

## Perspective

# An eco-friendly approach to sustainable crop production with bio fertilizers and its components

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Received: 15-Feb-2023, Manuscript No. IJMF-23-93564; Editor assigned: 17-Feb-2023, Pre QC No: IJMF-23-93564 (PQ); Reviewed: 06-Mar-2023, QC No: IJMF-23-93564; Revised: 13-Mar-2023, Manuscript No: IJMF-23-93564 (R); Published: 21-Mar-2023

### DESCRIPTION

Biofertilizers are a type of fertilizer that contains living microorganisms that help improve soil fertility and plant growth. They are becoming increasingly popular as an alternative to chemical fertilizers, which can have negative effects on the environment and human health.

Biofertilizers work by introducing beneficial microorganisms, such as bacteria and fungi, into the soil. These microorganisms form a symbiotic relationship with the plants, providing them with essential nutrients and improving their overall health. In return, the plants provide the microorganisms with carbohydrates and other organic compounds that they need survive (Haneef, et al., 2014).

One of the most common types of biofertilizers is nitrogen-fixing bacteria. These bacteria convert atmospheric nitrogen into a form that plants can use, reducing the need for synthetic nitrogen fertilizers. Other types of biofertilizers include phosphate-solubilizing bacteria, which help release phosphate from the soil, and plant growth-promoting rhizobacteria, which improve plant growth and resistance to pests and diseases (He, et al., 2022).

Biofertilizers offer several benefits over traditional chemical fertilizers. First and foremost, they are much safer for the environment and human health. Chemical fertilizers can leach into groundwater and surface water, polluting rivers, lakes, and other bodies of water.

Another advantage of biofertilizers is that they can improve soil health over time. Chemical fertilizers can actually deplete soil nutrients and make it less fertile in the long run. Biofertilizers, on the other hand, work to improve soil structure, increase water retention, and promote the growth of beneficial microorganisms in the soil. This can lead to healthier, more productive soil that is better able to support plant growth (Hernández, 2019, Mosier, et al., 2004). In addition, biofertilizers are often more cost-effective than chemical fertilizers in the long run. Although the initial cost of biofertilizers may be higher, they can reduce the need for other inputs such as pesticides and water, and can improve crop yields and quality.

There are several types of biofertilizers available on the market, including liquid formulations, granules, and powders. They can be applied to the soil through irrigation, spraying, or seed coating, depending on the type of biofertilizer and the crop being grown (Singh, et al., 2021).

In conclusion, biofertilizers offer a safe, effective, and sustainable alternative to chemical fertilizers. They can improve soil health, reduce environmental pollution, and enhance crop yields and quality. As the demand for sustainable agriculture practices continues to grow, biofertilizers are likely to become an increasingly important tool for farmers and growers around the world (Vessey, 2003).

### Components of bio fertilizers

**Bio Compost:** It is one of the environmentally favourable products made from decomposed waste materials discharged by the sugar industry. Human-friendly bacteria, fungus, and different plants have enlarged it.

**Tricho-Card:** It is a nonpathogenic, environmentally benign substance used in a range of crops, including citrus, paddy apples, sugar cane, brinjal, corn, cotton, and horticultural and decorative plants. It functions as a productive destroyer and antagonistic hyper parasite against the eggs of many bores, as well as other infections and eaters of flowers, fruits, leaves, and shoots in the field.

**Azotobacter:** It defends the roots from soil-borne diseases and is essential for fixing atmospheric nitrogen. As it makes up roughly 78% of the atmosphere, nitrogen is a crucial nutrient for plants.

**Phosphorus:** One crucial ingredient for the growth and development of plants is phosphorus. Microorganisms that hydrolyze phosphorus compounds into the soluble form for plant absorption are called phosphate solubilizing microorganisms. Many fungi and bacteria are used for the purpose such as Penicillium, Aspergillus, Bacillus, Pseudomonas, etc.

**Vermicompost:** It is an organic fertiliser that is eco-friendly and contains vitamins, hormones, organic carbon, sulphur, and antibiotics that help to improve the yield's amount and quality.

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One of the easy remedies to increase the fertility of the soil is to use vermicompost.

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