

MASS PRODUCTION OF PHOSPHATE SOLUBILIZER (PSEUDOMONAS STRIATA)

A group of heterotrophic microorganisms solubilize this fixed phosphorous by producing organic acids and enzymes and make them available to the crops. This group of microorganism is called Phosphorous Solubilising Microorganisms (PSM). Phosphate solubilizing bio-inoculants/biofertilizers are prepared from the bacteria or fungi which solubilize fixed form of phosphate in the soil. The Phosphate solubilising bacterial strains in the starter cultures were needed to be grown in large scale for which their mass production were required.

Mass production of inoculants

So larger conical flasks of 1000 ml were taken and then again starter cultures were transferred to these larger conical flaks containing the appropriate growth media in aseptic conditions for small scale production and for large scale production again 1 litre of the starter cultures were put into the fermenter. Finally continuous agitation and proper aeration was done for about 1 week. The flasks were checked for time to time for the growth of the cell mass and that they were free of any contamination. After 1 week the cell population increased up to 10^9 cells/ml or 10^9 cfu/ml load in the larger conical flasks. Then the conical flasks were stored in cool temperatures so that they can be mixed with proper carrier materials. Moreover, it is not advisable to keep the conical flasks for long time in storage because of the loss of cell load.

Carrier material preparation

The carrier should have the following characteristics a) It should have high organism matter content b) Low soluble salts less than 1% c)

High moisture content capacity. In this experiment for the inoculation to be made charcoal, cow compost and vermi-compost was used as carrier material. There are many steps for preparation of the carrier material. The steps are discussed below-

First about 1 kg of dried cow dung and black coal was brought from different areas. Then by the help of mortar and pestle the entire coal was crushed to dried powdered form. After crushing also the remaining pieces were further powdered by the help of mixer and grinder. The dust form of coal as charcoal was made and to it 1% calcium carbonate and wooden charcoal or activated charcoal was mixed and neutralized so that no contaminants are present A) Similarly the cow dung was also crushed and powdered with the help of mixer and grinder. B) Some amount of vermi-compost was also added as a carrier material.

Preparation of inoculum with carrier material

The mass produced bacterial cell cultures of both *Bacillus* spp. and *Pseudomonas* spp. were taken out of storage and then the cell cultures were mixed with the sterilized carrier materials in individual beakers. The mixing of the carrier materials and the production media were in the ratio 2:1 where 1 part of production media was mixed with 2 parts of carrier material or in other words 30:60 ratio of both. It was done manually and under aseptic conditions. The cell count of that carrier mixed culture was found to be 10^8 CFU/gm. The biofertilizers were packed in polythene bags which are advised to be of 250 gm. Then the packets were left at room temperature for curing.

Storage of biofertilizers

The polythene packets containing biofertilizers were stored in cool place away from direct sunlight. The biofertilizers were then sent to the hilly regions for application on the proper fields of biofertilizer plots.

Reference

Roychowdhury, D., Paul, M. and Banerjee, S. K. (2015) Isolation, Identification and Characterization of Phosphate Solubilising Bacteria from Soil and the Production of Biofertilizer. *Int. J. Curr. Microbiol. App. Sci.* 4(11): 808-815.

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