

Standard values for different Biofertilizers

S. No.	Parameters	Acetobacter	Azotobacter	Azospirillum	PSB
1.	Total Viable Counts per gram. of carrier* within 15 days of manufacture	>1X10 ⁸	>1X10 ⁷	>1X10 ⁸	>1X10 ⁸
2.	Contamination	Nil	Nil	Nil	Nil
3.	Total Viable Counts per gram. of carrier* 15 days before expiry	>1X10 ⁷	>1X10 ⁶	>1X10 ⁷	>1X10 ⁷
4.	pH value of Carrier	5.5-7.5	6.0-7.5	6.0-7.5	6.0-7.5
5.	Strain Efficiency	Capable of fixing 10 mg of N per gram. of carbon (sucrose, mannitol etc) consumed			Capable of developing P-solubilization zone >10mm

*Carrier can be Lignite, FYM, Vermiculite, Peat, Charcoal (alone or in combinations)

Rate and mode of biofertilizer application in Sugarcane

Rate: 5 kg/Acre or 12-15 kg/ha

Mode of application

- **Sett Treatment :** Suspend and mix thoroughly 5 kg biofertilizer (for one acre) in 100 litres of water. Treat cane-sets by dipping in this suspension before planting.
- **Soil Treatment :** Suspend 5 kg of biofertilizer per acre in 10 litres of water and mix thoroughly with 80-100 kg of FYM. The mixed biofertilizer in FYM is sprinkled over cane sets in the rows at the time of planting. Immediately rows should be covered with soil.

Precautions for using Biofertilizers

- Biofertilizer packets should be stored in cool and dry place away from direct sunlight and heat.
- Do not mix biofertilizer simultaneously with inorganic fertilizers/ pesticides.
- Biofertilizer packet should have name of the product, crop for which intended, date of manufacture and expiry, batch number, instructions for use, name and address of the manufacturer.
- Biofertilizer packet should be used before its expiry.
- For better results, biofertilizers should be used in combination with inorganic fertilizers.

Probable reasons for getting poor response of Biofertilizers

- Ineffective microbial strain.
- Insufficient microbial populations.
- High levels of contaminants.
- May have been exposed to high temperature or sunlight.
- Not followed recommended method and dosage.
- Used simultaneously with inorganic fertilizers/pesticides.
- Prevailing high soil temperature or low soil moisture.
- Acidity or alkalinity in soil
- Poor availability of P and Mo.
- Competition from native microbial and phages population.

Biofertilizers are not the replacement of chemical fertilizers but can supplement plant nutrient requirements. Hence, the judicious planning of using biofertilizers in combination with inorganic fertilizers will definitely have a long way in saving fossil fuels and protecting the environment.

BIOFERTILIZERS IN SUGARCANE



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Biofertilizers in Sugarcane

What is a Biofertilizer?

Biofertilizers are ready to use live formulations of beneficial microorganisms, which on application to seed, root or soil mobilize the availability of nutrients by their biological activity and help in building up the micro flora and thus soil health.

Why should Biofertilizers be used ?

Modern agriculture is dependent upon the supply of chemical fertilizers, which are becoming scarcer and more costly. These are major agents for pollution also for water and air. This situation has led to identifying harmless inputs like biofertilizers in crop cultivation, which not only help in saving chemical fertilizers but also safeguards environment and soil health and quality of crop products.

Benefits from using Biofertilizers

- Cost effective: increase crop yield by 10-30%
- Supplement to fertilizers: replace chemical fertilizers up to 25%
- Stimulate plant growth
- Biologically activate the soil
- Restore natural soil fertility
- Provide protection against some soil borne diseases

Types of biofertilizers available for Sugarcane

For Nitrogen

- *Acetobacter*
- *Azotobacter*
- *Azospirillum*

For Phosphorus

- *Bacillus spp*
- *Pseudomonas spp*
- *Aspergillus awamori*

Characteristics of Biofertilizers

Acetobacter Biofertilizer

- A product with superior strain of *Acetobacter diazotrophicus*
- An endophytic bacteria i.e. associates and colonizes within all parts of sugarcane (root, cane, leaves).
- Fixes atmospheric nitrogen and enhances the availability of N to sugarcane and produces growth hormone, or Indole Acetic Acid (IAA).
- Results visible after 5-6 weeks of its application
- Increases size and length of internodes.
- Improves yield (5-20 t/ha) and sugar content (5-15%)



Azotobacter Biofertilizer

- A product with potential strains of *Azotobacter chroococcum*
- A free living bacteria
- Enhances availability of nitrogen and produces plant growth regulators, thus stimulates rooting.
- Excretes antibiotics/bacteriocins, which protect from minor root pathogens.
- Stimulates early seedling vigour and improves yield up to 25%.



Azospirillum Biofertilizer

- A product with strains of *Azospirillum brasilense* or *Azospirillum lipoferum*.
- An associative type of bacteria, living in proximity of root zone.
- Fixes atmospheric nitrogen and provides 30-50% of N requirement and also produces plant growth hormones, auxins and cytokinins.

- Enhances germination efficiency, early seedling vigour, plant immunity and yields up to 20 %



Phosphate Solubilizing Biofertilizer (PSB)

- A product with single or consortium of *Bacillus spp.*, *Pseudomonas spp* and *Aspergillus awamori*.
- Multiply rapidly around the root zone, acts on inorganic bound soil phosphate and makes phosphorus available to the plant.
- Improves plant vigour and yield up to 15%.

