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PRODUCTION TECHNOLOGY OF CARRIER BASED AND LIQUID BIOFERTILIZER

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PRODUCTION TECHNOLOGY OF CARRIER BASED AND LIQUID BIOFERTILIZER

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INTRODUCTION

WHAT IS BIOFERTILIZER

When administered through seed or soil, biofertilizers are described as preparations containing living cells of effective strains of microorganisms that assist agricultural plants assimilate nutrients through their interactions in the rhizosphere.

They accelerate certain microbial process in the soil which augment the extent of availability of nutrients in a form easily assimilated by plants.

ADAVANTAGES OF BIOFERTILIZER

- It is a nutrient-renewable source.
- It aids in the preservation of soil health.
- Chemical fertilizers should be used in addition.
- It can take the place of 25-30% of chemical fertilizers.
- Crop yields are increased by 10% to 40%.
- Decompose plant wastes and keep the soil's C:N ratio stable.
- There is no negative impact on plant development or soil fertility.
- It secretes growth hormones to help plants develop.
- Nutrients are solubilized and mobilized.
- It is a non-polluting, environmentally beneficial, and cost-effective approach.
- Plants can be protected from soil-borne illnesses by using biofertilizers.

CARRIER BASED BIOFERTILIZER

A carrier is a medium that can transport microorganisms in sufficient numbers and under specific conditions to keep them alive. It is simple to get it to the farmers.

These are biofertilizers that come in the form of carrier-based microbial inoculants that can boost soil fertility without affecting plant development. For the creation of a high-quality biofertilizer, excellent carrier material is required.

PROPERTIES OF A GOOD CARRIER ARE

- It should be able to absorb a lot of moisture.
- Microorganisms should not be harmed by it.
- It should be offered in a large quantity and at a reasonable price.
- Has a lot of buffering power.
- It should have a high organic content and a water holding capacity of at least 50%.
- Good seed adhesion.
- Good buffering capability for pH.
- The pH of the carrier should be near neutral and easily modifiable.
- These characteristics simply suggest the possibility for a suitable carrier; ultimate carrier selection must be based on microbial proliferation and survival during storage, as well as general planting methods and equipment.

PRODUCTION OF CARRIER BASED BIOFERTILIZER

Rhizobium, Azotobacter, and Phosphobacteria are the most common bacteria grown using this method.

Culturing of micro-organisms

Starter culture is made by adding mother culture to the medium and shaking it constantly until the maximum number of cells is created in the lab.

Starter culture is employed for mass manufacturing of mother culture.

Processing of carrier material

These are responsible for transporting the inoculant from the lab to the farmland. A carrier should have the following characteristics:

- It should be less expensive and readily available locally.
- It should be high in organic content and free of harmful substances.
- A water holding capacity of greater than 50%.
- The finest transporters are peat and lignite.
-

Mixing of culture in carrier :-

The bacterial culture is placed in neutralized, sterilized carrier material that can contain 50% of its weight in water.

Packing and Marketing :-

The biofertilizers are now packaged in polythene bags with the bacteria's name, expiration date, and mode of use inscribed on them.

The inoculant is then ready for distribution to the farmers.

PRODUCTION OF BGA

- To prevent water loss due to percolation, choose a field for production near a water body and cover it with mud.
- Then fill the container with water to a height of 10cm and leave it for 12 hours.
- The field should then be treated with super phosphate and lime.
- Inoculate the BGA beginning culture, which has 8-10 distinct species in it.
- Then use furadan to keep insects away.
- Keep the water level at the same level for 20 days.

Collect algal flakes off the soil surface after the field has dried for commercialization.

LIQUID BIOFERTILIZERS

Liquid biofertilizers are liquid formulations comprising dormant or non-active microorganisms and their nutrients, as well as a chemical that encourages the creation of resting spores or cysts for a longer self-life and resistance to harsh circumstances.

The dormant form of the biofertilizer germinates when it reaches the soil, resulting in a new batch of active cells. They reproduce and thrive by exploiting the carbon supply in the soil.

ADVANTAGES OF LIQUID BIOFERTILIZERS

- It has a longer shelf life, ranging from 12 to 24 months.
- There is no loss of characteristics owing to storage at temperatures up to 45° C.
- There is no pollution.
- High temperature has a minor impact.
- Its fermenting smell makes it easy to spot.
- Better seed and soil survivability.
- The dosage is ten times lower.
- Farmers will find it simple to utilize.

NEED FOR BASIC FACILITIES

A modern microbiological laboratory with enough space, electricity, airflow, temperature regulation, and storage should be available. To keep the space free of contaminants, it must be carefully maintained.

Laminar air flow, an autoclave, a Biological Oxygen Demand (BOD) incubator, a dry sterilizing oven, a rotary shaker, a fermenter, a sealer, balances, microscopes, and high-grade chemicals and glassware are among the fundamental equipment. Gas, water, and electricity should all be available at all times.

Biofertilizer should be made by those who are technically trained and skilled.

PRODUCTION TECHNOLOGY

- On the slant, a pure culture of a competitive and efficient strain is cultivated in agar media.
- In a 250 mL conical flask holding a liquid media, a loopful of inoculum is transferred.
- For 3-7 days, place the conical flask on a rotary shaker or in an incubator.
- The mother culture is made from the contents of the flask.
- In bigger flasks, these mother cultures are proliferated even more.
- After that, the flasks are maintained on a rotary shaker for 96–120 hours.
- This broth culture should only be kept for 24 hours.
- After that, the fermenters in which the optimum conditions for microbial growth and activity is controlled artificially are used for large scale production.
- For the manufacturing of liquid biofertilizer, the broth from the fermenters is directly transferred to an automatic filling machine and packed into 250 ml, 500 ml, or 1 L pet bottles, depending on demand, leaving 2/3 of the container empty for bacterial aeration.
- After that, automated sealing machines are used to seal the pet bottles. The labels on the bottles used to fill microbial inoculants should include information such as the name of the inoculant, how to use it, the names of the crops, the manufacture date, and the expiration date.
- The bottles are then delivered to the farmer for usage.

CONCLUSION

Biofertilizers are assumed to be a viable and non-toxic alternative to synthetic agro-chemicals, including fungal control and avoidance of mycotoxins contamination, taking into account growing consumption requirements on Earth and hazards arising from the excessive use of chemical fertilizers and pesticides. Microbial inoculants are thought to address the drawbacks of chemical-based farming systems, therefore study into the broad use of biofertilizers is one of the most important areas of scientific study for the development of sustainable agriculture.