



BIOFERTILIZERS

What is bio fertilizers?

- Is a **large population of a specific** or a group of **beneficial microorganisms** for **enhancing** the productivity of soil.
- Either by **fixing atmospheric nitrogen** or by **solubilizing soil phosphorus** or by stimulating plant growth through synthesis of growth promoting substance.
- Bio fertilizers based on **renewable energy source** are cost effective, eco friendly and can help to economize on the high investment needed for chemical fertilizer

Benefits from using bio fertilizers

- Increase crop yield by 20-30%.
- Replace chemical nitrogen and phosphorus by 25%.
- Stimulate plant growth.
- Activate the soil biologically.
- Restore natural soil fertility.
- Provide protection against drought and some soil borne diseases.

The advantages of bio-fertilizers

1. Cost effective.
2. Supplements to fertilizers.
3. Eco-friendly (Friendly with nature).
4. Reduces the costs towards fertilizers use, especially regarding nitrogen and phosphorus.

Types of Biofertilizer

1) For nitrogen

- **Rhizobium** for legumes crops
- **Azotobacter**/ Azospirillum for non legume crops
- **Acetobacter** for sugarcane only.
- **Blue –Green Algae** (BGA) and Azolla for low land paddy.

2) For phosphorus

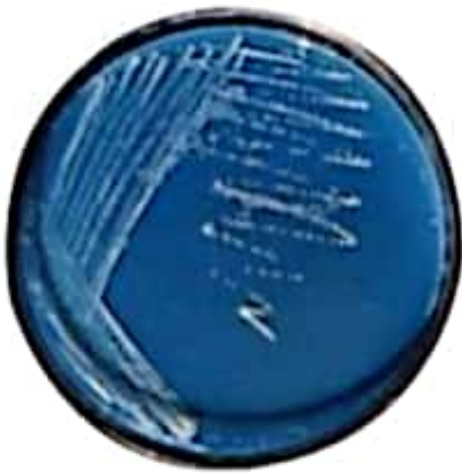
- Phosphate solubilizing Bacteria (PSB) for all crops to be applied with **Rhizobium**, **Azotobacter**, Azospirillum and Acetobacter

3) For enriched compost

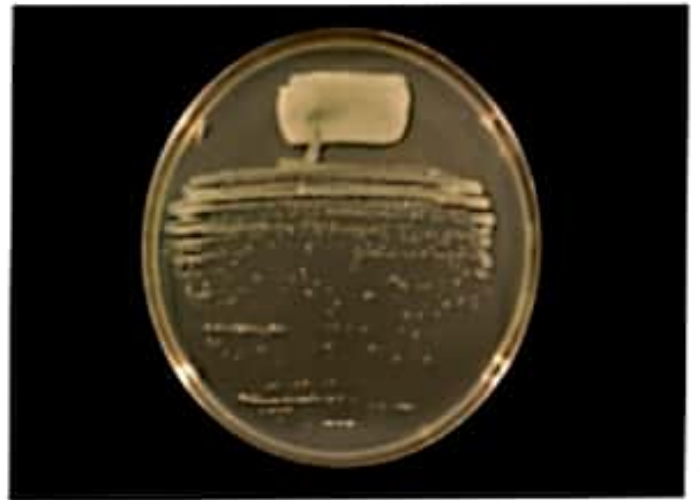
- Phosphate solubilizing Bacteria (PSB) and **Azatobacter** culture
- Cellulolytic fungal culture

- **Phospo**: it release insoluble phosphorus in soil and fix this phosphorus in clay minerals which is of great significance in agriculture.
- **Rhizo**: bacterial plays a very important role in agriculture by inducing nitrogen fixings nodules on the root of legumes such as peas and alfafa.
- **Azotobacter**: fixes the atmospheric nitrogen in the soil and make it available to the plants. It protects the root from other pathogens present in the soil.
- **Trichoderma**: it is a non pathogenic and eco-friendly product. The product is antagonistic hyper parasitic against different pathogens in the field and economically well established biocontrol agent.

Azospirillum



Rhizobium



Phosphobacteria

Phosphobacteria



Azotobacter



- **Composter:** composter breaks down any OM such as dead plants from yard waste, thereby increasing the soil productivity.
- **Tricho-Card:** Trichogramma is an efficient destroyer of eggs of many leaf and flower eaters, stems, fruit, shoot. It can be used in a variety of crops such as sugarcane, corn, vegetables, paddy and apple.
- **Vermi Compost:** it is 100% pure eco-friendly organic fertilizer. Has nitrogen phosphorus, potassium, organic carbon, sulphur, hormones, vitamins, enzymes and antibiotics which helps to improve the quality and quantity of yield.