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Isolation, screening of *Pseudomonas spp*. for plant growth promotion & antagonistic activities and compatibility with pesticide molecules: An *in vitro* study

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Plant growth-promoting rhizobacteria (PGPR) are beneficial bacteria that colonize plant roots and enhance plant growth by a wide variety of mechanisms. The use of PGPR is steadily increasing in agriculture and offers an attractive way to replace chemical fertilizers, pesticides, and supplements. Here, we have isolated, screened and characterized the PGPR from the rhizosphere / non rhizospheric soil. Soils samples were collected from different areas of Rangareddy district in Andhra Pradesh, India. Twenty four (24) isolates of plant growth promoting *Pseudomonas spp*. were isolated and identified based on their morphological, physiological and biochemical characteristics using standard methods and 2 isolates were collected from Guntur district. These test isolates were screened *in vitro* for PGPR properties like phosphate solubilization, siderophore, IAA, HCN productions, antagonistic activity against *Rhizoctonia solani*, *Sclerotium rolfsii* and compatibility with commonly used pesticide molecules. The results revealed that all the *Pseudomonas* isolates positive for IAA production, 76.9% for phosphate solubilization, 92.3% for ammonia, 88.46% for siderophores and 80.76% for HCN productions. Out of 26 *Pseudomonas* isolates 8 isolates viz., CBuP2, CRpP2, SBuP1, SRuP1, ABpP1, ARuP2, AmaP1 and AmaP2 showed inhibition potential against both *Rhizoctonia solani* and *Sclerotium rolfsii*. The maximum per cent inhibition against *Rhizoctonia solani* was showed by ABpP2 (37.75%). The maximum per cent inhibition against *Sclerotium rolfsii* was showed by AmaP2 (42.40%). The isolate that showed maximum inhibition potential against *Rhizoctonia solani* was also inhibitory to *Sclerotium rolfsii* to a lesser extent based on per cent inhibition and vice versa. Hence it can be inferred that the *Pseudomonas* isolates CBuP1, CBpP1, CBpP2, SBuP2, ABuP1, ARpP2 and AmaP1 could be considered for their bio control activity. Among the pesticides tested Azoxystrobin (fungicide), Flubendiamide (insecticide) and Pretilachlor (herbicide) were found to inhibit *Pseudomonas* at recommended/ half recommended dosage. However other fungicides, insecticides and herbicides were compatible with all the isolates tested. Out of the 26 isolates tested for their compatibility with the four each of the fungicides, insecticides, herbicides and based on their PGPR attributes and antagonistic activity, the isolate of *Pseudomonas* isolate ARuP1 showed potential as PGPR.

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