

Research Paper :

# Screening of Rhizospheric Bacteria as Growth Promoter and Biocontrol of Fungal pathogen of Groundnut and Soybean

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## SUMMARY

Rhizospheric bacteria were isolated from soil of different crop plants and identified and characterized as a *Rhizobium*, *Azotobacter*, *Azospirillum*, and *Pseudomonas*. All isolates were able to inhibit the growth of fungal pathogens of groundnut and soybean by producing siderophore. There was also considerable increase in height, weight and germination period of seedling of groundnut and soybean by seed inoculated with rhizospheric bacteria.

## Key words :

Rhizospheric  
bacteria,  
Biocontrol,  
Soybean,  
Groundnut

Rhizospheric bacteria promote the growth of crop plants, by synthesis of plant growth regulators auxin, gibberellin and ethylene etc. siderophore, HCN and antibiotics (Arshad and Frankenberger, 1992). Indole acetic acid (IAA) is one of the most physiological active auxins produced by several plant growth promoting rhizobacteria (Frankenberger and Brunner, 1983), which increase plant growth by solubilizing phosphate (DeFreitas *et al.*, 1997). They suppress the growth of deleterious microorganisms by production of siderophore, antibiotics, and cyanide (Edi, 2005). Siderophore is an iron chelating compound produced by microorganisms under iron stress condition, which results in elimination of fungal pathogens by iron starvation in soil (Arora *et al.*, 2001).

The phytopathogenic fungi cause number of diseases such as charcoal rot, dry rot, wilt, in crop plants. To control these phytopathogens, chemical management is not feasible, as pathogens are both seed and soil borne. Biocontrol can thus offer a very good alternative for management of the pathogens. Therefore, rhizospheric bacteria were isolated which promote growth of plant and inhibit the growth of soil and seed borne phytopathogens.

## MATERIALS AND METHODS

The rhizospheric bacterial strains used in this study were isolated from rhizospheric soil

of different crops and identified by growing on selective media *i.e.* *Azotobacter* on Ashby's agar medium, *Azospirillum* on Nitrogen free nutrient agar, *Rhizobium* on Yeast extract manitol agar and *Pseudomonas* on Citramide agar. Plant pathogenic fungi *i.e.*, *Alternaria alternata*, *Aspergillus flavus*, *Fusarium oxysporum*, *Macrophomina phaseolina*, were isolated from the diseased seeds of groundnut and soybean by blotter technique (DeTempe, 1963). These pathogen were identified by using standard literature of mycology (Alexopoulos, 1962).

## Siderophore assay:

Siderophore production by the different rhizospheric bacteria was tested by chromo azural S (CAS) assay (Schwyan and Neilands, 1987). Siderophore production was also checked by the top layer method. The strains were spread over citramide agar and incubated for 48h at 30°C. After incubation, a thin layer of CAS reagent in 0.7% agar was spread on the bacterial growth and plates were again incubated for 24h at 30°C, formation of yellow orange zone around the colonies indicates siderophore production (Carson *et al.*, 1992). The type of siderophore produced by rhizospheric bacteria was determined by growing on Succinate medium (Meyer and Abdullah, 1978) containing g/l succinic acid 4,

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