

# QUALITY CONTROL OF BIOFERTILIZERS AND ORGANIC MANURES



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- In context of INM & Organic farming there is need to seek alternative nutrient sources which should be **cheap and ecofriendly** so that farmers may be able to reduce the investment made on fertilizer with maintaining good soil environmental conditions leading to ecological sustainable farming. Therefore, there is a need of go for the use organic manures & biofertilizers, which are indigenous, cheap & ecofriendly. It is urgent need of the day that their quality should be monitored, through authentic agency.

## BIOFERTILIZERS

“Microbial Inoculant” or culture is the most appropriate name of biofertilizer. Biofertilizers can be defined as the preparation containing high concentrations; specialized living microorganism and are able to fix nitrogen solubilize & mobilize phosphorus and Potash, including cellulose decomposing microorganisms for rapid decomposition.

## QUALITY CONTROL OF BIOFERTILIZERS

Quality has to be controlled at various stages of production, marketing & storage.

- Mother culture stage
- Mixing of broth with carrier
- Carrier selection & standardization
- During packing & storage.
- Starter culture or broth culture stage
- Random sample testing at farmer's level.

### Indian standard specification for Rhizobium

S.N.	Parameters	Rhizobium Inoculant IS 8268-2001
1.	Base	Carrier based
2.	Viable cells	10 <sup>9</sup> cells/g carrier within 15 days of manufacture
3.	Cell no at the time of expiry	10 <sup>7</sup> cells/g within 15 days before expiry date
4.	Shelf life or expiry period	6 months from the date of manufacture
5.	Permissible contamination	No contamination at 10 <sup>8</sup> dilution
6.	PH	6.0-7.5
7.	Moisture %	35-40%
8.	Strain	Should be checked by several test & serologically
9.	Carrier	Should pass through 150-212 micron IS (72-100 mesh).
10.	Pot culture test others	Nodulation test + Ve. Result in 50% or more dry matter than control

### Indian standard specification for Azotobacter

S.N.	Parameters	Azotobacter Inoculant IS – 9138-2002
1.	Base	Carrier based
2.	Viable cells	10 <sup>7</sup> cells/g of carrier within 15 days manufacture.
3.	Cell no at the time of expiry	10 <sup>6</sup> cells/g within 15 days before expiry date
4.	Shelf life or expiry period	6 months from the date of manufacture
5.	Permissible contamination	No contamination at 10 <sup>5</sup> dilution
6.	PH	6.0-7.5
7.	Moisture %	35-40%
8.	Strain	A. Chroococcum mentioned
9.	Carrier	Should pass through 100 micron IS sieve
10.	Pot culture test others	Minimum amount of N-fixation not less than 10 mg/g of sucrose utilized.

### Indian standard specification for Azospirillum

S. N.	Parameters	Azospirillum Inoculant IS 14806:2000
1.	Base	Carrier based
2.	Viable cell cont at the time of manufacture	10 <sup>7</sup> cells /g of carrier with in 15 days of manufacture
3.	Viable cells at the time of expiry	10 <sup>6</sup> cells/g of carrier within 15 days be for expiry
4.	Shelf life/expiry date	Not < 6 month
5.	pH	7-8.0
6.	Moisture %	35-40%
7.	Carrier material	Peat lignite peat soil, charcoal in form of powder
8.	Plant test phosphate solubilization	Effective root development on all crops against which the inoculant is intended to be used. There should be 10% increase in the plants cover the dry mass of uninoculated control.

### Indian standard specification for phosphate solubilizing inoculants

S. N.	Parameters	Phosphate solubilizing inoculants IS 14807-2000
1.	Base	Carrier based
2.	Viable cell cont at the time of manufacture	10 <sup>7</sup> cells /g of carrier
3.	Viable cells at the time of expiry	10 <sup>6</sup> cells/g of carrier within 15 days be for expiry
4.	Shelf life/expiry date	Not < 6 month
5.	pH	6.5-7.5
6.	Moisture %	35-40%
7.	Carrier material	Peat lignite peat soil, charcoal in the form of powder
8.	Plant test phosphate solubilization	Phosphate solubilizing ability in the range of 35-50% and in terms of zone formation, minimum 10 mm solubilization zone.

**INOCULANT SHALL BE PACKED IN 50-75 MICRON 1000 DENSITY POLY THINE PACKETS SHOULD BE MARKED LEGIBLY**

- Name of the product
- Name & address of manufacturer
- Name of the carrier
- Batch number
- Date of manufacture
- Date of expiry
- Net mass
- Crop for which intended
- Storage instruction – 15-30°± .2

## Problems in Biofertilizers

- Unawareness & unavailability of bio-fertilizers to the farmers
- Some time poor quality biofertilizers
- Expired date inoculant reach to farmers which are in effective
- Unsuitable transport & storage system may create high temp, which destroy the microbial population in inoculants.

## Types of Organic manures

### Bulky Organic Manure

- FYM
- Compost
  - ◆ Farm /Rural compost
  - ◆ Town compost
  - ◆ Mechanical compost
  - ◆ Enriched compost
  - ◆ Phosphocompost
  - ◆ Vermicompost
- Night soil
- Biogas slurry
- Sewage & sludge
- Pig, poultry, Goat, Sheep manure
- Green manuring

## Concentrated O.M.

- Non edible & Edible Oilcakes
- Blood meal
- Meat meal
- Horn & hoof meal
- Wool waste

**Threshold value of compost quality for producers.**

Parameters	Threshold value	Method
<b>Physical properties</b>		
Moisture	15-20 %	Moisture box
Particle size	Passes through 4 mm screen	Sieving method
Inerts	<25 %	Sieving methods
Odor	Absence of foul odor	Smelling test
Colour	Dark brown	2% iodine test

**Threshold value of compost quality for producers.**

Parameters	Threshold value	Method
<b>Chemical properties</b>		
T.O.C.	Minimum 16-20 %	Dry combustion
Total nitrogen	Minimum (0.8%)	Kjeldhal digestion
C/N ratios	10 to 15 : 1, < 20:1	
Total P% in terms of P <sub>2</sub> O <sub>5</sub>	0.8	Triacid misture
Total K % in terms of K <sub>2</sub> O	1-2	Triacid misture
EC	3 to < 4 dSm-1	EC and pH meter
PH	6.5 to 7.5	PH meter
Hydrolysable carbohydrate	<0.1	

**Threshold value of compost quality for producers.**

Parameters	Threshold value	Method
<b>Biological properties</b>		
Respiration rate	Mg CO <sub>2</sub> -C/100g/day 13-15 mg	Carcia et al.
	100 g /days	
Salmonella sp.	Nil	
Shigella sp.	Nil	
Coliform	Nil	

**Benefits of Organic ;Manures**

- Effect on soil colour
- High cation adsorption capacity
- Granulation is increased
- Increase supply & availability of nutrients
- Plasticity & Cohesion is reduced
- Effect on biological properties of soil
- Increase water holding capacity
- Sustain soil fertility & productivity
- Check the environmental pollution
- Improve taste & quality of produce

## Quality control agency of biofertilizer & organic inputs

- NBDC presently converted as NCOF Gaziabad
- RBDC Converted as RCOF situated at Bangalore, Bhubneshwar, Hissar, Imphal, Jawalpur & Nagpur as a nodal agency for testing & maintaing quality of biofertilizer & organic manure
- BIS, ICAR Institutes & SAU's

## Summary & conclusion

- To get more efficiency of biofertilizers & organic manures producer should ensure that farmers should get quality product
- It should be available to the farmers or any grower at proper time in each season..



**Thank you**