Principles of living fungi

Living mode of fungi :

In nature fungi obtain their food either by infecting living organisms as parasites or by attacking dead organic matter as saprobes, many also form symbiotic relationships with higher plants as in mycorrhiza (Ectotrophic in **glomeromycetes fungi** and Endotrophic) and with blue-green algae as in Lichens, example: **foliose lichen**. Fungi that live on dead matter and incapable of infecting living organisms are called (obligate saprobes example ***Mucor***); those capable of causing disease or of living on dead organic matter (facultative parasites (or) facultative saprobes: leaf curl fungi example ***Taphrina deformans***); and those that can't live except on living protoplasm, (obligate parasites such as **downy and powdery mildews**). A living organism infected by the parasite is known as the host.

Cultivation of fungi :

Fungi which we can be cultivated them on nutrient media are (saprobes and facultative parasites), and those fungi cultivate on different culture media such as

1. Natural media: They are planting extract such as wheat extract, potato extract, carrot and others vegetable extract, also we can use fruit to prepare this kind of media.

2. Synthetic media: The main compositions of this medium are certain chemicals and some salts such as Czapek`s Dox Medium .

3. Semi-synthetic media: they are mixed of two kinds of media (natural and synthetic) such as Potato Dextrose Media. These three

types of culture media are liquid so we can be solidified them by adding **(1.5 – 2.0 %)** agar.

Optimum conditions suitable for fungal growth :

1. Temperature: Fungi are living in the wide range of temperature and according to it, fungi classified in to :

A. Mesophilic fungi: The range is (10–40ºC) and the optimum is (25 – 35ºC)**.**

B. **Psychrophilic fungi**: The range is (5–25ºC) and the optimum is (15ºC) **C**. **Thermophilic fungi**: The range is (20 – 50ºC) and the optimum is (40ºC).

2. Light: In some species, the pigment melanin may play a role in extracting energy from ionizing radiation, such as gamma radiation. This form of "radiotrophic" growth has been described for only a few species, the effects on growth rates are small, and the underlying biophysical and biochemical processes are not well known.

3-Aeration: All fungi prefer living in aerobic condition.

4- Hydrogen Ion concentration: pH: (acidic).

5. Humidity:

A) Some fungi are water mold.

B) Some fungi need some water for growth.

C) Some fungi are capable of growth in near-dry condition.

What are the important elements for fungal growth?

1. Carbon sources: (carbohydrates) such as monosugar (glucose and fructose) or di sugar such as sucrose and maltose and multi-sugar such as starch.

2. Nitrogen sources:

A. Organic source: such as Amino acids and peptone.

B. Inorganic source: such as nitrate and ammonia. The salts are added according to fungi requirements. **A. Macro elements**: which add in large quantities such as Na, Mg, k, Zn. **B. Microelements**: which add in trace quantities such as Sc, Mn.