

EFFECTS OF MICROBIAL ANTAGONISTS ON INDUCING DEFENSE RELATED ENZYMES IN RICE TISSUES TOWARDS CONTROL OF SHEATH BLIGHT

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The present study was conducted to quantify the defense related enzymes, chitinase and β -1,3-glucanase, towards the reduction of rice sheath blight due to application of microbial antagonists. In this study, bacterial antagonists, namely *Bacillus megaterium* and *Bacillus subtilis* and a fungal antagonist (*Aspergillus niger*) were applied to rice variety BW 361, grown in pots arranged in a completely randomized design with three replicates. Chitinase and β -1,3-glucanase activity in rice sheath tissues were quantified spectrophotometrically. Disease incidence and disease severity were quantified. The effects of the treatments on chitinase activity, β -1,3-glucanase activity, disease incidence and disease severity were analyzed using analysis of variance (ANOVA) and mean separation was done by Duncan's multiple range test (DMRT). Findings of the present study showed that treatments had a significant influence ($P < 0.05$) on percentage disease incidence and disease severity. Talc-based spore formulation of *B. megaterium* (T₁) had reduced disease severity in terms of percentage infected tillers per plant by 51.37 %, Talc-based spore formulation of *B. subtilis* (T₂) by 44.56 %, Talc-based spore formulation of *A. niger* (T₃) by 36.39 % and mixture of talc-based spore formulation of *B. megaterium*, *B. subtilis* and *A. niger* (T₄) by 50.26 % in comparison to the positive control (T₆) which has no application of any microbial antagonists. With respect to lesion length, T₁ had reduced disease severity by 67.35 %, T₂ by 59.47 %, T₃ by 51.74 % and T₄ by 71.54 % in comparison to T₆. Treatments had a significant influence ($P < 0.05$) on chitinase activity in rice sheath tissues. The highest percentage of chitinase activity was reported by T₃. T₃ had induced chitinase activity in rice sheath tissues by 83.04 % in comparison to positive control (T₆). There was no significant influence by the treatments on development of β -1,3-glucanase activity in rice sheath tissues ($P > 0.05$). The finding revealed that the ability of talc based formulations of *A. niger*, *B. megaterium*, *B. subtilis* and the mixture of those three antagonists in reducing sheath blight incidence and severity and increasing of chitinase activity in rice sheath tissues.

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