

Perspective

Effects of bio-fertilizer on soil microbial activity

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DESCRIPTION

The term “biofertilizer” refers to a material that contains living microorganisms that, when added to soil, seeds, or plant surfaces, colonise the rhizosphere or inside of the plant and encourage development by boosting the supply or availability of primary nutrients to the host plant. Natural processes such as nitrogen fixation, phosphorus solubilization, and plant growth-stimulating hormone synthesis are used by bio fertilizers to add nutrients (Adams, 2014). The microorganisms in bio fertilizers rebuild the soil’s organic matter and nutrition cycle. Healthy plants can be developed with the help of bio fertilizers, which also improve soil health and sustainability. Bio fertilizers can be expected to reduce the use of synthetic fertilizers and pesticides, but they are not yet able to replace their use. Since they play several roles, a preferred scientific term for such beneficial bacteria is “plant-growth promoting *rhizobacteria* (Mosier, 2004).

Biofertilizers offer organic, “eco-friendly,” agricultural input. Long-used bio fertilizers include *Rhizobium*, *Azotobacter*, *Azospirillum*, and Blue Green Algae (BGA). Leguminous crops use *rhizobium* inoculant. *Azotobacter* can be employed with a variety of vegetable crops, including wheat, maize, mustard, cotton, and potatoes. Sorghum, millets, maize, sugarcane, and wheat are the primary crops for which azospirillum inoculations are advised. *Nostoc* or *Anabaena* or *Tolypothrix* or *Aulosira*, a generic genus of *cyanobacteria*, are blue green algae that fix atmospheric nitrogen and are utilised as inoculations for paddy crops grown in both highland and lowland environments. Together with the water fern *Azolla*, *Anabaena* enriches soils with organic matter and adds up to 60 kg of nitrogen per hectare per season. Because seaweeds are so rich in many kinds of mineral elements (potassium, phosphorus, trace elements, etc.), residents in coastal areas frequently use them as manure. Additionally, seaweed manure aids in the breakdown of clays (Naveed, 2015).

Benefits

1. Bio fertilizers are a way to fix the soil’s nutrient

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availability. Nitrogen deficits are common.

2. Because a bio-fertilizer is considered to be alive, plant roots can form symbiotic relationships with it. Complex organic material might be quickly and safely converted by the involved microorganisms into simple chemicals so that the plants could absorb them. Long-lasting microorganism activity contributes to an increase in soil fertility. It preserves the soil’s natural habitat. It stimulates plant development, substitute’s chemical nitrogen and phosphorus by 30%, and boosts agricultural yield by 20% to 30%. Additionally, it can offer defence against some soil-borne illnesses and dryness (Ragunandan, 2019).

3. It has also been demonstrated that bio fertilizers with the capacity to fix nitrogen and solubilize phosphorus will increase the yield of crops.

4. In comparison to control groups, they promote the growth of numerous crops’ shoots and roots. When adopting fresh seed growth, this can be crucial.

5. Bio fertilizers also encourage healthy soil, which increases the viability of farming (Soe, 2013).

Groups of bio fertilizers

The *Azolla-Anabena* symbiosis: *Azolla* is an aquatic, tiny, eukaryotic fern that is found all over the world. bacterial blue-green algae As a symbiont, *Anabena azolla* lives in its leaves (Vessey, 2003). An alternate nitrogen source is *azolla*. Due to its potential application as a substitute for chemical fertilisers, this relationship has attracted considerable interest. *Rhizobium Legumes* and *Rhizobium* work together to fix nitrogen, greatly increasing the amount of nitrogen fixed overall. A well-known agronomic technique to guarantee adequate nitrogen is *rhizobium* injection. Third, *Streptomyces griseoflavus*.

Commercial bio fertiliser now in use: Unigrow, It is manufactured with a leftover from the processing of palm oil and has a microbiological component. Studies have demonstrated that it has positive outcomes.

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