GENERAL CHARACTERISTICS OF DRY BAKER'S YEAST

Updated in July 2022

These Cofalec's Baker's Yeast Characteristics established since 2006 in Europe have been registered and certified in **July 2022** by **DIN, the German Normation body as DIN Spec 91473**

This DIN specification "***Characteristics of Fresh and Dry Baker's Yeast"*** is available as free download under **www.beuth.de**

Foreword

This document serves to provide general characteristics for dry baker's yeast: active dry yeast and instant yeast.

It was established for the first time by COFALEC members a long time ago in 2006.

Although – or maybe just because – baker's yeast is a very long standing natural product, no real definition of dry baker's yeast exists at the moment. Also in the Codex Alimentarius a description of dry baker's yeast lacks. The yeast mentioned in the Food Chemical Codex[1] is inactivated yeast and the description is not relevant for dry baker's yeast.

In order to establish a description for dry baker's yeast, the technical committee of Cofalec prepared this document.

The document contains the following sections:

- Product characteristics
- Application characteristics
- Physico-chemical characteristics
- Microbiology
- Nutritional data

Within each section several parameters are mentioned with their typical value. The typical value is that value that is most prevelant but it should be realised that baker's yeast is a

[1] **Yeast, Dried – p. 508 - FCC Fifth Edition.**

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natural product and is adapted to local application characteristics and customs. For that reason some parameters have a rather large range indicated.
Where necessary a short description or explanation has been given to clarify the opinion of the Cofalec technical committee, especially on parameters that are requested but that are not very valuable in our eyes. For such parameters no typical values are given.

We trust this document will be of value to the bakery industry in giving a description of dry baker's yeast. Should you have any questions or remarks, do not hesitate to contact Cofalec.

Product characteristics

1. *Product definition*

Dry Baker's yeast consists of cells of *Saccharomyces cerevisiae*, a unicellular fungus, and is produced by multiplication of a pure strain of *Saccharomyces cerevisiae* cells. The cells are dried to a low water content to stop the metabolic activity.
The product is not to be confused with chemical leavening agent, which consists of sodium bicarbonate and a suitable food grade acid.
Although all baker's yeast is taxonomically designated as *Saccharomyces cerevisiae*, the different strains can have different characteristics.

2. *Description*

Dry baker's yeast is an internationally recognized term for baker's yeast formulations with a low (< 8 %) water content (relative to so-called fresh yeast). It is presented in two major product forms:

Active Dry Yeast
The particles are usually spherical and 0,2 – 3 mm in diameter. This yeast is rehydrated to reactivate it in lukewarm water at around 38 ° C (but not exceeding 45°C) before use. The colour is generally ivory and the smell is typical for yeast.

Instant Yeast
This yeast consists of porous cylindrical particles with a diameter of about 0,5 mm and length up to a few millimeters and is dried in such a way that a rehydration step in water is no longer necessary: the product can be added directly to the flour.
The colour is generally ivory and the smell is typical for instant yeast.

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3. *Product use*

Baker's Yeast is used in the baking industry in all fermented doughs. There is a large variation in the dough composition and process conditions throughout the world.

- Active dry yeast should first be rehydrated in lukewarm water at a temperature around 38 °C and then further be used as fresh yeast.
- Instant dry yeast is, depending on the activity and the recipe, typically added to the flour in 1/3 of the quantity of fresh yeast. However this can vary from 1/2 to 1/5 depending on the quality of local fresh yeast. Direct contact of the yeast with salt, fat or sugar is to be avoided to prevent excessive osmotic pressure and problems of dispersion during rehydration in the flour. Careful rehydration in the flour with water at ambient temperature is necessary.

Yeast cells produce gas (carbon dioxide) from the sugars present in the dough. The gas is captured in the dough that increases strongly in volume and thus gets its light texture. This light structure is fixed in the baking process.
In the Codex Alimentarius international food categorization system[2] the definition of bread clearly requires the presence and use of Baker's Yeast.

