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Biofertilizers in Crop Production

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SUMMARY

Chemical fertilizers, widely used since the Green Revolution, have significantly impacted soil health. These fertilizers often make soil ecosystems inhospitable for essential microflora and microfauna, which are crucial for maintaining soil fertility and providing indispensable nutrients to plants. In contrast, biofertilizers offer a sustainable alternative. They are products containing one or more species of microorganisms that can mobilize important nutritional elements, transforming them from non-usable to usable forms through biological processes. These processes include nitrogen fixation, phosphate solubilization, excretion of plant growth-promoting substances and cellulose biodegradation in soil, compost, and other environments.

INTRODUCTION

Bio-fertilizer is simply a substance which contains living microorganisms which when applied to the soil, a seed or plant surface colonizes the rhizosphere and promotes growth by increasing the supply or availability of nutrients to the host plant (Vessey, 2003). In a large sense, the term biofertilizer may be used to include all organic resources for plant growth which are rendered in available form for plant absorption through microorganisms or plant associations or interactions (Khosro and Yousef, 2012).

Classification of Biofertilizers:

S. No.	Types of Biofertilizers	Examples
N_2 fixing Biofertilizers		
1	Free-living	*Azotobacter, Beijerinkia, Clostridium, Klebsiella, Anabaena, Nostoc*
2	Symbiotic	*Rhizobium, Frankia, Anabaena azollae*
3	Associative symbiotic	*Azospirillum*
P Solubilizing Biofertilizers		
4	Bacteria	*Bacillus megaterium var. phosphaticum, Bacillus subtilis, Bacillus circulans, Pseudomonas striata*
5	Fungi	*Penicillium sp., Aspergillus awamori*
P Mobilizing Biofertilizers		
6	Arbuscular mycorrhiza	*Glomus sp., Gigaspora sp., Acaulospora sp., Scutellospora sp. & Sclerocystis sp.*
7	Ectomycorrhiza	*Laccaria sp., Pisolithus sp., Boletus sp., Amanita sp.*
8	Ericoid mycorrhizae	*Pezizella*
9	Orchid mycorrhiza	*Rhizoctonia solani*
Biofertilizers for Micro nutrients		
10	Silicate and Zinc solubilizers	*Bacillus sp.*
Plant Growth Promoting Rhizobacteria		
11	Pseudomonas	*Pseudomonas fluorescens*

Source: *Singh et al*. (2014)

Methods of Application of Biofertilizers

1. Seed treatment

One packet of the inoculant is mixed with 200 ml of rice kanji to make a slurry. The seeds required for an acre are mixed in the slurry so as to have a uniform coating of the inoculant over the seeds and then shade dried

for 30 minutes. The shade dried seeds should be sown within 24 hours. One packet of the inoculant (200 g) is sufficient to treat 10 kg of seeds.

2. Seedling root dip

This method is used for transplanted crops. Two packets of the inoculant is mixed in 40 litres of water. The root portion of the seedlings required for an acre is dipped in the mixture for 5 to 10 minutes and then transplanted.

3. Main field application

Four packets of the inoculant is mixed with 20 kgs of dried and powdered farm yard manure and then broadcasted in one acre of main field just before transplanting.

Benefits of Biofertilizers

Biofertilizers offer numerous advantages, contributing to sustainable agriculture and environmental protection. Some of the key benefits are

- **Soil Enrichment**: Their use leads to soil enrichment, enhancing soil quality over time.
- **Root Proliferation**: Biofertilizers improve root proliferation by releasing growth-promoting hormones.
- **Nitrogen Fixation**: These fertilizers harness atmospheric nitrogen, making it directly available to plants.
- **Phosphorus Solubilization**: They increase the phosphorus content of the soil by solubilizing and releasing unavailable phosphorus.
- **Nutrient Conversion**: Microorganisms in biofertilizers convert complex nutrients into simple nutrients, making them available to plants.
- **Nutrient Supply and Plant Growth**: They contain microorganisms that promote the adequate supply of nutrients to host plants, ensuring proper growth.
- **Increase in crop yield**: Biofertilizers improve the availability of nutrients and increase the crop yield by 10-25%.
- **Eco-friendly and Cost-effective**: They are sustainable and affordable alternatives to chemical fertilizers.
- **Disease Protection**: Biofertilizers can also protect plants from certain soil-borne diseases.
- **Long-term Benefits**: Though biofertilizers may not show immediate results, the long-term effects are remarkable and beneficial.
- **Reduction of Greenhouse Gas Emissions**: By reducing the dependency on chemical fertilizers, biofertilizers help decrease the emissions of greenhouse gases associated with fertilizer production and application.

CONCLUSION

Biofertilizers, being organic in nature, are crucial for sustaining soil health and enhancing long-term soil fertility. Hence, inorder to maintain soil health while sustaining crop productivity, combined use of chemical fertilizers with biofertilizer can be recommended. In this context, biofertilizers would be the viable option for farmers to increase productivity per unit area.

REFERENCES

Vessey, J. K. (2003). Plant growth promoting Rhizobacteria as biofertilizers. *Journal of Plant and Soil*. 225(43): 571-8.

Khosro, M. and Yousef, S. (2012). Bacterial bio-fertilizers for sustainable crop production: A review APRN. *Journal of Agricultural and Biological Science*. 7(5): 237-308.

Singh, S., Singh, B.K,, Yadav, S.M. and Gupta, A.K. (2014). Potential of biofertilizers in crop production in Indian agriculture. *Am. J. Plant. Nutr. Fert. Technol.* 4(2):33-40.