

BAKING UPDATE

Yeast Handling and Packaging

Practical technology from Lallemand Inc., parent of American Yeast Sales, producers and distributors of Eagle® yeast, fresh and instant.

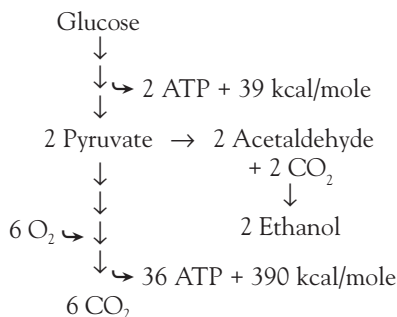



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How Oxygen Affects Yeast

Yeast consumes sugar (glucose) to produce compounds they need for growth and to generate energy for other reactions. The glucose molecule contains stored energy in the bonds between its six carbon atoms, which is released as it is broken down into smaller fragments by a series of enzyme-catalyzed reactions. Some of the stored energy is converted into chemical energy through the formation of adenosine triphosphate (ATP), and the rest is released as heat.

Yeast uses two metabolic pathways for consuming glucose. Both result in the formation of two molecules of pyruvic acid (three carbon atoms each) per molecule of glucose. Without sufficient oxygen, yeast ferments and converts each molecule of pyruvic acid to one ethanol and one carbon dioxide. In the presence of sufficient oxygen, yeast respire and breaks the two molecules of pyruvic acid down completely into six molecules of carbon dioxide.



The amount of available energy is greater with respiration than fermentation. Fermentation releases about 56 kcal/mole of glucose, of which about 30 percent is recovered as ATP and the rest is released as heat. Respiration releases about 680 kcal/mole of glucose, of which about 42 percent is recovered as ATP and the rest is released as heat. This tenfold greater heat release explains why oxygen has such a dramatic effect on the shelf life of fresh yeast. 

Yeast Handling in the Bakery

TIME, TEMPERATURE, and oxygen reduce fresh yeast performance. Bakers can get the most out of their yeast by following handling guidelines that take these factors into account.

YEAST STABILITY

Yeast is at its best immediately after it has been grown. The individual yeast cells are intact with an optimum content of protein and carbohydrate to provide the desired leavening, conditioning, and flavor. As yeast ages, it feeds off its carbohydrate reserves and becomes less active. Its own enzymes also start "autolysing" the yeast by breaking proteins down into amino acids and eventually rupturing the cells. The loss of protein reduces activity, the ruptured cells die, and the free amino acids promote bacterial contamination.

Time. With normal handling, cake, granular, and cream yeast have a shelf life of at least two weeks before a noticeable decline in their performance. Even with the best handling, a performance decline and mold growth are usually noticeable after four to six weeks. With improper handling, yeast may already show signs of age by the time it is delivered to the bakery.

Temperature. Elevated temperature accelerates ageing by speeding up yeast metabolism, which generates heat, which further speeds up metabolism. The warmer the yeast gets, the harder it is to cool down again and the greater the potential damage to its performance. For best results, yeast should be packed as cool as possible, chilled down as soon as possible, then stored at a consistent 32° to 40°F until it is used. Freezing doesn't affect performance but makes

the yeast mushy and dark.

Oxygen. Oxygen accelerates ageing by encouraging the type of yeast metabolism (respiration) that generates the most heat. This makes the combination of oxygen and elevated temperature especially undesirable. The problem is greatest with granular yeast in open bags, least with cream yeast in large tanks, and in-between for well-wrapped cake yeast. The problem with granular yeast can be reduced using properly sealed bags.

Other factors. Old baking and yeast references mention typical shelf lives of two weeks or more for yeast stored at 75°F or

higher. This may apply to the old European types of slow-acting cake yeast for lean, straight-dough applications, but it certainly does not apply to modern American types of fast-acting granular yeasts for sugar-containing sponge and dough applica-

tions. In general, sugar tolerance declines faster than lean dough performance, and initial gassing activity declines faster than final proof time.

YEAST HANDLING GUIDELINES

- Inspect yeast when received
- Avoid contamination
- Store at 32° to 40°F
- Use oldest yeast first
- Keep closed and cool until used
- Keep cream cool and clean
- Avoid ingredients that shock yeast

YEAST HANDLING GUIDELINES

Inspect yeast when received. Temperature, appearance, odor, and taste should be normal. There are few absolutes because temperature measurements vary depending on how they are taken, and the other items are subjective. Most American bakers prefer yeast with a light color and dry texture. Old or damaged yeast frequently appears dark and gummy, but even good yeast varies between suppliers and over time without affecting performance. Odor should be fresh and pleasant without musty or fruity smells

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Lallemand Products for the Baker

LALLEMAND Inc. is a privately held company producing yeast since 1923. The company owns and operates manufacturing facilities in North America and Europe that produce bakers yeast, wine yeasts, yeast extracts, specialty yeasts, and bacteria.

