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DETERMINATION OF INDOLE ACETIC ACID PRODUCING AND ANTAGONISTIC POTENTIAL OF ENDOPHYTIC FUNGAL SPP. PRESENT IN TWO RICE VARIETIES IN SRI LANKA

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Abstract

The health problems caused by extensive use of agrochemicals in rice cultivation in Sri Lanka necessitates investigations on alternative, less harmful methods of maintaining productivity and for disease management. Endophytic fungi (EF) of many plant spp. have been reported to have the ability to enhance plant growth through the synthesis of Indole Acetic Acid (IAA) and to possess mechanisms of fungal pathogen control. Therefore, the present study was carried out to evaluate the levels of IAA production by the EF isolated from two rice varieties Bw 367 and Suwandel with the aim of using them for increased crop productivity. Preliminary screening of growth inhibition of two rice pathogens by the EF was also carried out as a means of using them in disease management. Healthy plant samples of rice varieties Bw 367 and Suwandel were collected during the Yala and Maha seasons (2019) from Anuradhapura, Kurunegala, Gampaha and Kalutara districts, in Sri Lanka. Endophytic fungal spp. were isolated onto 2 % Malt Extract Agar medium. The isolates were identified based on morphological features and molecular characterization of the ITS region of rDNA. A total of 256 isolates belonging to 30 fungal genera were isolated from the two rice varieties and IAA production by these fungal isolates was then evaluated using Salkowski's assay. The effect of the isolated EF on the growth of *Rhizoctonia solani* and *Bipolaris oryzae*, the causative agents of Sheath blight and Brown spot diseases of rice respectively was also tested under *in-vitro* conditions using the dual culture assay. Amongst the tested isolates, *Microdochium fisheri* and *Dendryphiella* sp isolated from Suwandel produced IAA at significantly high levels of 12.7 $\mu\text{g mL}^{-1}$ and 10.0 $\mu\text{g mL}^{-1}$ respectively ($P < 0.05$). Dual culture studies revealed that *Penicillium oxalicum* and *Fusarium falciforme* isolated from Bw 367 inhibited the colony growth of *R. solani* by 65.3 % and 53.5 % respectively whilst the growth inhibition of *B. oryzae* was less at 36.9 % by both. The study indicated that some of the EF associated with the selected rice varieties have the ability to produce the growth promoting phytohormone IAA whilst some others have the means to control the growth of two common rice pathogens and have the potential to be used for increased productivity of rice as well as for the control of the two rice diseases after further testing.

Keywords: Endophytes, Rice, IAA, Phytopathogens, Antagonism