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**Paper : Mycology**

**Q1:Explain the structure of fungi and define function of organelle present in fungi ?**

**Ans :Structure of fungi:**

1. Fungi exist in two fundamental forms; the filamentous (hyphal) and single celled budding forms (yeast). But, for the classification sake they are studied as moulds, yeasts, yeast like and dimorphic fungi.
2. All fungi have typical eukaryotic morphology. They have rigid cell wall composed of chitin, which may be layered with mannans, glucans and other polysaccharides in association with polypeptides. Some lower fungi possess cellulose in their cell wall. Some fungi such as Cryptococcus and yeast form of Histoplasma capsulatum possess polysaccharide capsules that help them to evade phagocytosis.
3. Inner to the cell wall is the plasma membrane that is a typical bi-layered membrane in addition to the presence of sterols. Fungal membranes possess ergosterol in contrast to cholesterol found in mammalian cells. The cytoplasm consists of various organelles such as mitochondria, golgi apparatus, ribosomes, endoplasmic reticulum, lysosomes, microtubules and a membrane enclosed nucleus.
4. A unique property of nuclear membrane is that it persists throughout the metaphase of mitosis unlike in plant and animal cells where it dissolves and re-forms. The nucleus possesses paired chromosomes.

**Moulds:**

* The thallus of mould is made of hyphae, which are cylindrical tube like structures that elongates by growth at tips. A mass of hyphae is known as mycelium. It is the hypha that is responsible for the filamentous nature of mould . The hyphae may be branched or unbranched. They may be sep aseptate. Hyphae usually have cross walls that divide them into numerous cells. These cross walls, called septa have small pores through which cytoplasm is continuous throughout the hyphae. Therefore all hyphal fungi tend to be coenocytic (multinucleate).
* With exception of zygomycetes (Rhizopus), all moulds are septate. Non-septate hyphae are considered to be more primitive because if a hyphal strand is damaged the entire strand dies. When a septate hyphal strand is damaged, the pores between adjacent compartments can be plugged, thus preventing death of the whole hyphal strand.

**Mycelium are of three kinds:**

1. Vegetative mycelium are those that penetrates the surface of the medium and absorbs nutrients.

2. Fertile mycelium are aerial hyphae that bear reproductive structures such as conidia

3. Aerial mycelium are those that grow above the agar surface .

. Hyphae may have some specialised structure or appearance that aid in iden

**Reproductivespores**

The **organelles** are living structures, each with a specific **function**. The inclusions are dead, have no specific **function** and thus are not essential to cell survival. Amongst the cell **organelles** are included the endoplasmic reticulum, mitochondria, ribosome, Golgi apparatus and vacuoles.

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**Q3:Explain some factor that can effect the growth of fungi ?**

**Ans : Environmental conditions for fungal growth:**

Fungi are profoundly affected by physical and physicochemical factors, such as **temperature,** aeration**, pH, water potential, and light**. These factors not only affect the growth rate of fungi but also can act as triggers in developmental pathways.

• **Temperature** and fungal growth • **pH** and fungal growth • **Oxygen** and fungal growth • **Water** availability and fungal growth • Effects of **light o**n fungal growth

**Temperature and fungal growth:**

 Microorganisms are often grouped into four broad categories in terms of their temperature ranges for growth:

* **Psychrophilic fungi** are defined as having optimum growth at no more than 16°C and maximum growth of about 20°C.
* **Psychrotrophic fungi** would be those that can grow at low temperatures but also above 20°C.
* **Thermophilic fungi** are defined as having a minimum growth temperature of 20°C or above, a maximum growth temperature of 50°C or above, and an optimum in the range of about 40–5o.

**Oxygen and fungal growth :**

Most fungi are strict aerobes, in the sense that they require oxygen in at least some stages of their life cycle.

**Water availability and fungal growth**

All fungi need the physical presence of water for uptake of nutrients through the wall and cell membrane, and often for the release of extracellular enzymes.

**Light**

Light in the near-ultraviolet (NUV) and visible parts of the spectrum (from about 380 to 720 nm) has relatively little effect on vegetative growth of fungi, although it can stimulate pigmentation. In particular, blue light induces the production of carotenoid pigments in hyphae and spores of several fungi.

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**Q4:How will you classify fungi into different groups ?**

**Ans : Classification of fungi:**

Fungi were initially classified with plants and were a subject of interest for botanists; hence the influence of botany can be seen on their classification.

In 1969 R.H Whittaker classified all living organisms into five kingdoms namely Monera, Protista, Fungi, Plantae and Animalia.

Traditionally the classification proceeds in this fashion: Kingdom - Subkingdom - Phyla/phylum - Subphyla - Class - Order - Family - Genus- Species. This classification is too complicated to be dealt here. There are alternate and more practical approaches, one based on sexual reproduction and the other based on morphology of the thallus (vegetative structure).

Based on Sexual reproduction:

* **Zygomycetes:** which produce through production of zygospores.
* **Ascomycetes:** which produce endogenous spores called ascospores in cells called asci.
* **Basidiomycetes:** which produce exogenous spores called basidiospores in cells called basidia.
* **Deuteromycetes :** fungi that are not known to produce any sexual spores (basidiospores). This is a heterogeneous group of fungi where no sexual reproduction has yet been demonstrated.

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**Q5:Write down name of some harmful fungi ,name of disease caused and also names of useful and edile fungi ?**

**Ans :Name of harmfull fnngi for animal and humans:**

1. Aspergillosis :caused by Aspergillus spp. Aspergillus most common in human pathogen .
2. Blastomycosis : caused by blastomyces dermatitidis and blastomyces gilchristii.
3. Candidiasis :casued by Candida spp. A major casued by morbidity and mortility.
4. Dermatophyosis ; Caused by dermatophytosis but many other species contribute.
5. Sporotrichosis :Chronic disease caused by dimorphic fungus of the genes

**USEFUL AND EDIALE FUNGI :**

* **MASHROOM:** Bear's Head Tooth.
* Birch Polypore.
* Brown Birch Bolete.
* Chaga.
* Chanterelles.
* Chicken of the Woods.

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**Q2: What are Autotrophs and Heterotrophs? Are fungi Autotrophs? If yes ,Explain how .**

**Ans :** An **autotroph** or primary producer is an organism that produces complex organic compounds using carbon from simple substances such as carbon dioxide, generally using energy from light or inorganic chemical reactions.
A **heterotroph** is an organism that cannot produce its own food, instead taking nutrition from other sources of organic carbon, mainly plant or animal matter. In the food chain, heterotrophs are primary, secondary and tertiary consumers, but not producer.

Fungi are not autotrophs because , All fungi are heterotrophic feeders. Specifically, they are categorized as chemoheterotrophs (also called organotrophs). Fungi do not have chlorophyll to make food using photosynthesis like plants nor can they make food solely from the simple molecules around them like autotrophic organisms do. As heterotrophs, fungi need the complex organic materials found in the soil to make their food and to provide the energy needed to make it.

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