

Benha university

Date: 13/1/2016

Faculty of science

Time: 2 hours

Botany department

diploma of applied microbiology students

Microbial transformations

Answer the questions :

1) a- Submerged cultivation :

- 1- shaker is the most common apparatus used
- 2- rate of growth for the organism is twice rate of growth on surface culture .
- 3- Media are homogenous , agitation and the same environmental conditions .

b- Physiological aspects for inoculation process :

- 1- Faster growth occurs by using condensed inoculums
- 2- using young spores not old for inoculation
- 3- Transfer to medium similar to the stock
- 4- for quick growth pregermination of spores should be done
- 5- for fungi that don't form spores , associated mycelium can be used .

c- legume inoculant :

The seeds of legumes , such as alfalfa , peas , clover are inoculated with strains of rhizobium bacteria at the time of planting of the seed . these bacteria develop root nodules on leguminous plant . the bacteria fixing gaseous nitrogen from air into forms usable by plant . to insure good nodule formation a mixture of strains of rhizobium is incorporated into inoculant .

d- Gibberellins : are plant hormones promote growth by both cell enlargement and cell division . application of small amount of gibberellins make lengthening of stems and internodes , acceleration of seed germination , breaking of dormancy and hastening of flower formation gibberellins are produced by the fungus gibberella fujikuroi . it has been realized that green plants contain small amount of gibberellin like compounds .

E- pectinases : are utilized to eliminate pectin and pectin like protective colloids in fruit of the juices during the concentration steps of processing commercial microbial pectinase production utilized species of penicillium or aspergillus pectinas , in part is retained in the cells and in past is excreted to the medium the enzyme is recovered from both sources .

2)a- Biodegradation : is the degradation of industrial materials such as , paints , rocks , paper , wood , textiles

B- Bioremediation : use of microorganisms to remove pollutants from the environment e.g. microbial degradation of xenobiotics .

C- Bioleaching of material : Copper is present in mines as $CuSO_4$. copper metal can be obtained by using thiobacillus ferrooxidans .

D- Heterotrophs : Microorganisms need additional of other requirements e.g. vitamins or amino acids .

E- Biosensors : Microorganisms is used indicator to ensure the completion of the process .