KAZI NAZRUL UNIVERSITY

RANIGANJ GIRL'S COLLEGE

DEPARTMENT OF ZOOLOGY
1st Year

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Course Name	: Environment Studies
Course Code	: AEE101
Topics	: BIOFERTILIZER
Semester	: 1st Sem.

Raniganj Girls' College

Course Name: Environment Studies

Course Code: AEE101

Topic of the project: Different aspects of Air, Soil, Water, Noise pollution

A Project Report

Submitted by Semester-I students (Academic Year 2021-22)

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CERTIFICATE

This is to certify that this project titled "Different aspects of Air, Soil, Water, Noise pollution" submitted by the students for the award of degree of B.A. Honours/ Program is a bonafide record of work carried out under my guidance and supervision.

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Place: Raniganj

Date: 18.03.2022

Jishin Subhra Ghosh

Assistant Professor, Department of Zoology

Signature of the supervisor with designation and department

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Biofertilizers

INTRODUETION

In Past 50 years history, the chemical Pesticides and fertilizers have played a crucial role in boosting the agricultural production, however they have a Short history in modern agriculture. Their immediate action and low cost managed to bring them rapidly in to the center of attention. Their toxic effects on environment, plant, animal and human life diverted the focus on ecofriendly plant protection. moreover, the development of resistance in insects against common pesticides has not been Solved yet. Thus, practices such as Integrated pest management (IPM) have gained more Importance.

Indescriminate use of chemical pesticides contributed in loss of Soil productivity along with addition of Salts to the Soil. To revive the Soil health and living on alternate source has become essential concept of biofertilizer came forward, which can be a good Supplement for a chemical fertilizers, Biofertilizers are nutrient availability Systems in which biological process are involved,

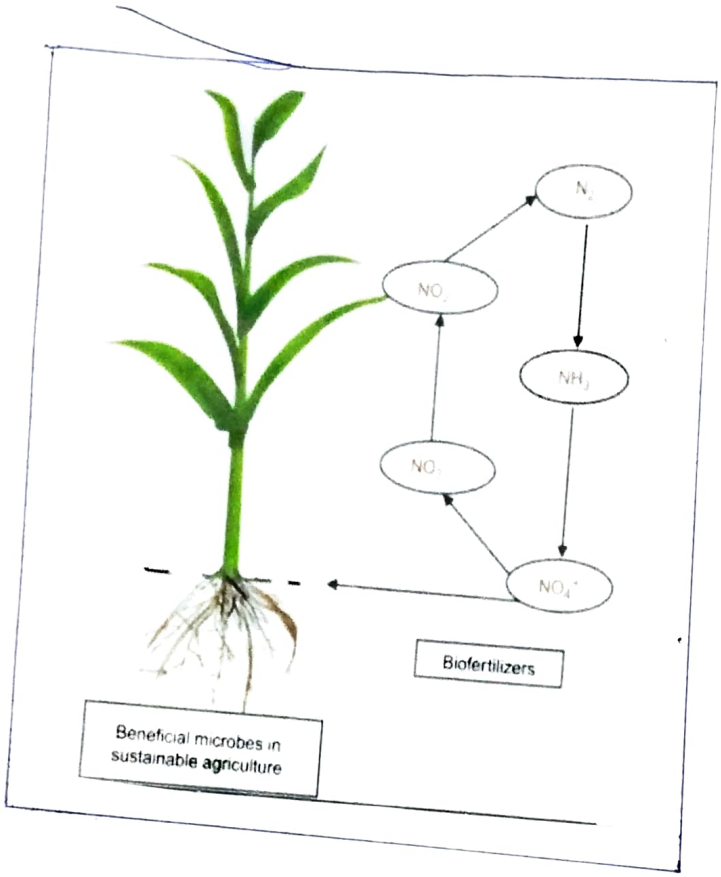
Biopesticide and Biofertilizer is a need of modern agriculture Since demand for Safe and residue free food is increasing. Therefore, to cater the need, It is necessary to promote the efforts for production of biopesticides and biofertilizers in the state in private Sector to encourage the entrepreneurs.

