The Effects of Acid Rain, Smog Cars on Antioxidant Systems, Associated Enzyme and H⁺-ATPase Activity in Rice Cultivars (Oriza sativa L.)

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Abstract : The effects of acid rain (AR), smog's cars (SC), and combined AR+SC on the antioxidants enzymes, lipid-soluble antioxidants, and water-soluble antioxidants were studied in the two cultivars of rice. The results showed that simulated AR significantly increased the total glutathione (TGSH), thiobarbituric acid (TBA), and α -tocopherol, accompanied by decreases in dry weight and leaves area in the two cultivars, and this change was more obvious in Shirudi cultivar than in Aus cultivar (p \leq 0.05). Under SC stress cultivar shirudi had higher H+-ATPase, glutathione peroxidase (GSH-px), and catalase (CAT) activities than cultivar Aus. The results of superoxide dismutase (SOD) activity, TGSH, and α -tocopherol levels affected by AR treatments were very different to those of SOD activity, TGSH, and α -tocopherol levels, as shown in SC treatment. It seems that SOD activity coupled with the water-soluble antioxidants and α -tocopherol levels correlated with the lipid-soluble antioxidants. It is suggested that α -tocopherol increases H+-ATPase activity.

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