



## Bio fertilizer and their use in field crops

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Bio fertilizer are formulations of living cells of some beneficial micro-organisms with suitable carrier materials. These micro-organisms benefit plants by supplying and facilitating uptake of nutrients (mainly nitrogen and phosphorus) we all know that nitrogen and phosphorus are two major plant nutrients for plant growth. These are generally supplemented through chemical fertilizer, however a major portion of the nitrogen is lost due to leaching and evaporation. Again, due to acidic nature of soil pH of N region, major portion of phosphorus remains insoluble or unavailable to plants. Moreover, harmful effect on soil due to injudicious use of nitrogenous and phosphates fertilizer can not be denied. It is gift of nature that we have a number of micro-organisms which can help the farmers in nitrogen and phosphorus nutrition in a cost effective and eco friendly organic way.

### Types of bio fertilizers for nitrogen : *Rhizobium* spp.

Is used only in legume crops. It fixes atmospheric nitrogen in root nodules and supply to the plant. However, specific strains are effective with specific legumes. *Azotobacter*/*Azospirillum* are used with all non legume crops. *Azotobacter* is for upland crops and *Azospirillum* is for low and crops.

**For phosphorus :** Phosphatika (phosphate solubilising bacteria) can be used for all crops it makes the phosphorus soluble and available for plant uptake. It can be used along with *Rhizobium*/*Azotobacter*/*Azospirillum*.

**Benefits of using bio fertilizer :** Through use of bio-fertilizer you can reduce use of chemical sources of

nitrogen upto 20-25 per cent and phosphorus upto 15-25 per cent. These are comparably cheaper than chemical fertilizer. Bio-fertilizers increase crop productivity (generally 10-40% in grain yield and 15-30%). The living micro organisms in biofertilizer activate soil biologically. Helps in survival and multiplication of other beneficial micro organism. These help in maintain soil fertility in sustainable way. Help in healthy plant and root growth by secretion of various growth promoting hormones and vitamins. They help in better nutrient uptake and tolerance against drought and moisture stress. These acts against some soil borne pathogen thereby reduce disease incidence. These help in speedy decomposition of plant residues, improve soil texture, structure and water holding capacity. These are eco-friendly and thus have no harmful effect in soil and environment.

### Method of application :

**Seed treatment :** For greengram, blackgram, arhar, lentil, gram, soysbean, pea, all beans. For treatment of 5kg seed, *Rhizobium*-100g+ phosphatika 100 g should be thoroughly dissolved in about 200ml water. The seeds should be soaked and thoroughly mixed in the solution so that a black layer is formed on each seed. Then the seeds are to be dried under shade and sown immediately. For upland paddy, maize, wheat, mustard, sunflower, niger, okra etc. In this case, *Azotobacter*-100g should be mixed with phosphatika 100g instead of *Rhizobium* rest method is same as above.

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