Application Methods

DEFINITION [Biofertilizer]

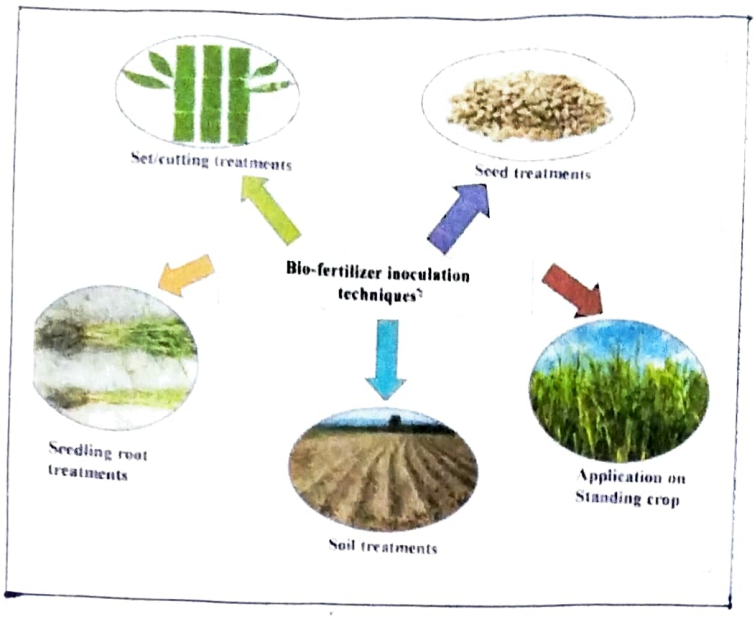
- Biofertilizer is a large population of a specific or a group of beneficial microorganisms for enhancing the productivity of a soil either by fixing atmospheric nitrogen or by solubilising soil phosphorus or by stimulating plant growth through synthesis of growth promoting substances.

- Bio-fertilizers based on renewable energy source are cost effective supplement to chemical fertilizers, eco-friendly and can help to economise on the high investment needs for chemical fertilizer use as far as nitrogen and phosphorus are concerned.

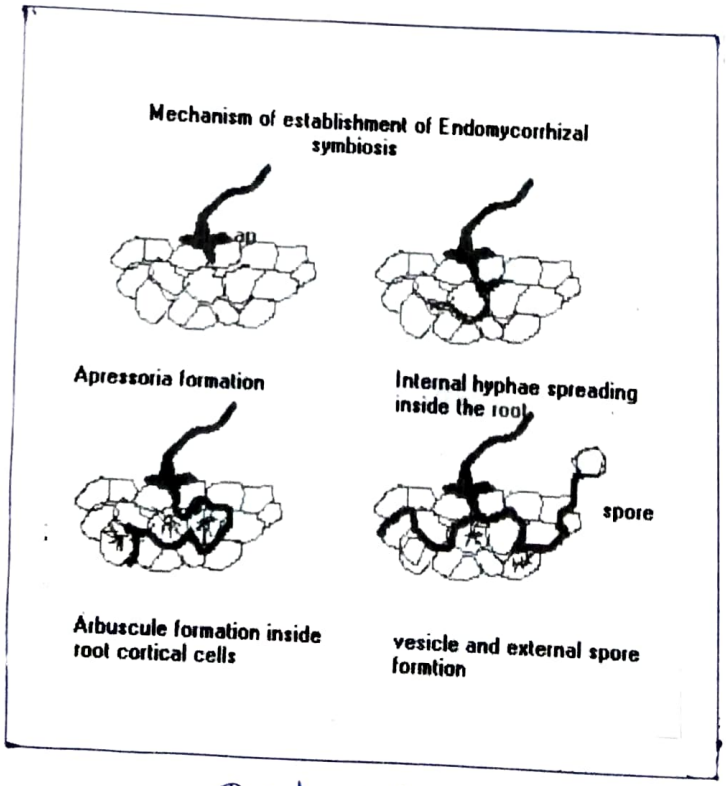

N_2
NO_2
NH_3
NO_3
NO_4^+
Biofertilizers
Beneficial microbes in sustainable agriculture

