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The role of zeolite in reducing oxidative damage in tomato plants exposed to drought

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Statement of the Problem: The drought is a worldwide problem and insufficient supply of plants with water is one of the most important causes of low agricultural yields and thus representing one of the most common problems faced by the producers. There has been an increased interest in science in recent years in the use of natural aluminosilicates in agriculture where the most famous is zeolite, a mineral whose absorption properties and balanced release of water and nutritive substances ever more successfully solve the issue of water supplying and mineral nutrition and have beneficial impact on overall plant growth. The aim of this study was to investigate the role of zeolite in prevention of oxidative stress in tomato plants exposed to drought. Changes in the activity of peroxidase (POD, EC 1.11.1.7), catalase (CAT, EC 1.11.1.6), ascorbate peroxidase (APX, EC 1.11.1.11), superoxide dismutase (SOD, EC 1.15.1.1) as well as reduced and total ascorbate content in plant leaves exposed to drought for 28 days were investigated. Activities of antioxidant enzymes in the leaves of plants exposed to drought were at the same level with and without the addition of zeolite. The obtained results indicate that zeolite did not prevent oxidative damages caused by drought. Native electrophoresis resolved the presence of two peroxidase isoforms specific for drought and their activities were higher in tomato leaves whit zeolite. The drought induced an increase in activities of superoxide dismutase, ascorbate peroxidase and ascorbate concentration and this antioxidative strategy was more expressed in zeolite treated plants. Unexpected results related to the role of zeolite open the possibility to different perspectives in discussion on the zeolite role in drought prevention.

Biography

Dino Hasanagic received his degree of M.Sc. from the Faculty of Science in Sarajevo, and he is currently attending plant biochemistry programme at Faculty of Science in Novi Sad, Serbia. His field of interest is antioxidative metabolism of plant cell - effects of abiotic stress (drought, metals, senescence, ROS signaling, redox state). Dr Biljana Kukavica is expert in plant enzyme antioxidative metabolism. Her interest is focused on enzyme and non-enzyme antioxidative defense in plant cell under oxidative stress. Dr Danijela Kojic has a big experience in the field of biochemistry and molecular biology and her researches are addressing the antioxidative enzyme role in adaptation to stress conditions. The expertise and passion of the authors is recognized among their peers, and they constantly expanding their knowledge in researches regarding enzymology.

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