

Fermentation of dough by Baker's yeast

- Yeasts are:
 - 1- Eukaryotic unicellular microorganisms.
 - 2- Classified as members of the fungus kingdom.
 - 3- Most yeasts reproduce asexually by budding, A few yeasts reproduce by fission, the parent cell dividing into two equal cells.
 - 4- Most yeasts have many forms from spherical to egg-shaped.
 - 5- It's found worldwide in soils and on plant surfaces and is especially abundant in sugary fruits. The fermentation of dough is often initiated by naturally occurring yeasts present in the air
 - 6- They are the largest of the bacteria, yeast species either require oxygen for aerobic cellular respiration or are anaerobic.
 - 7- Commercial yeasts have many proteins such as enzymes and is a rich source of vitamins B1, B2, niacin, and folic acid.

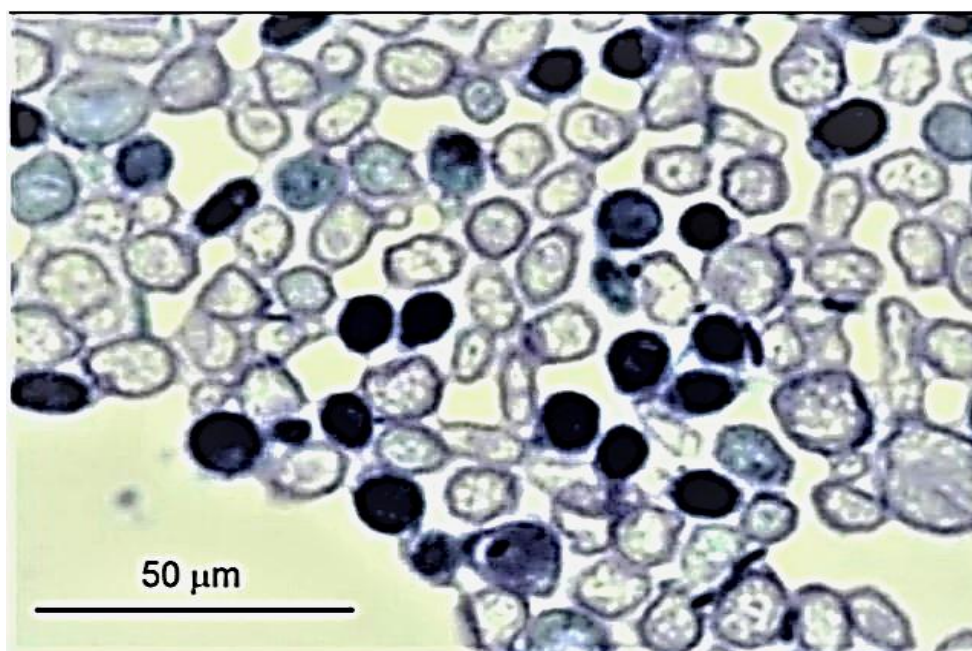
The strains of *Saccharomyces cerevisiae* were selected carefully to be used in the production of bread, beer, Alcohol, and wine, depending on:

- 1) Its available and cheap.
- 2) Its capacity to produce abundant gas.
- 3) Its viability during storage .
- 4) Its ability to produce desirable flavor .



* **Fermentograph** : a special device is used to measure the strength of the fermentation occurring in dough, Where the yeast, flour and water are placed then this device begins draw a line graph of the increase in size of the dough.

Yeast viability & Methylene blue: The methylene blue staining is used to measure yeast viability; the living yeast cells will be colorless → because the stain which break down by enzymes that existing in cells; while the non - viable cells do not produce these enzymes → So the stain enters the cells. This is an easy, quick & cheap method.



Measure of Yeasts Vitality Procedure:

The stain will be penetrating into dead cells, whereas the living cells don't.

Procedure:

1. Prepare suspension by 1 gm of yeast to 10 ml of water and mix well.
2. Mix equal volume of yeast sample & methylene blue solution on a microscope slide by using a wire loop cover with cover slip.
3. Examine by microscope → count the colored & no colored cells in 3 microscopic fields then calculate the rate and use the law formula for the equation:

$$\text{The proportion of living cells \%} = \frac{\text{The number of living cells}}{\text{The total number of cells (living + dead)}}$$

Types of Yeasts: must be rehydrated in warm water & sugar before use.



Cream yeast
(solids content 15%-20%)



Compressed (or cake, or crumbled) yeast
(solids content 30%-40%)



Dried yeast
(solids content 94%-96%)

***Measurement of yeast activity for dough fermentation:**

- 1- Mix 50 gm of flour + 1 gm yeast (dry) or 10 ml (liquid) + 20 ml water to make dough .
- 2- Insert the dough in a 100 ml graduated cylinder or baker smeared with oil to prevent its adherence with glass wall .
- 3- Press it to the bottom & measure the volume, incubate at warm condition.
- 4- Record the volume every 10-mint for an hour.
- 5- Write the values in a table

Time (min)	Volume of the dough
0	
10	
20	
30	
40	

6- Calculte the % of volume increasing= $(\text{final volume} / \text{initial volume}) \times 100$.

*Compare different kinds of yeasts by this test.