CLASSIFICATION OF BIOFERTILIZER

S.NO	GROUPS		Examples
A.	N_2 fixing Biofertilizer		
	1.	Free-living	Azotobacter, Clostridium, Anabaena, Nostoc,
	2.	Symbiotic	Rhizobium, Anabaena azollae
	3.	Associative Symbiotic	Azospirillum
B.	P Solubilizing Biofertilizer		
	1.	Bacteria	Bacillus Subtilis, Pseudomonas Striata
	2.	Fungi	Penicillium sp,
C.	P Mobilizing Biofertilizer		
	1.	Arbuscular mycorrhiza	Glomus sp., Scutellospora sp.
	2.	Ectomycorrhiza	Laccaria sp., Pisolithus sp.
	3.	Ericoid mycorrhiza	Pezizella ericae.
D.	Biofertilizer for micro nutrients		
	1.	Silicate and zinc Solubilizers	Bacillus sp.
E.	Plant Growth Promoting Rhizobacteria		
	1.	Pseudomonas	Pseudomonas fluorescence



Microbial Biofertilizer



Biofertilizers

METHODS OF BIOFERTILIZER

* isolated bacterial cultures were subculture in to nutrient broth.
* The cultures were grown under shaking condition at $30 \pm 2^{\circ}C$
* The culture incubated until it reaches maximum cell population of 10^{10} to 10^{11}.
* Under optimum condition this population level could be attained with in 4-5 days for Rhizobium 5-7 days for Azospirillum and 6-7 days for Azotobacter.
* The culture obtained in the flask is called starter culture.
* For large scale production, inoculum from starter culture is transferred in to large flasks / fermentor and grown until required level of cell count is reached.

Prepare appropriate media for specific to bacterial inoculant in required quantity

⇩

Inoculated with specific bacterial Strain for aseptic condition

⇩

Incubated at $30 \pm 2^{\circ}C$ for 5-7 days in rotary shaker

⇩

observe growth of the culture and estimate the population (starter culture)

⇩

The above the media is prepared in large quantities in fermenton

⇩

sterilized and cooled well

⇩

media in a fermenton is inoculated with the log phase of culture grown in large flask (usually) 1-2 % of inoculum is sufficient)

⇩

cells are grown in fermenton by providing aeration and continuous stirring

⇩

Broth is checked for the population of Inoculated organisms

⇩

cells are harvested with the population load of 10^9 cells/ml

IMPORTANCE OF BIOFERTILIZER

Increasing Harvest yields :

- Average increase crop yields by 20 to 30 percent.
- Algae-based fertilizers have Improved yields in rice at rates ranging between 10 and 43%

Improving soil structure :-

- use of microbial bio fertilizers improves the soil structure by influencing the aggregation of the soil particles.

