

Physiological Defense of Rice (*Oryza sativa* L.) During Salt Stress

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The mechanism(s) imparting salt tolerance in plants in respect to the physiological aspects remain unresolved. The aim of this study was to identify and determine the differential physiological responses of three varieties of rice to induced salinity levels of 4, 6 and 8 dS m⁻¹ at three growth stages (seedling, tillering and flowering). The highly salt tolerant variety, Pokkali showed increased super oxide dismutase (SOD) activity (19% - 71%) and a decrease in ascorbate peroxidase (APX) activity. On the other hand At 353 (moderately tolerant) had a slight increase in SOD and high content of APX (174%). This variety showed symptoms of oxidative damage at 8 dS m⁻¹ similar to that of IR 28 variety (salt sensitive). The salt treatment resulted in a decreased SOD and increase in the content of APX to a high level, 116% - 432% in IR 28. Induced salinity significantly decreased chlorophyll content (20 - 64%) and photosynthesis rate (14 - 70%) in all varieties under experimental conditions. These results indicate that, SOD was the main antioxidant enzyme in highly tolerant rice varieties and APX in moderately tolerant and sensitive varieties.

Another stress indicator proline was higher in leaves than in roots, and leaf proline showed positive correlation with root proline. Induced salinity caused an increase in proline in leaves of Pokkali by 431% at seedling stage over the control at EC= 8 dS m⁻¹. At tillering stage, most varieties accumulated higher amounts of proline in leaves compared to other stages. Pokkali, At 353 and IR 28 showed a significant reduction during flowering stage. The pattern of change of root proline was same as that of leaf proline.

Key words: Salinity, SOD, APX, Proline