> , MPN/g	Absent		ES ISO 7251
<i>Salmonella</i> in 25g	Absent		ES ISO 6579-1 ES ISO 6579-2
<i>S. aureus</i> cfu/g, Max.	10		ES ISO 6888-1 ES ISO 6888-2 ES ISO 6888-3
Rope spore count, cfu/g, Max.	10	100	Annex D

8. Packaging and Labelling

8.1 Packaging

- 8.1.1 The product shall be packed with clean, sound material, free from insect and fungal infestation and the packing material shall be of food grade quality and shall be securely sealed,
- 8.1.2 prevent entry of light and preclude contamination from the external environment.
- 8.1.3 The product shall be packed in containers which will safeguard the hygienic, nutritional and organoleptic qualities of the products.
- 8.1.4 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They shall not impart any toxic substance or undesirable odour or flavor to the product.

8.2 Labelling

The labeling shall comply with the requirements of CES 73, and shall be legibly and indelibly marked with the following:

- a) name of the product. For example, **Fresh Baker's Yeast (FBY) such as Liquid baker's yeast) or dry baker's yeast (Instant Baker's Yeast)**
- b) name, address and physical location of the producer/packer/importer;
- c) list of ingredients (descending order);
- d) code or batch number;
- e) net weight in SI unit
- f) country of origin;
- g) manufacturing date(dd/mm/yyyy);
- h) storage recommendation;
- i) expiry date (dd/mm/yyyy); and
- j) declaration 'Contains edible starch', when edible starch is added.
- k) Any other information required by the purchaser

9. Sampling Method

Baker's Yeast shall be sampled in accordance with CAC/GL 50.

Annex A (Normative) Determination of moisture

Apparatus

Dish, with a cover, made of glass or aluminum, about 25 mm in diameter

Glass stirring, approximately 60 mm long, with a flattened end

Reagent

Ethyl alcohol or rectified spirit.

Procedure

- Weigh the dish with the cover and stirring rod (M).
- Transfer to this, add about 10 g of dry yeast or 2.5 g of fresh yeast and
- weigh accurately to the nearest milligram (M₁).
- 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 (M₂).

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 cells.

Annex B (Normative) Determination of fermenting power

Apparatus

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 water bath.

Barometer

Thermometer

Reagents

Sugar phosphate mixture. Grind and mix thoroughly 400 g of sucrose, 25 g of diammonium hydrogen phosphate $[(\text{NH}_4)_2\text{HPO}_4]$ and 25 g of dipotassium hydrogen phosphate (K_2HPO_4).

Calcium sulphate solution. Dilute 30 g of saturated calcium sulphate solution ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) 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 two litres does not exceed 5.0.

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 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.

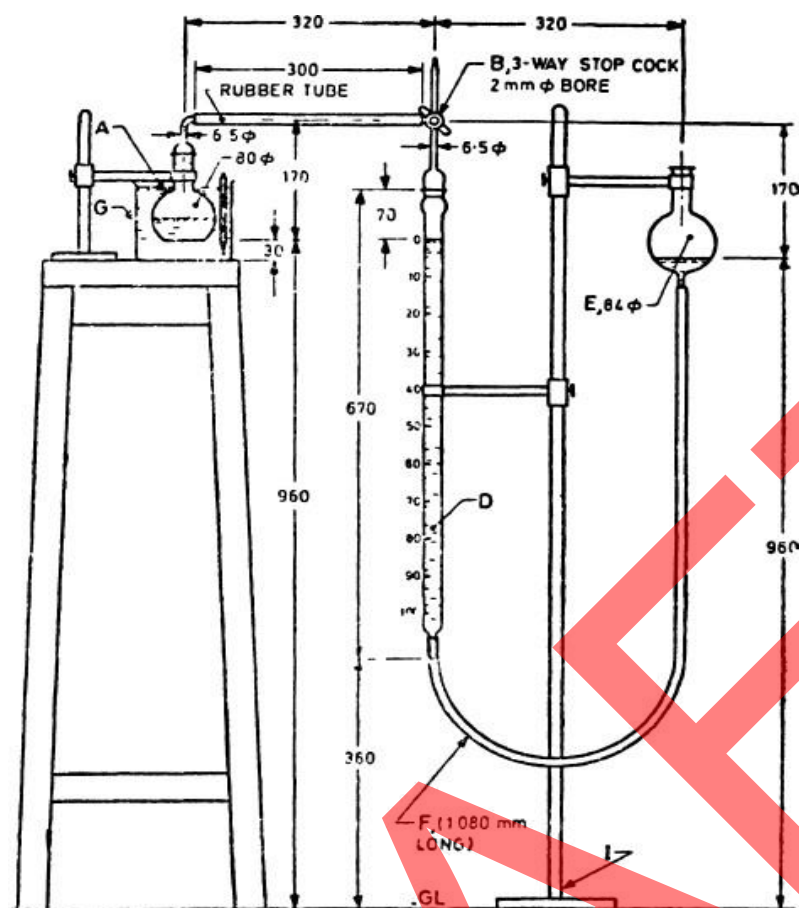


Figure1—Assembly of a fermentometer

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

Time	Volume of CO ₂ evolved ml	Room temperature °C	Atmospheric pressure mmHg	Corrected volume ml
08:00				
08:10				
08:20				
08:30				
.....				
.....				
.....				
11:00				

Calculation

The fermenting power, expressed as corrected volume in millilitres, shall be expressed as follows:

$$\text{Observed volume} \times \text{Observed average pressure} \times 293$$

Corrected volume =

$$\frac{\text{Observed volume} \times \text{Observed average pressure} \times 293}{760 \times (273 + \text{Average room temperature})}$$

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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.

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Annex C
(Normative)
Determination of dough raising capacity

C.1 Apparatus

Beaker 500mL

Measuring cylinder 100mL

C.2 Reagents

Wheat flour conforming to CES 309

Sucrose

C.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 D (Normative) Determination of bacterial rope spore count

D.1 Apparatus

Flask 100 mL

Conical flask 250mL

Water bath

Pippete 1mL and 10mL Petri dishes

D.2 Reagents

Sterilised peptone water, 0.1%

Tryptone glucose extract (TGE) Agar composed of:

- Tryptone 5.0g;
- Agar, bacteriological grade, 15.0 g. Granulated or chopped shreds, practically free from thermophilic bacteria shall be used;
- Yeast extract 2.5g;
- Distilled water, one litre;
- Sodium chloride 6.5g;
- Glucose (dextrose) 1.0g; and
- Final pH of 7.0 ± 0.1 .

D.3 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 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 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.

D.4 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.

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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)(Reaffirmed in 2010)—Specification for baker's yeast(Third Edition)
- [4] AOAC 942.17, Determination of Arsenic in foods - Molybdenum blue method
- [5] AOAC 999.10, Lead, Cadmium, Copper, Iron, and Zinc in foods, Atomic Absorption Spectrophotometry after dry ashing.

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Organization and Objectives

The Institute of Ethiopian Standards (IES) is the national standards body of Ethiopia. IES is re-named by the proclamation number 1263/2021, from Ethiopian Standards Agency (ESA) to Institute of Ethiopian standards, with the mandate given by the regulation Number, 193/2010 and proclamation number, 1263/2021.

IES's objectives are:

- ❖ Develop Ethiopian standards and establish a system that enable to check whether goods and service are in compliance with the required standards,
- ❖ Facilitate the country's technology transfer through the use of standards,
- ❖ Develop national standards for local products and services so as to make them competitive in the international market.
- ❖ Conduct standards related research and provide training and technical support.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational and research institutes, governmental organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.

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