



Technical Paper

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UNDERSTANDING YEASTS IN THE BAKERY

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What are Yeasts?

Yeasts (classified as fungi in botanical terms) are broadly classified as either 'true yeasts' or 'wild yeasts'. The true yeasts are capable of forming spores contained within an Ascus (Ascospores), while the so-called wild yeasts mostly do not have this capability. In the bakery, the most readily recognised yeast is referred to as 'baker's yeast'. This is one of the strains of *saccharomyces cerevisiae* (meaning 'sugar-loving' yeast) which occur in nature but has been cultured to ensure its purity and functionality. Modern yeasts used by bakers are purchased for their ability to generate carbon dioxide gas within bread and other fermented doughs in a consistent manner. A wide range of yeast species, some true and some wild, are familiar to bakers because they are associated with the generation of carbon dioxide gas in the manufacture of sourdough products. Care must be taken not to assume that all yeasts present in a sourdough are of the type defined as 'wild' simply because baker's yeast has not been used in the recipe. The yeasts in the mother or starter doughs in sourdough production may not have the same consistent carbon dioxide producing qualities as baker's yeast.

There are about 500 known yeast species. Both true and wild yeasts occur in nature and are most commonly associated with sweet, soft fruits and in the sugar containing juices of many plants. The yeasts are present in soil, most commonly finding their way there from falling fruits. In spells of dry weather, yeast spores may be carried by the wind or insects from the soil back onto growing plants. The availability of water plays a key role in their activity. Unlike moulds which favour low light for successful growth, yeasts can survive and be active in range of lighting levels.

Yeasts are a group of single-cell microorganisms which are characterised by their ability to reproduce by a number of different methods. The reproduction process for yeasts that is best known to bakers is by the process of 'budding'. In this reproductive process under appropriate conditions, a small bulge develops on the side of the 'mother' cell, and this gradually enlarges to form a new cell (sometimes referred to as a 'daughter' cell) with identical properties to the mother cell. In suitable conditions, reproduction is rapid, and chains of yeast cell may form.

The shape and size of yeast cell varies, not only between species but also, to some extent, between individual cells within the same species. This natural variation can lead to the availability of different strains of yeast within the same species and is important to bread bakers using *saccharomyces cerevisiae* as these differences may be used to create different gassing profiles during fermentation (see below). The different strains also allow the selection of *saccharomyces cerevisiae* to cope with freezing and thawing conditions, and the presence of preservatives (see below).

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The general structure of yeast cells is illustrated below based on baker's yeast. The cell comprises:

- A carbohydrate-based double-cell wall with an internal membrane which holds a suite of different enzymes.
- A nucleus which holds the basic genetic information for the cell and is capable of being sub-divided during reproduction.
- Bulk cell contents referred to as the cytoplasm including cavities (vacuoles) containing glycogen and volutin.
- The mitochondria which generate the chemical energy needed to power the biochemical reactions in the cell.
- Lipid (fat) globules which may form under certain conditions.

