**Paper- Skill Enhancement**

**Unit 1: Biofertilizer**

**Cyanobacteria: Isolation, characterization, mass multiplication, Role in rice cultivation, Crop response, field application.**

Role of blue green algae (*e.g. Aulosira, Anabaena, Cylindrospermum, Nostoc*). In water logging conditions the cyanobacteria multiply, fix atmospheric N2 and release it into the surroundings in the form of amino acids, proteins and other growth promoting substances.

**Isolation of Cyanobacteria (Blue-Green Algae, BGA)**

1. The cyanobacteria are isolated on **Fogg’s medium.**
2. About 5 g soil from top layer of paddy field is collected, powdered and transferred into flask containing **Fogg’s medium, pH 7.0.**
3. After proper agitation, flask is incubated at room temperature under the influence of 12 hours of light (1,500 lux) and dark regime.
4. A loopful culture is transferred to 10 ml sterile distilled water, which is then serially diluted. A drop of water from each dilution is inoculated into **Fogg’s medium** in Petri plates.
5. Plates are incubated for further growth of algae.

**Mass multiplication of Cyanbacteria Biofertilizer**

The following four methods are used for mass cultivation-

1. Cemented tank method.
2. Shallow metal troughs method
3. Polythene lined pit method and
4. Field method.

The polythene lined pit method is most suitable for small and marginal farmers to prepared algal biofertilizer. In this method, small pits are prepared in field and lined with thick polythene sheets.

**Mass cultivation of cyanobacteria is done by using any of the four methods under the following steps:**

a). Prepare the cemented tanks, shallow trays of iron sheets or polythene lined pits in an open area. Width of tanks or pits should not be more than 1.5m. this will facilitate proper handling of culture.

b). transfer 2-3 kg soil and add 100 g of superphosphate. Water the pit to about 10cm height. Add 2ml of insecticide e.g malathion to protect the culture from mosquitoes. Mix well and allow to settle down soil particle.

c) when water become clear, sprinkle 100 g of starter inoculum on the surface of water.

d) when temperature remains between 35-40°C during summer, optimum growth of cyanobacteria is achieved. Always maintain the water level to about 10cm during this period.

e). after drying the algal mat will get separated from the soil and forms flakes. During summer about 1kg pure algal mat per m2 area is produced. These are collected, powdered, kept in sealed polythene bags and supplied to the farmers.

f). the algal flakes can be used as starter inoculums if the same process is repeated.

Moreover, the cyanobacteria inoculants can be stored for more than 3 years without any loss in viability.

**Field application of BGA Inoculants-**

For one hectare of rice field, 10 Kg of BGA inoculant is applied. However, after 10 days of transplantation Flakes is dispersed which grows luxuriantly in water.

**Crop response –**

It has been found that BGA inoculant incrases crop yield by 34% and save nitrogen fertilizer by 30%