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Preparation of Biofertilizer by using Plant Endophytes

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ABSTRACT

Bio-fertilizer contains microorganisms which promotes the adequate supply of nutrients to the host plants and ensure their proper development of growth and regulation in their physiology. Living microorganisms are used in the preparation of biofertilizers. Only those microorganisms are used which have specific functions to enhance plant growth and reproduction. There are different types of microorganisms which are used in the bio-fertilizers. Bio-fertilizers offer great potential for not only improving soil fertility but also provide for efficient use of various resources for increasing crop production on sustainable basis. They helps in maintaining long term soil fertility and sustainability by fixing atmospheric N2, mobilizing fixed macro and micro nutrients or convert insoluble P in the soil into forms available to plants, there by increases their efficiency and availability.

Key Words: Biofertilizer, endophytes , nitrogen fixing bacteria.

INTRODUCTION

Bacterial endophhytes ubiquitously colonize the internal tissues of plants, being found in nearly every plant worldwide. Some endophytes are able to promote the growth of plants. For those strains the mechanisms of plant growth-promotion known to be employed by bacterial endophytes are similar to the mechanisms used by rhizospheric bacteria, e.g., the acquisition of resources needed for plant growth and modulation of plant growth and development. Similar to rhizospheric plant growth prmoting bacteria, endophytic plant growth-promoting bacteria can act to facilitate plant growth in agriculture.

Objective

Preparation of biofertilizer by using plant endophytes

Materials and Methods

Preparation of mother cultures:

Mother culture of selected strains are obtained after ascertaining their performance in green house and at field levels. The pure culture of efficient strain of nitrogen fixing organism is grown on respective agar medium on slant and maintained in laboratory. A loopful of inoculum from the slant is transferred in a 250 ml capacity conical flask containing liquid medium. Kept conical flask on rotatary shaker for three days .The content of these flasks attain a load of 105 cells per ml called mother culture. This other culture are further multiplied in larger flasks.

Preparation of broth cultures:

Prepared liquid medium for respective bacteria. Distribute equal quantity in big conical flasks.Sterilize it in autoclave for half an hour at 15 lbs pressure. After sterilization each flask containing suitable broth is inoculated with the mother culture in 1:5 proportions aseptically .Kept the flask on rotatory shaker for 72 hours until the viable count per ml reaches to 109 cells. The broth become more thick in consistency.

Preparation of carrier:

Lignight is used as carrier in the preparation of biofertilizers. The carrier are crushed and powdered to 200 mesh. It is neutralized by adding of 1% calcium carbonate and sterilized at 15 lbs pressure for 4 hours in autoclave.

Preparation of inoculate:

The sterilized and neutralized lignitte is mixed with high count broth culture. About 1 part by weight of broth is required to 2 part of dry carrier.

Curing :

After mixing thr broth culture and lignite in 1:2 proportion then it is kept for curing at room temp for 7 days.After curing it is sieved to disperse the concentrated pockets of growtg and to break the lumps.

Filling and Packing:

After curing , sieved powder if filled in polythene bags leaving 2/3 space open for aeration of the bacteria. Then the bag is packed.

Storage:

For long survival of microorganisms the bag are stored in cold storage at 40 c temp.

Result

Biofertilizer prepared by using endophytes was used on tomato plant and it is noticed that the plant growth is better than the normal soil.

Discussion and conclusion

Environmental stresses are becoming a major problem and productivity is declining at an uprecedented rate. Our dependence on chemical fertilizers and pesticides has encouraged the thriving of industries that are producing life-threatening chemicals and which are not only hazardous for human consumption, but can also disturb the ecological balance. Biofertilizers can help solve the problem of feeding an increasing global population at a time when agriculture is facing various environmental stresses. It is important to realise the useful aspects of biofertilizers and implement their application to modern agricultural practices

References

Raja N. 2013. Biopesticides and biofertilizers: ecofriendly sources for sustainable agriculture. J Biofertil Biopestici, vol.4 (1).

SOER 2015 — The European environment — state and outlook 2015

Megali L, Glauser G, Rasmann S. 2013. Fertilization with beneficial microorganisms decreases tomato defenses against insect pests. Agron Sustain Dev. doi:10.1007/s13593-013-0187-0.

Food and Agricultural organization of the United Nations, Soil bulletin 20,

Prof. Dr. Zulkifli Hj. Shamsuddin, University Putra Malaysia, in Inaugural Lecture of 17thJune 2005

Wikipedia, the free encyclopedia

Vessey J.K. 2003. Plant growth promoting rhizobacteria as biofertilizers. Plant Soil,255:571–586

Fuentes-Ramirez LE, Caballero-Mellado J. Bacterial biofertilizers. In: Siddiqui ZA, editor.PGPR: biocontrol and biofertilization. The Netherland: Springer; 2005. pp. 143–172.

Siddiqui ZA, Mahmood I. 1999. Role of bacteria in the management of plant parasitic nematodes. A review. Bioresour Technol; 69:167–179.

Ghumare, M. Rana, O. Gavka and B. Khachi 2014. Bio-fertilizers-increasing soil fertility and crop productivity. J Indust Pollution Control.

Niir Bord, The Complete Technology Book on Biofertilizer and Organic Farming, Niir Project Consaltancy services.