

BIO-FERTILIZER
IN
INTEGRATED NUTRIENT
MANAGEMENT
(INM)

Bio-fertilizer in INM:

The scientists had given emphasis on a particular aspect in a particular period to feed up the increased population of human –

HYV Seeds	- During 60's & 70's
Chemical Agriculture	- During 80's & 90's
Environment & Safe	- During 2000 onward

Some of the bad effect of modern / chemical Agriculture –

1. Soil erosion and degradation.
2. Reduction water holding capacity of the soil.
3. Increase of soil acidity.
4. Fertilizer and pesticide contamination.
5. Genetic erosion

Concept of INM:

The basic concept underlying Integrated Nutrient Management (INM) is the maintenance of soil fertility and plant nutrient supply to an optimum level for sustaining the desired crop productivity through optimization of benefits from all possible sources of plant nutrients.

Components of INM:

1. Soil resources.
2. Judicious application of chemical fertilizers.
3. Renewable source of plant nutrients.

RENEWABLE SOURCE OF PLANT NUTRIENTS

(All of Bio-logical origin)

Organic
Manures

Green
Manures

Legumes
In Cropping
System

Bio-fertilizer

FYM
Compost
Vermicompost

Dhaincha
Sunhemp
Azolla, etc.

Legumes as
companion
crops or as
intercrops

Rhizobium
Azotobacter
Azospirillum
Phosphatika
Trichoderma

Bio-fertilizer – Bio-fertilizers are micro-organisms which play very vital role in mobilization of different nutrients from organic and inorganic non-available forms to available forms.

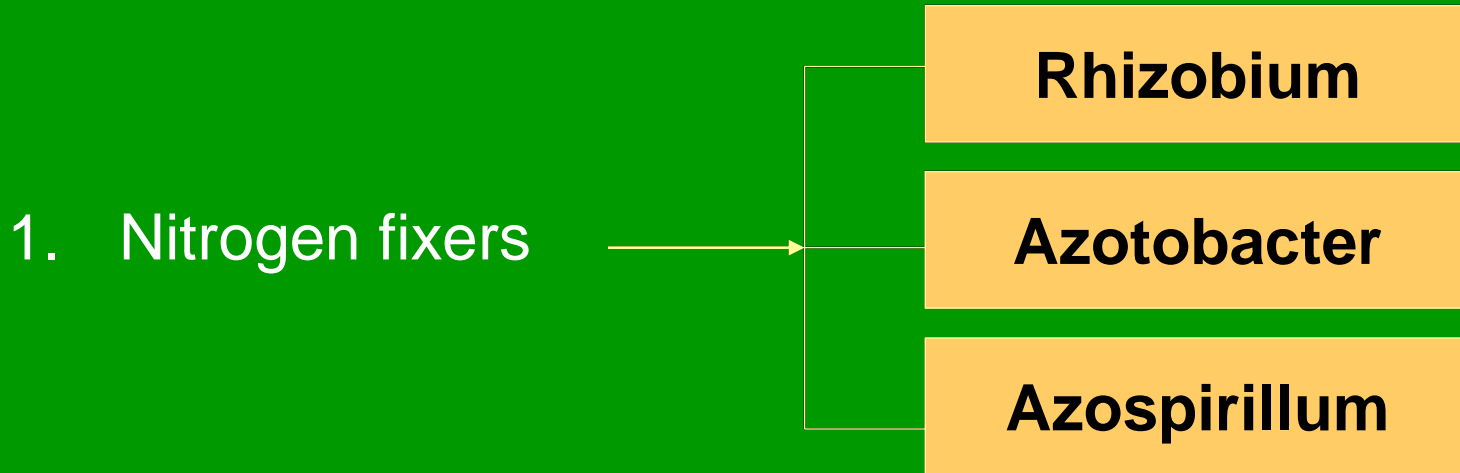
Advantages of using Bio-fertilizer:

- ❖ Increase availability of nutrients specially nitrogen and phosphorous.
- ❖ Can replace 25-30% chemical fertilizers.
- ❖ Increase farm productivity, generally 10-40% in grain yield and 15-30% in vegetative growth.
- ❖ Activate the soil biologically, thereby increasing naturally fertility of soil.

- ❖ Help in decomposing plant residues, thereby improving C/N ratio of soil, improving soil texture and structure, increasing water holding capacity.
- ❖ Help in stimulating plant growth in general and root growth in particular as they secrete various growth hormones, providing better nutrient uptake and increasing tolerance towards drought and moisture stress.
- ❖ Bio-fertilizer also secrete some fungistatic and antibiotic like substances which reduces the incidence of diseases and increase disease resistance.

Types of Bio-fertilizers:

Basically Bio-fertilizers can be grouped into 3 (three) categories -



2. Phosphate solubilizers / mobilizers – Phosphatika

3. Compost accelerators and enricher :

Accelerator - Trichoderma viride, Asdpergillus niger

Enricher - Azotobacter

Potential of different Bio-fertilizers

Sl. No.	Bio-fertilizer	N/P contribution (Kg./ha.)	P.C. increased in Crop yield
1.	Rhizobium with legume crops	50-300	10-60
2.	Azotobacter	15-25	10-20
3.	Axospirillum	20-35	20-35
4.	Blue green algae	20-30	10-20
5.	Azolla	25-35	15-35
6.	Phosphatika	10-15	10-25
7.	VAMF (Vasicular Arbuscular Mycorhizal Fungi)	10-40	10-55

Methods of application:

1.	In pulse crops	-	Rhizobium + Phosphatika
2.	In other than pulse crops in upland condition	-	Azotobacter + Phosphatika
3.	In other than pulse crops in low land condition	-	Azospirillum + Phosphatika

Different Methods of Application:

1. Seed Treatment
2. Seedling Root Dip Treatment
3. Soil Treatment

1. Seed Treatment:

For every 10 Kg of seeds	-	Rhizobium / Azotobacter (+) 5 Kg. Phosphatika Per ha.
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2. Seedling Root Dip Treatment:

For 1 bigha of vegetable crops (30 minutes in evening)	-	300 gm. Azotobacter (+) 700 gm. Phosphatika	In 3 lits. of water
For 1 Bigha of paddy seedling (overnight)	-	600 gm. Azopirillum (+) 700 gm. Phosphatika	In the field itself with dry cowdung / compost / soil if available

3. Soil Treatment:

With 15 Kg. of compost for overnight only	-	1200 gm. Azotobacter (+) 1200 gm. Phosphatika
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If acid soil, mix the mixture with 8 Kg. of slaked lime before use.

When Bio-fertilizer is applied, sufficient quantities of organic matter must be supplemented to the soil for better result.

Precautions to be observed in Bio-fertilizer:

- ❖ Store Bio-fertilizer packets in cool and dry place away from heat and direct sunlight.
- ❖ Open the packets just before use and use all its contents at a time.
- ❖ Bio-fertilizer and treated seeds should not be mixed with chemical fertilizers, insecticides or pesticides.
- ❖ In case the seeds are to be treated with fungicides then with double the recommended dose of Bio-fertilizers.
- ❖ Seed Treatment and Bio-fertilizer manure preparation should be done in shade
- ❖ Always use specific Bio-fertilizer for specific crop and use the packet before expiry specified on each packet.