



Effects of 1,3-Diaminopropane on photosynthetic activity and antioxidant system in wheat (*Triticum aestivum* L.) under arsenic stress

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Abstract

Abiotic stress factors such as salinity, drought, and heavy metal pollution limit agricultural production by causing loss of plant growth, product quality and yield. Recent studies in the agricultural field have turned to biosafe and sustainable approaches that will increase tolerance to environmental changes in plants and alleviate stress-induced damage. Plant polyamines contain many forms with chemical diversity that play a role in metabolic processes in plants. It is also known that polyamine contents in plants increase as a stress response. Therefore, the use of exogenous polyamines in stress tolerance studies is one of the promising ideas. 1,3-Diaminopropane (DAP) is a simple diamine and the precursor of spermidine, which is essential for growth regulation and signaling pathways in plants. This study examined the effects of exogenous DAP treatments in three dosages (D1, 0.1 mM; D2, 0.5 mM; D3, 1 mM) on plant growth, photosynthesis and antioxidant system in wheat plants under arsenic (As, 100 µM) stress. Wheat seedlings were harvested after 7 days treatment period. All enzyme activity assays and native-PAGE analyses were conducted on samples to evaluate the activity/isozyme compositions of the antioxidant system. Growth parameters, oxidative stress markers and Photosystem II efficiency were detected. Our results show that DAP applications reduced As stress-induced ROS accumulation and lipid peroxidation in wheat leaves. While As stress caused the suppression of the antioxidant system in leaves, it was observed that exogenously applied DAP increased the antioxidant enzyme activities. Furthermore, DAP attenuated stress-induced damage on photosynthesis-related parameters. As a result, the use of natural compounds to increase plant tolerance to abiotic stresses has the potential to improve agricultural production.

Keywords: Antioxidant system, Arsenic, 1,3-Diaminopropane, Stress, *Triticum aestivum* L.