

Mustansiriyah University

College of Sciences

Biology Department

Nanotechnology

Suhad Abbas Abid

MSc. Nano-Biotechnology

Lab. 4: Synthesis of nanoparticles by fungi

Synthesis of nanomaterials using fungi is one method of bottom-up strategy where a major reaction based on reduction or oxidation of the substrate causes an increase of colloidal structures.

- Fungi are a favorable option for NPs synthesis since fungi are filamentous by nature and able to withstand the pressure of flow and mixing in the bioreactor trough. By contrast, the bacterial fermentation process involves numerous additional steps to obtain a clear filtrate of colloidal broth. In addition, fungi can accumulate metals by biological and physicochemical means.

- Fungi are an excellent choice for large-scale production as biocatalysts because of their ability to secrete extracellular enzymes. Due to their properties of high production of specific enzymes; metabolites, rapid growth, easy handling and low cost for large scale production.

- Biological synthesis of nanoparticles by fungi can be by **reducing enzyme** (Intracellular or Extracellular) and the procedure of biomimetic mineralization.

2. Biological synthesis of selenium nanoparticles by Fungi

Materials:

Twenty four hours *Candida albicans* culture, sterile Sabouraud dextrose broth (SDB) medium, distilled water, sodium selenite **Na₂SeO₃**.

Methods:

1. Fungal suspension prepared by growing a single colony at 35 °C for 24 to 48 hrs in Sabouraud dextrose broth.
2. After incubation, the medium will contain reducing organic proteins and enzymes (resulting from the growth and metabolism of fungal agents).
3. Add 1 ml of sodium selenite 1mM solution to candida medium.
4. Incubated at 28 °C for 24 h (away from light and movement).

Results:

Reduced Se salt and the production of NPs became macroscopically visible as the colour of the environment was changed from yellow to orange.