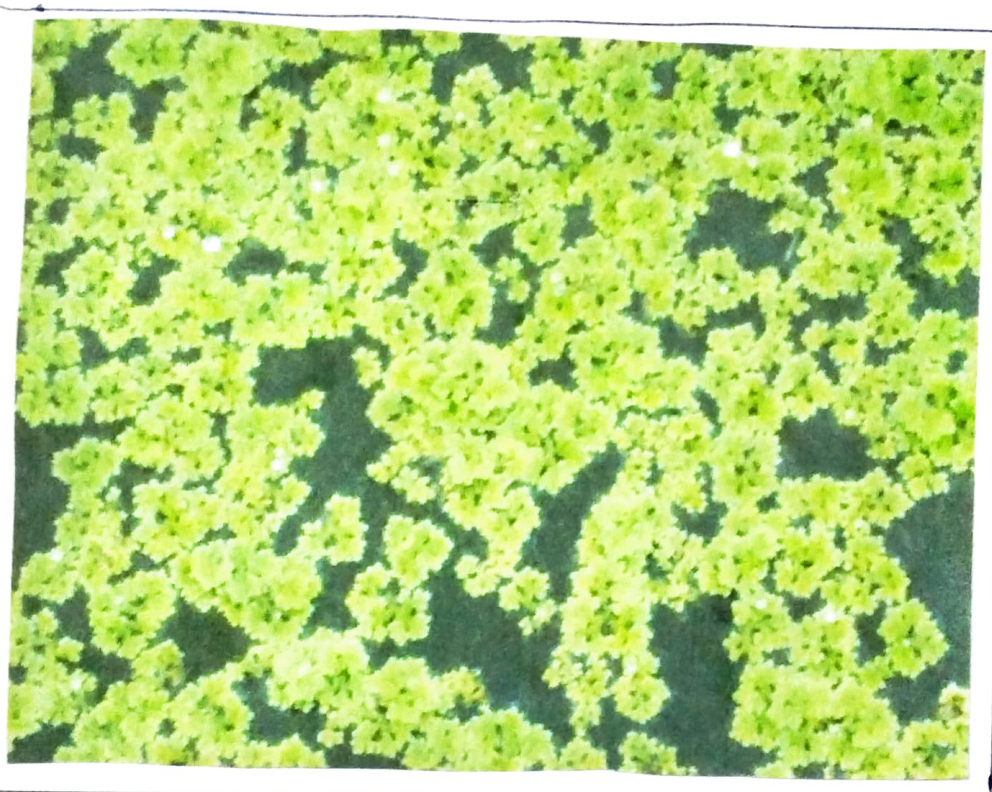
Better water relation :-

Arbuscular mycorrhizal colonization induces drought tolerance in plants by :

- Improving leaf water and turgor potential.
- Maintaining stomatal functioning and transpiration.
- Increasing root length and development.

Improving sustainability :-

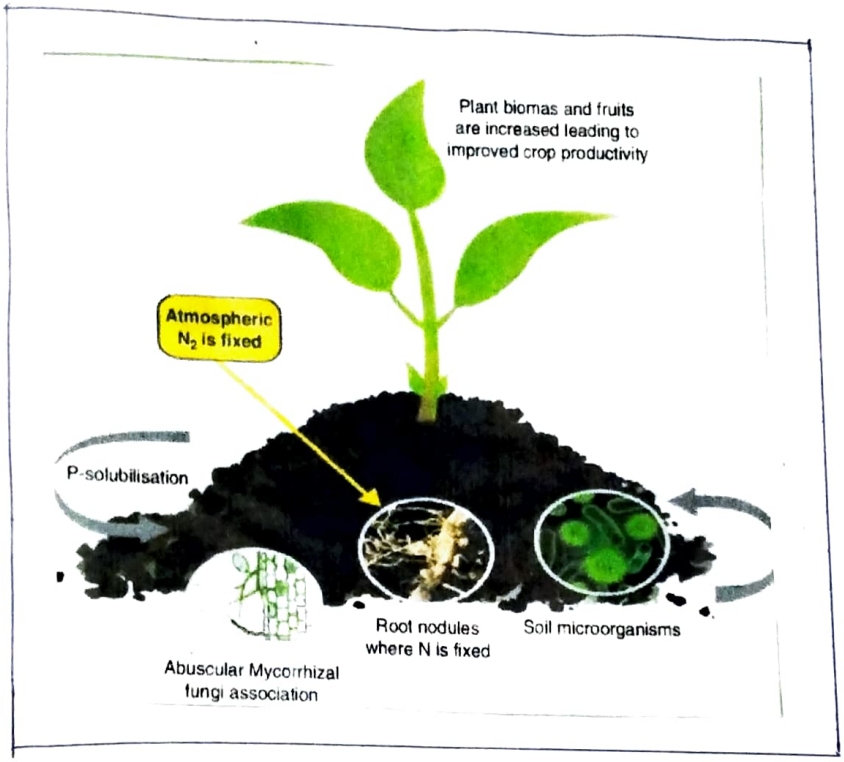
- Biofertilizer strengthen the soil profile.
- Leave water sources untainted and
- Edify plant growth without detrimental side-effects.



Azolla

ADVANTAGE OF BIOFERTILIZER

1) Renewable Source of nutrients.
2) Sustain soil health.
3) Supplement chemical fertilizers.
4) Replace 25-30% chemical fertilizers.
5) Increase the grain yields by 10-40%.
6) Decompose plant residues, and stabilize C:N ratio of soil.
7) Improve texture, structure and water holding capacity of soil.
8) No adverse effect on plant growth and soil fertility.
9) Stimulates plant growth by secreting growth hormones.
10) Secrete fungistatic and antibiotic like substances.
11) Solubilize and mobilize nutrients.
12) Eco-friendly, non-pollutants and cost effective method.



