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Plant growth promoting, biocontrol and antioxidant activities of endophytic actinomycetes of rice

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Actinomycetes has been routinely exploited in agriculture and industry because of their ability to produce a broad range of antibacterial, antifungal and plant growth regulatory metabolites. But the endophytic niche inside the plants occupied by actinomycetes is overlooked and relatively unexplored. Endophytic actinomycetes have recently been garnering attention for their ability to improve and promote the growth of host plants as well as in reducing disease symptoms through various mechanisms. In rice, there is a paucity of information on endophytic actinomycetes with plant growth promoting potential. Hence, in this study, the endophytic actinomycetes associated with the healthy leaves and roots of a drought tolerant rice genotype were isolated and assessed for their intrinsic plant growth promoting potential in addition to biocontrol and antioxidant activities.

The rich starch casein agar was found to be more suitable for isolation as it enabled growth of a higher diversity of actinomycetes than the tap water yeast extract medium while roots were observed to be a good habitat for actinomycetes than leaves. Eighteen isolates unique in their morphological characteristics like color of aerial mycelia, substrate mycelia, spore mass color, pigment production and colony size were selected and screened. Four isolates increased the germination percentage of inoculated seeds of rice variety Swarna when evaluated through *in vitro* germination studies. All eighteen isolates produced indole acetic acid ranging from 16.06-37.43 µg/ml. Sixteen isolates tested positive for siderophore production while three isolates demonstrated antagonism towards the rice pathogen *Rhizoctonia solani*. ACC deaminase activity which can aid in reducing stress ethylene production in plants were observed in six isolates. Culture filtrates of five isolates also exhibited antioxidant activity ranging from 9.49-24.88 µg ascorbic acid equivalents /ml as measured by ammonium molybdate reduction method indicating the potential of isolates to confer tolerance to plants experiencing oxidative distress caused by different biotic and abiotic stresses.

The isolates of actinomycetes showed great versatility in the production of bioactive metabolites with several isolates demonstrating multiple plant growth promoting mechanisms. The present study was able to successfully isolate endophytic actinomycetes with multiple plant growth promoting capabilities. With further studies, effective strains can be selected to be used as a component of integrated management systems for plant growth promotion, stress tolerance and pest management.

Biography

K V Prasad Babu has completed master's degree in microbiology from Osmania University, Hyderabad. Currently, he is working as a Research Assistant in Microbiology under the supervision of Dr. P C Latha at Directorate of Rice Research, Hyderabad, India.

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Effect of Bt cotton gene on generalist predator, *Chrysoperla carnea* Stephens

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Comparative biology and feeding potential of *C. carnea* on aphid reared on Bt cotton hybrids (MECH 12 Bt and MECH 162 Bt), non Bt hybrids (NTCH 1482 and NHH 44), and on eggs of *Corcyra cephalonica* was studied in the laboratory during 2005-06 to understand the effect of Bt gene of cotton on a generalist predator, *Chrysoperla carnea* via aphids fed on the cotton. Observations on duration of the larval instars of the predator, predatory potential of each instar, total grub period, pupal period, egg period, fecundity and hatching showed no significant differences among the Bt and non-Bt treatments, suggesting no negative effect of Bt Cry 1 Ac gene on the predator.

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