

BRIEF COMMUNICATION

Lead induced oxidative stress and alteration in the activities of antioxidative enzymes in rice shoots

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Abstract

Physiological responses of *Oryza sativa* L. to lead excess (10 and 50 μM) were studied in a hydroponic system after 48- and 96-h exposure. Accumulation of Pb in stressed rice shoots was concomitant with an increased metal concentration in the growth media and duration of exposure. The Pb stress resulted in an enhanced lipid peroxidation accompanied by altered activities of antioxidants. A substantial increase in α -tocopherol content of the Pb stressed rice shoots was observed suggesting its important role as an antioxidant. Among the antioxidant enzymes studied, activities of superoxide dismutase (SOD) and ascorbate peroxidase (APX) increased in the Pb-treated rice shoots, whereas that of catalase (CAT) declined. Activity of an important ascorbate-glutathione cycle enzyme, glutathione reductase (GR), also increased significantly in the Pb-treated shoots. The results suggest that Pb toxicity resulted in induction of oxidative stress in rice shoots, and α -tocopherol accumulation and upregulation of SOD, APX, and GR activities play an effective role in acclimatization to Pb stress.

Additional key words: α -tocopherol, ascorbate peroxidase, catalase, glutathione reductase, lipid peroxidation, *Oryza sativa*, superoxide dismutase.