

THE EFFECT OF SALINITY ON ANTIOXIDANT ENZYME ACTIVITY IN BREAD WHEAT GENOTYPES

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Introduction

Salinity is one of the most serious environmental problems that causes osmotic stress and reduction in plant growth and crop productivity by reducing water uptake and cause nutrient disorders and ion toxicity. Bread wheat plays a special role in providing food in all over the world especially in Iran.

The enzymatic antioxidant system such as CAT and POX activity is one of the protective mechanisms against oxidative stress. When plants face harsh conditions like environmental stress, CAT or POX convert H₂O₂ to water. Peroxidation of plasmalemma leads to damage intracellular membrane that can affect respiratory activity in mitochondria and breaking down pigment and leading to the loss of the carbon fixing ability in chloroplasts. These reasons indicate the importance of research about salt stress tolerance mechanisms especially ROS scavenging systems in wheat.

Material and Methods

This study was conducted in pot as a factorial experiment based on CRD with three replications on ten genotypes (Kouhdasht, Azadi, Moghan3, Ohadi, Arta, Bezostaia, Homa, Ghods, Star and Verinak) with three salinity levels (0,100 and 200 mM of NaCl). The activity of CAT and POX in response to salinity was determined in order to detect saline-tolerant genotypes. Enzyme assay was carried out according to Aebi (1).

Salt treatments were applied 50% anthesis and appropriate treatment concentration was reached after two weeks.

Result and Discussion

CAT and POX activity, significantly changed with increasing salt stress levels. Catalase and peroxidase activity were significantly increased in ten genotypes at two salinity levels in comparison with the control (2). Kouhdasht, Bezostaia and Ghods genotypes showed the highest CAT and POX activity under salinity relative to control condition. Salt stress increased the superoxide level in cells. If this radical is not scavenged by antioxidant enzyme, it disturbs vital biomolecules thus Catalase and Peroxidase are very important to inactivate and scavenge H₂O₂ (3).

Earlier investigations have shown that salt tolerant plant cultivars have a more active antioxidant system than salt sensitive cultivars of the same species and are able to establish in saline soils.

Key words: Bread Wheat, Catalase and Peroxidase activity, Salinity.

References

- Aebi, H.1984.Catalase in vitro, Method of Enzymology,105:121-126.
Esfandiari,E., Shakiba.M.R, Mahboob.S, Alyari.H, and Toorchi.M.2007.Water stress, antioxidant enzyme activity and lipid peroxidation in wheat seedling, Journal of Food, Agriculture & Environment,5:149-153.
Rehab,T.B., El-Danasoury.M, and Craker.L.2012.Impact of Ascorbic Acid on Seed Germination, Seedling Growth, and Enzyme Activity of Salt-Stressed Fenugreek. Journal of Medicinally Active Plants,1(3):106-113.



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