

Modulation of insect-induced oxidative stress responses by microbial fertilizers in *Brassica juncea* FREE

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ABSTRACT

Microbial fertilizers have increasingly gained popularity as environmentally sustainable nutritional supplement for plant growth. However, the effect of these microbes on plant-induced responses and the resultant effect on late-arriving herbivores are still unclear. Following insect herbivory, oxidative stress is one of the earliest responses induced in plants. Therefore, we analyzed the effect of phosphorus solubilizing bacteria (PSB), vesicular-arbuscular mycorrhiza (VAM) and their combination on oxidative stress in *Brassica juncea* against *Spodoptera litura* herbivory. Six antioxidant enzymes, viz. superoxide dismutase (SOD), catalase (CAT), peroxidase (POD), ascorbate peroxidase (APX), monodehydroascorbate reductase and glutathione reductase (GR), were studied. Our results indicated a sporadic increase of APX and GR in PSB-supplemented plants. In contrast, VAM-supplemented plants showed an active systemic response against herbivory with an increase in all the six enzymes at 72 h. Conversely, supplementation of PSB–VAM together led to increased APX, SOD, CAT and POD enzymes, which subsided by 72 h. Thus, the presence of VAM, alone or in combination with PSB, acted like a vaccination for plants against stress. However, the mode of action of PSB and VAM governed the temporal dynamics of antioxidants. Our study thus shows microbial fertilizers have prominent effects on plant immunity.

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