

OXIDATIVE STRESS INDUCED BY CADMIUM IN PLANTS

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Soil and water contamination with metals is a major environmental problem, leading to considerable losses in plant productivity. Exposure to toxic metals can intensify the production of reactive oxygen species (ROS), which are continuously produced in both unstressed and stressed plants cells. We have been working on the antioxidant stress responses of several plant species to heavy metals with special attention to cadmium. The aim of our research is better understand the mode of action and role of antioxidants (enzymatic and non-enzymatic) in protecting plants from oxidative stress. Heavy metals can be extremely toxic to cells and normally are present in low concentrations in the environment. However, human activities have considerably altered such a scenario and many events of environmental contamination have been widely reported in recent years. Cadmium (Cd) is particularly toxic and can generate the production of reactive oxygen species (ROS), which must be dismutated by a group of antioxidative enzymes. We have been studying the biochemical and physiological aspects related to the antioxidative responses by plants (tomato, coffee, soybean, tobacco, rice, radish, sugarcane and crotalaria) to heavy metal (Cd, Ni, Al and Se). The analyses carried have shown that glutathione reductase (GR) normally respond more effectively to heavy metal stress. Other enzymes such as catalase (CAT), superoxide dismutase (SOD), glutathione S-transferase (GST) and other peroxidases vary considerably in their responses, which appear to be dependent of plant tissue, metal concentration and developmental stage. An ongoing project in our laboratory has been initiated using proteomic and molecular approaches to gain further insights into the antioxidative stress responses to these metals.

Key words: Cadmium, Oxidative stress, Plants

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