RESEARCH PAPER

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Effect of plant growth promoting fungal inoculant on the growth of *Arachis hypogea* (L.) and it's role on the induction of systemic resistance against *Rhizoctonia solani*

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Beneficial plant microbe interactions in the rhizosphere are primary determinants of plant health and soil fertility. Plant growth promoting fungi have great effect towards the growth of plant crops. Soil borne pathogenic fungi cause heavy crop losses all over the world. As the use of chemicals for disease control and fertilization causes environmental problems, there is a need for alternative control measures. The most important and economically cultivated plant pea nut was selected to test the growth promotion by antagonistic microorganisms with or without pathogen *Rhizoctonia solani* . This necessitates a study on plant growth promoting fungi (PGPF) as adequate work has gone on rhizobacteria. The present investigation was made to study the effect of PGPF on the growth of *Arachis hypogea* (L.) and its role of induction of systemic resistance against *Rhizoctonia solani.* Forty five rhizosphere fungal isolates were obtained from 12 different cultivated field crops and were screened for their potential to promote growth in *Arachis hypogea* (L.). The isolate (Cc_2) obtained from *Cucumis sotivus* (L.). Duch.ex. poir was identified as the potential plant growth promoting fungus. The effect of soil inoculation of the selected isolate Cc_2 on the growth of healthy plants of *Arachis hypogea* (L.) and those challenged with *Rhizoctonia solani* was studied by pot culture experiment. The effect was studied in terms of morphological and biochemical parameters. The overall vegetative growth of plant (root and shoot development, dry matter accumulation) and Reproductive growth (pod and seed development). The fungal inoculants improved the growth very effectively both in plants challenged and unchallenged with *Rhizoctonia solani.* The soil inoculation of Cc_2 has improved the chlorophyll content, caroteniod content, anthocyanins content, total soluble sugar content, protein content compare to the untreated plants (T_0) and plants infected by *Rhizoctonia solani* (T_1). The phenol and proline contents were found to be more in plants challenged with *Rhizoctonia solani.* The ability of the selected isolate to produce growth hormones was determined. Results revealed that the selected isolate could produce indole acetic acid and gibberellic acid. The *in vitro* study by dual culture method revealed that there was a negative interaction (Antibiosis) between the plant growth promoting fungal inoculant (Cc_2) and the pathogen *Rhizoctonia solani.* It could be concluded that the selected isolate Cc_2 proved to be a potential fungus in promoting plant growth and yield in *Arachis hypogea* (L.) and in inducing systemic resistance in *Arachis hypogea* (L.) against *Rhizoctonia solani.* Finally Cc_2 was identified as *Rhizopus* sp. in generic level.

Key words : Plant growth promoting fungi (PGPF), Phytopathogens, Caroteniod, Antagonistic, Rhizobacteria.

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INTRODUCTION

Environmental concerns have led to the need for sustainable use of natural resources. The conventional agriculture has caused considerable impacts on soils and water. It is important to change certain agricultural managements to environmental cleaner techniques. The sustainable agriculture has pointed many approaches and techniques to reduce environmental impact. One of these strategies is the utilization of soil micro biota for the promotion of plant growth and control of plant diseases..