

The Role of Beneficial Microbes (Biofertilizers) In Increasing Crop Productivity and Profitability

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Biofertilizers are known to play a number of vital roles in soil fertility; crop productivity and profitability. Biofertilizers are the products containing living cells of different types of beneficial microbes (bacteria, fungi, protozoa, algae and viruses). Some of the commonly used beneficial microbes in agriculture include *Rhizobia*, *Mycorrhizae*, *Azospirillum*, *Bacillus*, *Pseudomonas*, *Trichoderma*, *Streptomyces species* etc. Beneficial microbes are essential for decomposing organic matter in the soil and increase essential macro-nutrients (nitrogen, phosphorus, potassium, sulfur, calcium and magnesium) and micro-nutrients (boron, copper, chlorine, iron, manganese, molybdenum and zinc) availability to crop plants. Beneficial microbes also play significant role in solid wastes and sewage management. Beneficial microbes increase plants tolerance to different environmental stresses (drought, heat, cold, salinity etc.) and increase plant resistance to insects and diseases attacks. Beneficial microbes not only improve crop growth and productivity by increasing photosynthesis and producing hormones and enzymes, but also improve crop quality by controlling different insects and various plant diseases. Beneficial microbes reduce the use of chemical fertilizers and thereby reduce environmental pollution caused by chemical fertilizers. Beneficial microbes reduce cost of production and so increase grower's income and profitability. Beneficial microbes are therefore very important for increasing crop productivity, profitability and sustainability. Applications of organic manures such as crop residues, animal manures, chicken manures, green manures, composts, farm yard manure, biochar, ash etc. increases the beneficial microbes in the soil and improves soil health and sustainability.



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