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RESEARCH ARTICLE

Biochemical changes in rice plants due to application of bioinoculant, organic product, plant activator and moculation of *Pyricularia oryzae*

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ABSTRACT

The present study were undertaken to investigate the changes of biochemical and enzymatic constituents in rice plants due to application of bioinoculant, *Serratia marcescens,* plant activator, Nicotinic Acid (NA), organic product *Panchakavya* (PK) and *Pyricularia oryzae* inoculation under pot culture conditions. Among the various treatments, combined application of SMS (seed treatment with *S.marcescens* @ 10g/kg of IR 50 rice seed), NA_1 (foliar application of NA @ 0.1 per cent for 15 days after transplanting (DAT)) and PK_2 (foliar application of PK @ 5 per cent on 30 DAT) was significant changes of biochemical and enzymatic constituents in rice plants. The phenolic content (total and O.D. phenol) increased with application of SMS, NA and PK. Reducing sugars were found generally decreased after the initial sampling. Application of SMS, NA_1 and PK_2 combinations reduced the accumulation of non-reducing and total sugars. The starch content was found increased due to combined application of SMS with NA_1 and PK_2 and *P.oryzae* inoculation. Blast infection increased the protein content of rice leaves. Application of SMS, NA_1 and PK_2 reduced the protein accumulation. The increased activity of PO and PPO was observed due to SMS, NA_1 and PK_2 application at all the sampling periods. Sampling after *P.oryzae* inoculation influenced the ascorbic acid oxidase and peroxidase activity. The level increased up to 14^{th} day of sampling and then reduced.

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INTRODUCTION

Rice continues to be the major staple food crop for human population. With the twin forces of population growth and economic expansion particularly in Asia, world rice requirements are expected to increase by 1.7 per cent annually between 1990 and 2025. Although seemingly small, this growth rate translates into an additional requirement of 13 million tonnes of rice per year. With less land available to expand rice-growing areas with competing demands from urbanization and industrialization on existing rice lands and irrigation water, production increase should come from intensive agriculture in existing lands of favourable and less favourable areas. This can yield some negative non-target effects such as serious increases in pest and disease pressure, for instance the catastrophe caused by rice blast (Zeigler *et al.,* 1994).

Blast of rice caused by *Pyricularia oryzae* Cavara (*Magnaporthe grisea*) is found to occur in almost all the rice growing countries and is the most destructive fungal disease of rice causing loss up to 90 per cent (Mehrotra, 1980) despite, decades of research towards its control. The possible control measures of blast disease are the use of fungicides, growing resistant varieties, application of organic amendments, balanced nutrition, biological agents and resistance inducing chemicals. The indiscriminate use of chemical fungicides