



Bio-Capsules : A Revolutionary Step in Agriculture

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Introduction

Bicapsule is an encapsulated form of agriculturally important microbes. This capsule was invented by the Indian Institute of Spice and Research (IISR), kozhikode. The technology involves encapsulation of the microorganisms of interest in a gelatin capsule for delivery to agricultural crops for the enhanced soil nutrient solubilization, enhanced growth and yield. The patent on this discovery was filled in 2013. Now, this capsule is easily available in the market. The Hindu on 16 October 2020 gives a separate column on this with a heading "bio-capsule becoming popular among farmers". It enlightened the uses, cost effectiveness etc. "Biocapsules is a revolutionary technology that ensures the successful delivery of biologically competent beneficial microbes," says Santhosh J. Eapen, Director, IISR.

Need for Bio- capsule in Indian Agriculture

India is a country with approx 190 Mha of net cultivated area. With such a large area for cultivation the requirement of fertilizers are also very high. To feed a country with one of the largest population in the world, there is need to increase the productivity and fertilizers alone cannot do this. The total indigenous capacity of N and P₂O₅ increased from 17,000 and 21, 000 tones in 1950/51 to 12 276 million and 5 547 million tons in 2004/05 (<https://www.fao.org/3/a0257e/A0257E03.htm>). Of course with such an increase amount of fertilizers the soil is losing its capacity to thrive the crop. Now, it's time to look an alternative for the chemical fertilizers. The bio-capsule is one of those alternatives. This capsule enhances the soil ecosystem, it can be used for delivering all kind of micro-organisms viz.,



N fixers, nutrient solubilizers/mobilizers, Plant Growth Promoting Rhizobacteria (PGPR), *Trichoderma*, *Burkholderia*, etc. These microbes will solublise the minerals, fixed the nitrogen and also promote the plant growths.

Revolutionary Technique

Santosh J. Epen says that bio-capsule is a revolutionary technology which will ensure the delivery of agriculturally important microbes to the field. Unlike the previous formulation it is easy to handle and Director M. Anandaraj .The bio-capsule costs a nominal amount of transport added by former IISR Rs.100.The production is now being controlled by two licensed private firms with different microorganisms based on the requirement.

Methods and Application

The capsule contains the microorganism



in an immobilized/inactive condition and the cells can be activated by dissolving the capsule in water. This suspension can be diluted and the seeds or seedlings or rhizomes are soaked in the suspension for 30 minutes before sowing/transplanting into the main field. The remaining suspension can be used as soil drench.

Advantages

- Cost effective.
- Precise delivery of microbes.
- Eco-friendly.
- Easy to handle and transport.
- Low production cost.
- Does not need sophisticated technology for production.
- Maintains soil ecosystem with a high microbial population.
- Cut off the need of chemical fertilizers.
- They increase yield up to 30 percent.

Farmers from Kerla, Tamil Nadu, Andhra Pradesh and Gujrat has shown interest in the bio-capsule. Farmers from the urban sides are also showing interest in this due its non residual nature in the field. One of the key attraction of the capsule is that it can be diluted in 100-200 liters of water depending on the requirement, which is equivalent to the 4,000 kg talc based formulation of microbes .The weight of capsule is 1g so the farmers could easily replace 4 tones of powder with 4 kg of capsule. The *Trichoderma harzianum* and

PGPR are being currently marketed under the brand names Trichocap and Powercap.

Conclusion

Production of such bio-capsule is a boon for the agricultural sector. The increasing cost of the fertilizers and other amendments eventually increases the cost of overall production which marginalized the profit of the farmers. Easy availability of such capsules in the market will obviously increases the production in the agriculture sector. On the other hand these capsules does not have any side effect on the soil and have no residual effect in the soil.

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