Lallemand is a leading producer of yeast and baking ingredients and supplies a full range of products to the baking industry through its subsidiaries Lallemand Distribution and American Yeast Sales.

YEAST

- Lallemand fresh yeast blocks and bags
- American fresh yeast blocks and bags
- Eagle® fresh yeast blocks and bags
- Bulk liquid cream yeast and installations
- Fermipan® instant yeast
- Instaferm® instant yeast

LALLEMAND DOUGH CONDITIONERS

Essential® Natural Dough Conditioners

- Essential® PBR potassium bromate replacers for conventional and frozen doughs
- Essential® LCR natural L-cysteine and sulfite replacer

Fermaid® Dough Conditioners

- Fermaid® potassium bromate replacers for conventional and frozen doughs
- Fermaid® Relax and Fermaid® P natural L-cysteine and sulfite replacers

Eagle® Dough Conditioners

- Eagle® CM potassium bromate replacer for continuous mix

OTHER BAKING PRODUCTS

Chemical Leaveners

- Single-acting and double-acting baking powder
- Bakers cream

Yeast Foods and Oxidizers

- Single-strength and double-strength yeast food
- Bromate-free yeast food
- Bromate, L-cysteine, ADA, and ascorbic acid

Preservatives

- Powdered, granular, and dust-free calcium propionate
- Sodium propionate
- Natural mold inhibitors
- Potassium sorbate and sorbic acid
- Vinegar and raisin juice

Emulsifiers

- Sodium stearyl-2-lactylate (SSL)
- Calcium stearyl-2-lactylate (CSL)
- Monoglycerides
- Mono- and diglycerides
- Ethoxylated mono- and diglycerides

Sugars and Syrups

- Granular and brown sugar
- Liquid and dry malt syrup
- Liquid and dry honey and molasses
- Corn syrup, bakers syrup, and ceralose

Shortening

- Butters, margarines, and shortenings
- Soy, cotton seed, canola, and olive oils

Dairy and Egg Products

- Whole, nonfat, dry, and buttermilk
- Whey and dairy blends
- Liquid, frozen, and dry eggs, yolks and whites


Spices, Nuts, Fruits, and Flavors

- Sesame seeds, poppy seeds, salt, spices
- Nut meats, slices, pieces, flakes, pastes
- Raisins, dates, prunes, processed fruits
- Chocolates, cocoa powders, jimmies
- Inactive yeasts, yeast extracts, flavors

Specialty Flours and Grains

- Vital wheat gluten
- Soy and potato flour
- Graham and corn meal
- Rolled, steelcut, and quick oats

Miscellaneous Products

- Guar gum
- Caramel colors
- Lubricants, trough grease, oven and depanning oils 

Yeast Handling In the Bakery

(Continued)

that can indicate spoilage. Taste should be mild and slightly sour, except if defoam oil has been added, which can be bitter.


Avoid contamination. Do not use yeast if there are signs of damage or tampering. Keep foreign material off the yeast packages, and reseal holes after taking temperature readings.

Store at 32° to 40°F. Measure both yeast and cooler temperature. Yeast can be cooled to 31°F without freezing, but coolers are usually set to 34°–37°F.

Use oldest yeast first. Use the producer's date code to rotate stock. If the producer does not provide an open date code, use the date received.

Keep closed and cool until used. Leave the bags, boxes, or cakes sealed and in the cooler until right before use. Remove only the amount needed, and reseal the package to protect the remainder.

Keep cream cool and clean. Keep cream yeast below 40°F, use within two weeks, and follow the system manufacturer's cleaning procedures. Keep slurred yeast below 50°F, use gentle agitation once the yeast has been suspended, and clean frequently.

Avoid ingredients that shock yeast. Yeast should not come into direct contact with concentrated salt, vinegar, calcium propionate, or other chemical or natural preservatives. 

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BAKING UPDATE

Lallemand Baking Update is produced by Lallemand Inc. to provide bakers with a source of practical technology for solving problems. If you would like to be on our mailing list to receive future copies, or if you have questions or comments, please contact us at:

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