

## Microbial population and soil enzyme activities in the rhizosphere of groundnut plants treated with compost enriched with optimum levels of microbial inoculants

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An investigation was carried out under green house PNP condition to know the effect of enriched compost with different levels of *Aspergillus awamori*, *Trichoderma harzianum* and *Glomus mosseae* on microbial population and soil enzymatic activities in the rhizosphere of groundnut plants. Results revealed that acid phosphatase activity and dehydrogenase activity was recorded maximum (35.83 and 198.05 micro grams PNP/g soil, respectively) in the rhizosphere soil of plants inoculated with *Aspergillus awamori*(10<sup>-8</sup>/ml)+ *Trichoderma harzianum*(10<sup>-4</sup>)+ *Glomus mosseae*(40spores/10gm soil inoculum)+compost(4g/kg soil),also more bacterial population(14X10<sup>4</sup>CFU/ml)and maximum per cent mycorrhizal colonization(80.5%)was recorded in the root bits of plants, however maximum mycorrhizal spore number (127 spores/50g soil)was recorded in the rhizosphere soil of plants treated with *Aspergillus awamori* (10<sup>-8</sup>/ml)+ *Trichoderma harzianum*(10<sup>-4</sup>)+ compost(4g/kg soil)followed by *Aspergillus awamori*(10<sup>-8</sup>/ml)+ *Trichoderma harzianum*(10<sup>-4</sup>)+ *Glomus mosseae*(40spores/10gm soil inoculum)+compost(4g/kg soil).where as alkaline phosphatase activity was recorded maximum (34.27micro gram PNP/g soil)in the soil treated with *Aspergillus awamori*(10<sup>-8</sup>/ml)+ *Trichoderma harzianum*(10<sup>-4</sup>)+ compost(4g/kg soil).Interestingly,maximum fungal population (10X10<sup>2</sup>CFU/ml) recorded in the treatments included mycorrhizal fungi. In general, actinomycetes population was recorded in all the inoculated plants, but in 10<sup>-2</sup> dilution maximum population recorded in the plants treated with *Aspergillus awamori*(10<sup>-8</sup>/ml)+ *Trichoderma harzianum*(10<sup>-4</sup>)+ *Glomus mosseae*(40spores/10gm soil inoculum)+compost(4g/kg soil). Least were recorded in uninoculated control plants.

Key words : Rhizosphere, Microbial inoculants, Soil enzyme, Groundnut

### INTRODUCTION

Groundnut (*Arachis hypogla*) is an annual legume with 3-4 foliate leaves is an important contributor of vegetable oil in India. It occupies a prime place among oil seeds of our country. About 80% of the production is used up for oil alone. The average pod yield for India is around 1 t ha<sup>-1</sup> during the *kharif* season and 1.7 t ha<sup>-1</sup> for the *rabi* season. Seedling diseases caused by, *Fusarium*, is the economically important disease of ground nut (Ali *et al.*,2000). Biological control of this disease will be an ecofriendly approach with no deleterious effect on the environment. The use of biocontrol strategies offers several advantages over chemical control, as it is economical, self-perpetuating and usually free from residual side effects. There have been some scientific reports suggesting that dual inoculations with arbuscular mycorrhizal(AM)and saprophytic soil fungi may cause an additive or synergetic growth enhancement of the inoculated host plant. Vanitha and Anasuya(1998) showed significant rise in P content of soil and plants when

inoculated with compost along with *Aspergillus awamori* and AM fungi. Some *Trichoderma* spp. have shown antagonistic potential against pathogenic fungi and a beneficial effect on plant growth. Different mechanisms have been suggested as being responsible for their biocontrol activity,which include competition for space and nutrients,secretion of chitinolytic enzymes,mycoparasitism and production of inhibitory compounds(Haram *et al.*, 1996; Zimand *et al.*, 1996). The rhizosphere is a volume of soil as influenced by plant roots (Hiltner, 1940) and it is a region where the plants and microorganisms interact very closely. The nutrient accumulation in the soil is due to the action of microorganisms that decomposes the organic matter in the soil and thus promotes the plant growth. The biological activity in soil provides better insight in understanding the decomposition and transformation of organic matter.The interactions between microorganisms and their influence on mycorrhizal root colonization, disease control and plant growth enhancement, the changes produced in the soil microbial