4. *Conservation*

Dry baker's yeast consists of particles of yeast cells that have been dried to a low water content, but they retain their ability to become active after careful rehydration, in water for Active Dry Yeast, directly in the dough for Instant Dry Yeast. Both are perishable products, although with a considerable longer lifespan than fresh baker's yeast when conserved in the correct conditions: it should be kept in the unopened original package at room temperature.
The package of Instant Dry Yeast is airtight sealed and either vacumised or under protected atmosphere and protects the yeast from moisture, oxygen and light. The package of Active Dry Yeast is similar (sealed, waterproof..) but not under vacuum or modified atmosphere. For both, the "best before" date is mentioned on the package.
Once opened, the yeast is best stored dry and refrigerated and used as quickly as possible. It is difficult to make general statements on how the activity of the yeast will evolve, as environmental conditions may be very variable.

5. *Weight of the package*

The indicated weight is a net weight at the time of packing. It should not change during conservation.

6. *Traceability*

The following information is indicated on the package or accompanying documents:

- Best before + date
- Batch number

[2] *Codex Alimentarius committee on food additives and contaminants*

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Application characteristics

7. Fermentation activity

Fermentation activity or leavening power is the most critical characteristic of yeast. It is checked on a regular basis in the normal quality control by all baker's yeast manufacturers. For quality control reasons this is done under carefully controlled, constant conditions, meaning:

1. Controlled rehydration conditions, e.g. time, temperature, method
2. Controlled dough or fermentation medium composition, e.g. sugar content
3. Controlled fermentation conditions, e.g. temperature

As yeast is applied in many different bread production processes, i.e. different dough compositions and leavening and baking conditions, it is impossible to check fermentation activity under all these conditions. For this reason fermentation activity is checked in one or more tests, having a good correlation with local application conditions. From country to country and one yeast producer to another, there are different tests to achieve a relationship as close as possible with the actual application.
Such fermentation tests can be done with a range of equipment, from proprietary, in-house developed equipment to equipment available on the market, e.g. from Burrows & Harrison or SJA.
Given the tuning of the fermentation tests to local conditions to optimally serve the local market, the comparison of fermentation test results from different manufacturers has to take the above mentioned differences into consideration.
When measuring fermentation activity of a dry yeast, one should take into account the higher dry matter of the product as compared to a fresh yeast.

Especially in the case of dry yeast, rehydration conditions are of great influence on the activity and as such temperature and rehydration method have to be standardised in order to obtain reproducible results.

Physico-chemical characteristics

8. Dry matter and density

Typical values

Type of product	Dry matter range (%)	Density
Active dry yeast	92 – 96	0.75 – 0.95
Instant yeast	93 – 97	0,55 – 0,80

9. Nitrogen / dry matter (%)

The nitrogen content on dry matter typically has a value of 7.5 % +/- 1.5%, and is determined using the Kjeldahl method.

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10. Ashes / dry matter (%)

The ash content on dry matter for yeast is typically 6% +/- 2%, using the determination method of desiccation and mineralization at 550-650°C.

11. pH

The typical pH of yeast after rehydration is normally around pH=6 +/- 2 pH units.

Microbiology

Being an ingredient used in the production of a major foodstuff, the microbiological quality of yeast is of prime importance. The drying process generally reduces the number of contaminating micro-organisms and once dried, the micro-organisms are unable to further develop in the closed original packaging. The levels of contamination of some micro-organisms may decrease over time.

In the baking industry, next to yeast also other ingredients sensitive to microbiological contamination are used.
Also the hygiene of the dough preparation process and especially the handling of the bread after the baking – e.g. during packaging and transport – is of high importance to the overall hygiene of the bread. Fortunately due to the baking process that kills most of the micro-organisms present in the dough including the yeast cells, and the relative low water content, bread is not extremely sensitive to microbiological spoilage.

The methods used should take into account that some of the contaminating micro-organisms may be damaged in the drying process and therefore a careful rehydration step is necessary in order to be able to detect these micro-organisms.

