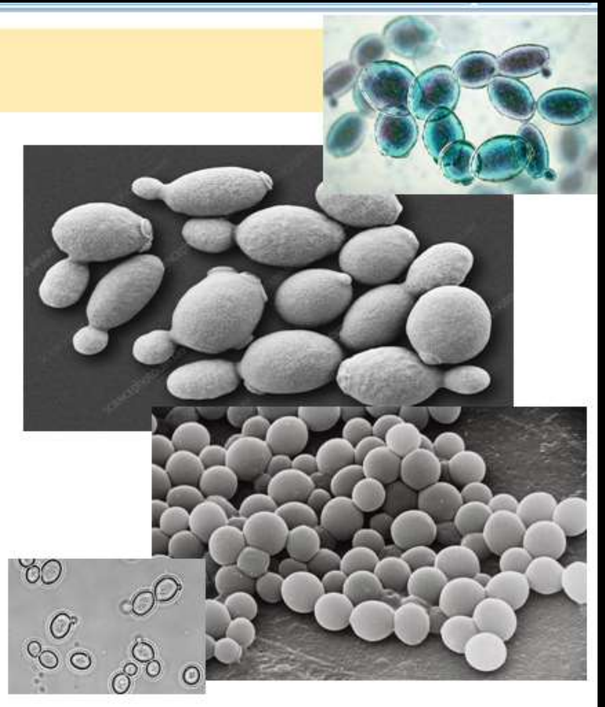
ISOLATION OF YEASTS

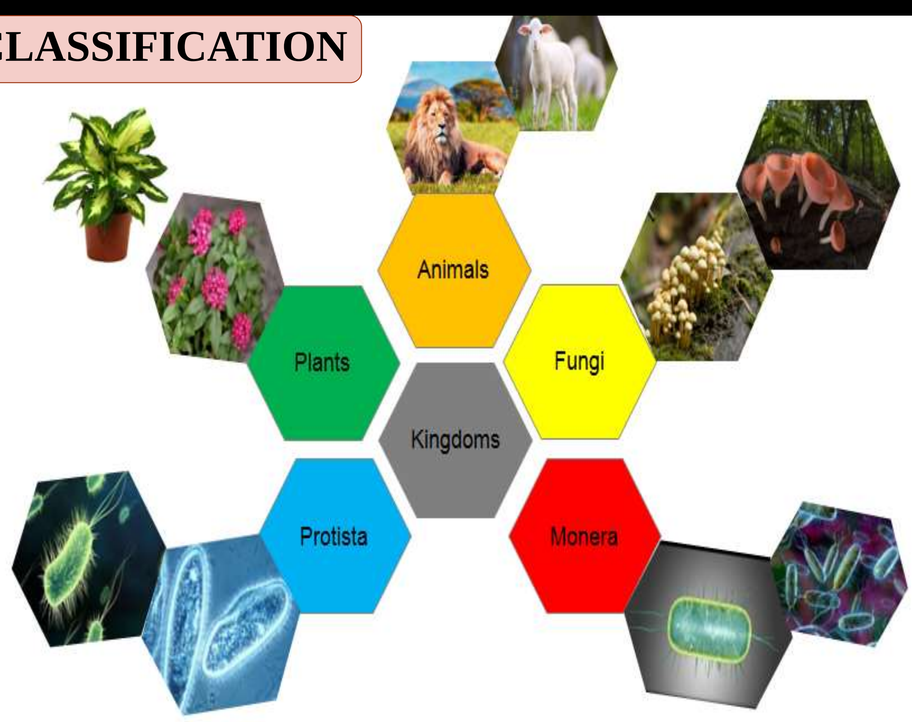
RAVISHANAKAR, DEEPTHI HEBBALE AND Dr. T.V.RAMACHANDRA

INTRODUCTION

- Yeasts are eukaryotic, single-celled microorganisms classified as members of the ***fungus*** kingdom.
- The first yeast originated hundreds of millions of years ago, and at least 1,500 species are currently recognized.
- Yeast sizes vary greatly, depending on species and environment, typically measuring 3–4 µm in diameter, although some yeasts can grow to 40 µm in size.
- One of the most well-known is ordinary brewer's yeast (*Saccharomyces cerevisiae*), also known as baker's yeast.
- Yeasts, such as *Candida albicans* (better known as candida) also are present in our bodies. Candida is not normally harmful, but can cause infections.



