Differential Response in Scavenging of Reactive Oxygen Species in Rice var. IR 20 Exposed to Sublethal and Lethal Level of NaCl Stress

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The effects of NaCl on plant growth, oxidants production, antioxidant activity and ion accumulation were analysed in both pretreated [plants treated with sublethal (50mM) dose of NaCl before subjecting to lethal dose (100mM) NaCl]and non-pretreated [plants directly subjected to lethal dose (100mM) NaCl] rice seedlings. A significant reduction in shoot length, root length, leaf area and total dry matter production was observed in nonpretreated plants than pretreated plants. The pretreated plants had reduced contents of superoxide radical (O_2^{-}) , hydrogen peroxide (H_2O_2) , malondialdehyde (TBARS contents) coupled with lipoxygenase (LOX) activity over non-pretreated plants. The antioxidant enzymes viz., superoxide dismutase (SOD), catalase (CAT), peroxidase (POX) and ascorbate peroxidase (APOX) had shown a significantly higher activity in pretreated plants over non-pretreated plants. The pretreated plants showed improved ionic regulation than non-pretreated plants as evidenced from lower Na⁺, Cl⁻ and higher K⁺ contents. The roots of both pretreated and non-pretreated plants had lower Na⁺ and Cl⁻ contents than leaves. Our results suggest that pretreatment of rice seedlings with sublethal dose of NaCl enabled the plants to acclimatize to lethal NaCl stress by enhanced antioxidant enzyme activity and reduced oxidants production, membrane deterioration, sodium and chloride contents.