

**ISOLATION, IDENTIFICATION AND CHARACTERIZATION OF  
FUNGAL ISOLATES FOR THEIR POTENTIAL AS BIO-FERTILIZER**



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## ABSTRACT

The worldwide increase in both environmental damage and human population pressure have the unfortunate consequence that global food production may soon become insufficient to feed the world's people. It is, therefore, essential that agricultural productivity should be significantly increased within the next few decades. To this end, agricultural practice is moving towards a more sustainable and environmentally friendly approach to overcome the loss caused by the chemical fertilizer. The aim of current study was to explore different fungi that can be used as biofertilizer. The study involves the isolation of different fungi from the rhizosphere of various agriculture farms. After isolation, 18S rRNA identification was carried out and fungi were belonging to genus *Penicillium*, *Talaromyces*, *Trichoderma* and *Aspergillus*. Indole Acetic Acid (IAA) estimation was carried out using Salkowski reagent. Fungal isolates were allowed to grow in cultivation media (Potato Dextrose Broth, PDB) in which one was supplemented with tryptophan (TRP) and one without TRP. Primary screening was carried out and eleven fungi were further screened. Phosphate solubilization was assessed in Pikovskaya's media and later estimated using a stannous chloride method, showing decent solubilization of phosphate. Siderophore production was also assessed using CAS assay that indicated good extent of siderophore production. Further for biocontrol, enzymatic assay for  $\beta$ -glucanase and chitinase were carried out. For cellulase enzyme production 1% carboxymethylcellulose (CMC) and for chitinase enzyme production 10% v/v colloidal chitin (as a sole carbon source) was supplemented in solid minimal-medium-9 (MM9). Antagonism effect of the test fungal isolate was carried assessed against *Aspergillus niger*, *Rhizoctonia solani* and *Fusarium oxysporum*. *Talaromyces pinophilus* strain M13 showed several PGP traits and thus was screened for preparing liquid bioformulation and seed germination assay on chick-pea (*Cicer arietinum*) was performed. Field trials on banana crops were also achieved. The bioformulation exhibited augmented crop productivity compared to control crops. All the experimental data of biochemical assessment with pot and field trials suggest *Talaromyces pinophilus* M13 as a novel fungus and can be used as biointensifier.

**Keywords:** PGPF, Biocontrol agent, *Talaromyces pinophilus*, Bioformulation and Biofertilizer