CLASSIFICATION



Difference between yeast and fungi

- **Fungi and yeast are two closely-related organisms, which belong to the kingdom Fungi.**
- **The main difference between yeast and fungi is that yeast is a unicellular, rounded-shape organism whereas fungi is a multicellular organism with filamentous hyphae.**

YEAST	VERSUS	FUNGI
Yeast is a microscopic fungus, which comprises a single, oval-shaped cell, reproducing through budding		Fungi is a unicellular or multicellular, spore-producing organisms, feeding on organic matter
Very common in the environment		Found in damp, dark or steam-filled areas
Oval in shape, and is colorless and smooth		Have a fuzzy appearance, and colors can be green, orange, black, brown, purple, and pink
Converts carbohydrates to alcohol during fermentation		Secrete hydrolytic enzymes to external food sources and absorb nutrients through the cell wal
Reproduces through budding		Reproduce through either sexual or asexual spores
Used in baking industry and in the production of ethanol		Used in the production of cheese and antibiotics
Causes vaginal infection in humans		Cause diseases like ringworm and athlete's foot
Belongs to the phylum Ascomycota and Basidiomycota		Consist of six phyla: Chytridiomycota, Zygomycota, Ascomycota, Basidiomycota, and Glomeromycota
Ex: *Saccharomyces cerevisiae* (baking yeast)		Ex: *Mucor*, *Penicillium*, *Rhizopus*, and *Aspergillus*

Habitats of yeast

- **Yeast are widely dispersed in nature with a wide variety of habitats. They are commonly found on plant leaves, flowers, fruits as well as in soil.**

- **Yeast are also found on the surface of the skin and in the intestinal tracts of warm-blooded animals, where they may live symbiotically or as parasites .The growth of yeast is affected by pH, temperature, and nutrient level.**

Uses of Yeast (Good-industrial and Bad- pathogenic)

- Bread, Alcoholic Beverages, Food

- Infection in human by yeast, example *Candida albicans*

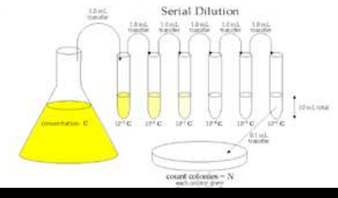
Isolation of yeast

- **Sources:** yeasts are very common in the environment, and are often isolated from sugar-rich materials. Examples include naturally occurring yeasts on the skins of fruits and berries (such as grapes, apples, or peaches) and exudates from plants (such as plant saps or cacti).
- **Media used**: Reagent Quantity (1 lit of distilled water)

Reagent	Quantity (1 lit of distilled water)
Yeast extract	10 g
Peptone	20 g
Dextrose	20 g
Agar (for plates)	20 g

Autoclave the media for 40 to 45min at 121°C.

Plate the media and incubate it for 24 hrs in incubator at 35°C to grow the yeast



Examples of Fermentation

- **Fermentation refers to the metabolic process by which organic molecules (normally glucose) are converted into acids, gases, or alcohol in the absence of oxygen.**
- **There are a number of products from fermentation, the most common are ethanol, lactic acid, carbon dioxide, and hydrogen gas (H_2).**
- **These products are used commercially in foods, vitamins, pharmaceuticals, or as industrial chemicals.**

sauerkraut

Cell cycle of Yeast

- Once yeast cells commits to cell division, they initiate budding (the processes by which a tiny daughter cell starts appearing and growing on the top of a mother cell, hence the name "budding yeast").
- The daughter cell (bud) stays connected with the mother cell till the end of cell cycle.
- Yeast cells duplicate their microtubule, organizing center named 'spindle pole body ' (SPB) and replicate their chromosomes.
- Duplicated chromosomes get attached to the microtubules at their kinetochores in a bipolar manner (metaphase) and are pulled apart towards the mother and the daughter compartments so that each cell gets one copy of each chromosome (anaphase).
- At the end of mitosis, the two cells get physically separated (cytokinesis) by contraction of the actomyosin ring at the bud neck.