Plant Growth

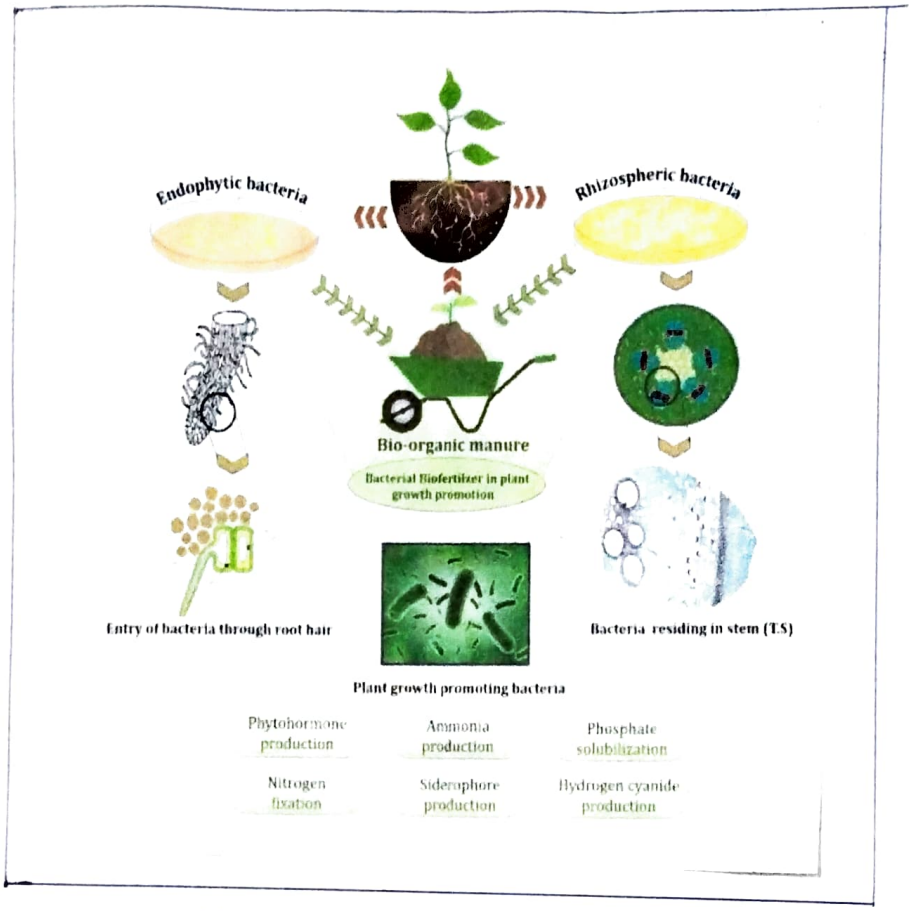
DISADVENTAGE OF BIOFERTILIZER

1) Biofertilizers require special care for long-term storage because they are alive.

2) must be used before their expiry date.

3) If other microorganisms contaminate the carrier medium or if growers use the wrong strain, they are not as effective.

4) Biofertilizers lose their effectiveness if the soil is too hot or dry.



Plant Growth Promoting Rhizobacteria

CONCLUSION

* Despite the Indian government's efforts to promote the production and use of biofertilizers, various studies found that biofertilizers have found little acceptance among farmers In India.

* The present policy of providing grants and low Interest loans to biofertilizers producers should be abolished; this has resulted in the setting up of a large number of Inefficient plants, which cannot produce good quality biofertilizers.

* The policy of marketing biofertilizers at very low prices should also be stopped. These prices are too low to attract adequate Investment in modern manufacturing facilities.

* There are many commercial mycofungicides and fungal biofertilizers available worldwide.

* There are however, some limitations in using these products.

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my teacher Tuhin Subhra Ohash as well as our principal Chubi De who gave me the golden opportunity to do this wonderful project on the topic "BIOFERTILIZER" which also helped me in doing a lot of research and I came to know about so many new things.

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I am making this project not only for marks but to also increase my knowledge.

Thanks Again To All who Helped Me.