



## Bio-Capsules for Plants

Recently, ICAR (Indian Council of Agricultural Research) scientists have developed the technology to pack bio-fertilizers in tiny capsules. This eliminates the need for farmers to carry the sacks of biofertilizers.

- It is being called the **one-gram capsule, which have many advantages:**
  - One-gram capsules are very efficient as it contains the microbial population equivalent to what is present in a one-kg pack of powder-based biofertilizer or a one-litre bottle.
  - Also, as these microbial strains are retained in the dormant stage, there is no issue of their viable loss in room temperatures as is the case with many liquid-based bio formulations.
- Currently, various forms of Plant Growth-Promoting Biofertilizers like rhizobacteria (PGPR) formulations are sold commercially. While some are powder-based formulations, others are liquid-based.
- Biofertilizers have become popular in the last few years with organic farming becoming increasingly popular.

### Biofertilizer

- It consists of a carrier medium rich in live microorganisms. When applied to seed, soil or living plants, it increases soil nutrients or makes them biologically available.
- Biofertilizers contain different types of fungi, root bacteria or other microorganisms. They form a mutually beneficial or symbiotic relationship with host plants as they grow in the soil.
- **Advantages of Biofertilizer**
  - Increase the nitrogen and phosphorus available to plants more naturally than other fertilizers.
  - They are simple to use, even for novice small growers.
  - They do not pollute the soil or the environment, whereas chemical fertilizers often result in too much phosphate and nitrogen in the soil.
  - They are a cheap, easy-to-use alternative to manufactured petrochemical products.
  - They restore normal fertility to the soil and make it biologically alive. They boost the amount of organic matter and improve soil texture and structure.
  - They increase yield by up to 30 per cent because of the nitrogen and phosphorus they add to the soil.
    - The improvement in soil texture and quality helps plants grow better during periods of drought.
    - Biofertilizers help plants develop stronger root systems and grow better.
    - Biofertilizers also reduce the effects of harmful organisms in the soil, such as fungi and nematodes. Plants resist stress better and live longer.
- **Disadvantages of Biofertilizer**
  - Biofertilizers require special care for long-term storage because they are alive. They must be used before their expiration date.
  - If other microorganisms contaminate the carrier medium or if growers use the wrong strain, they are not as effective.
  - The soil must contain adequate nutrients for biofertilizer organisms to thrive and work.

- They complement other fertilizers, but they cannot totally replace them.
- They lose their effectiveness if the soil is too hot or dry.
- Excessively acidic or alkaline soils also hamper successful growth of the beneficial microorganisms; moreover, they are less effective if the soil contains an excess of their natural microbiological enemies.
- Shortages of particular strains of microorganisms or of the best growing medium reduce the availability of some biofertilizers.

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