

### **Biological control of plant disease**

#### **1) Answer the questions**

- a) Biological system, Avirulent, nonpathogenic disease, chemical sources.
- b) Resistance activity
- c) Growth , viability
- d) Hydrolyze , degradation
- e) Coiling process
- f) Mycoparasitism
- g) Synergism
- h) Its metabolites ( filtrate )
- i) Antibiotics

#### **2) a) Direct method: through antagonism by:**

1- Coiling process and 2- biocontrol products that may be toxins or antibiotics

- 1- Coiling process : in which the hyphae of biocontrol agent surrounds the hyphae of the pathogen , hence there is competition on nutrients lead to killing the pathogen
- 2- Toxins and hydrolytic enzymes : That produced by biocontrol agent such chitinase that and glycan in the cell wall of the pathogen lead to killing the pathogen
- 3- Antibiotics : such as *Bacillus subtilis* produce antimicrobial agents against *Rhizoctonia solani*

#### **b) Methods of inoculation:**

- 1) Spore suspension on high mass production through painting process.
- 2) Inoculation of sclerotium of the fungus to give high mass production.
- 3) Inoculation of metabolite (filtrate of biocontrol agent).

#### **C) The culture or the media may be:**

- 1) Open field: for development of the resistance
- 2) Green house
- 3) Environmental controlled or regulated chamber that used in experimental researches

#### **d) Synergism phenomena:**

\_First induction using biological agent that may be non pathogen isolated through induction of resistant genes of the host

Second induction by the target pathogen that stimulate the host resistance , where as first and second inductions are called ( double induction phenomena ) i-e are synergisted in host resistance.