

E231 Biochemical Changes of Antioxidant Enzymes in the Senescing Leaves of Rice Plant

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Biochemical changes of senescence-induced active oxygen species by invoking antioxidant response system were investigated in the leaves of rice (*Oriza sativa* L. cv. Dongjin). The levels of H₂O₂ contents were gradually increased during leaf senescence. Catalase activity was decreased during leaf senescence. Unlike catalase deactivation, the activities of ascorbate peroxidase (APX), peroxidase specific to guaiacol, and glutathione reductase (GR) were increased in the senescing leaves. In order to analyze the changes of antioxidant enzyme isoforms during leaf senescence plant extracts were subjected to native PAGE. The leaves of rice had five isoforms of Mn-SOD and two isoforms of Cu/Zn-SOD. No Fe-SOD isoform was observed in the plants. In addition, the leaves had seven isoforms of APX and seven isoforms of GR. These results suggest that leaf senescence induces a gradual increase of H₂O₂ contents in the leaves of rice and the accumulation of H₂O₂ in the senescing leaves activates the enzymes of ascorbate-glutathione cycle under catalase deactivation.

E232 Salt Stress-Induced Biochemical Changes in Antioxidant Enzymes of Rice

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Biochemical changes of salt stress-induced active oxygen species by invoking antioxidant defence system were investigated in the leaves of rice (*Oriza sativa* L. cv. Dongjin). Salt stress preferentially enhanced the activities of the superoxide dismutase (SOD), ascorbate peroxidase (APX), and peroxidase specific to guaiacol, whereas it induced the decrease of catalase activity. On the other hand, glutathione reductase (GR) was not affected by salt stress. In order to analyze the changes of antioxidant enzyme isoforms against salt stress plant extracts were subjected to native PAGE. Leaves of rice had five isoforms of Mn-SOD and two isoforms of Cu/Zn-SOD. No Fe-SOD isoform was observed in the plants. Expression of Cu/Zn-SOD and Mn-SOD, particularly that of Mn-SOD was preferentially enhanced by salt stress. Seven ascorbate-specific peroxidase (APX) isoforms were presented in the leaves of rice. The intensities of APX-4 to -7 were enhanced by salt stress, whereas those of APX-1 to -3 were not changed for salt stress. Gel stained for GR activity revealed seven isoforms in the plants. Activation levels for most of GR isoforms were not changed in the stressed-plants compared to the control plants. These results collectively suggest that salt stress activates the enzymes of SOD/ascorbate-glutathione cycle under catalase deactivation in the leaves of rice except that GR activity is not affected by salt stress.