The following microbiological analyses are normally used in checking the microbiological quality of dry baker's yeast:

12. Total count

The total count is normally the total count achieved on a suitably rich medium agar plate. In the case of baker's yeast, the total plate count will include the yeast cell count, which will overwhelm all other counts. So unless special measures are taken to suppress the growth of the yeast cells, for dry baker's yeast this result is with little meaning.
Even when the growth of yeast cells is suppressed this cell count is not very informative because the vast majority of the cell count is usually due to lactic acid bacteria that are harmless. Checking the microbiological quality of dry baker's yeast is therefore better done with the tests indicated below.

13. Coliforms

The content is below 1000 CFU/g following the NF ISO / 4832 standard or an internal protocol compatible with this standard.

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14. E.coli

The content is less than 10 CFU/g following the SDP 07/1 - 07/93 standard or an internal compatible protocol.

15. Salmonella

Absence of Salmonella in a sample of 25g, following the NF ISO / FDIS 6579 standard or an internal protocol compatible with this standard.

16. Listeria monocytogenes

The content is less than 100 CFU/g following the NF V08-55 standard or an internal protocol compatible with this standard.

17. Staphyloccus aureus

The content is below 10 CFU/g following the NF ISO / 6888 standard or an internal protocol compatible with this standard.

Nutritional data

18. Fats / dry matter (%)

The typical fat content on dry matter is 6% +/-2%, and is determined with an extraction method with appropriate solvents.
In the case of instant dry yeast a food grade emulsifier (e.g. E491, E 472c,…) is used to protect the yeast during the drying process in order to maintain a good activity.

19. Carbohydrates / dry matter (%)

The typical carbohydrate content on dry matter is 20% +/- 9%. Carbohydrates in the sense of regulation 1169/2011 means any carbohydrate which is metabolised by humans, and includes polyols.

20. Fibre / dry matter (%)

The typical fibre content on dry matter is 28% +/-5%.

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21. Proteins / dry matter (%)

The typical Kjeldahl protein content on dry matter is: 46% +/- 10%, as determined with the Kjeldahl method.
See also the remarks made on the nitrogen content of yeast.

22. Minerals / dry matter (%)

The amount of minerals in yeast is highly dependent on the raw materials used in the preparation of the yeast. The variability in the levels of minerals in molasses thus explains the variability of minerals in yeast. Minerals are normally measured using Atomic Absorption Spectrometry (AAS).
Given that there are only few sources of zinc in food, yeast is a very valuable source of zinc for human consumption.

Component	**Typical content**
Potassium	0.6% - 2.5%
Sodium	< 0.5%
Calcium	0.02% - 0.15%
Magnesium	0.03% - 0.25%
Zinc	> 0.005% (> 50 ppm)
Iron	0.001% - 0.1%

23. Vitamins / dry matter (%)

Vitamins are determined by third party laboratories according to standard methods, often biological assays. Typical values for yeast are indicated in the table below.

Vitamin	**Typical content**	**Units**
B1 Thiamin	2 – 15	mg/100 g
B2 Riboflavin	2 – 8	mg/100 g
B6 Pyridoxin	0,5 – 6	mg/100 g
B8 Biotin	0.05 – 0.25	mg/100 g
B9 Folic acid	1 – 4	mg/100 g
PP Nicotinic acid	10 – 60	mg/100 g

In the case of Instant Dry Yeast, ascorbic acid is sometimes added as an anti-oxidising agent for dough conditioning at a level of 0.1 – 0.5 %.

24. Energy value (Kcal/100g dry matter)

A typical caloric energy value is 373 kcal/100g dry matter.

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Below the typical, indicative values for nutritional components are summarised in a table. For ranges of these typical values, see text above. For detailed provisions concerning nutrition labelling, we refer to the Regulation 1169/2011 on “Food Information to Consumers”. Yeast is exempted from the requirement of the mandatory nutrition declaration (Annex v).

Typical nutritional data as is

100 g of Dry yeast (95% dry Matter)	Typical value
Energy	355 kcal
fat of which - saturates - polyunsaturates	5,7g 0,9g 0,3g
carbohydrate of which - sugars - polyols - starch	19g 14g
fibre	27g
protein	43,5g
salt	0,3g
vitamins and minerals	

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