

Silicon Modulate the Thermo Tolerance of Wheat by Triggering the Superoxide Dismutase – The First Enzyme of Antioxidant Defence Network

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Abstract—Amongst various antioxidant enzymes, superoxide dismutase (SOD) plays very important role in antioxidant defense network of the plants against the abiotic stresses. Superoxide dismutase (SOD; EC1.15.1.1) catalyzes the dismutation of superoxide anion radicals into hydrogen peroxide and oxygen, specifically eliminating the ROS and balancing free oxygen radicals. SOD plays very important role in the development as well as stress resistance in plants. An experiment was conducted to study the activity of SOD in contrasting wheat genotypes viz., HD3086 and BT-Schomburgk under exogenous treatment of Si (2.5 μmol), HS (38°C, 2 h) and Si+HS during pollination and milky-ripe stages. We observed non-significant changes in the SOD activity in thermo tolerant cv. in response to Si and HS treatments during pollination stage. BT-Schomburgk showed significant increase in the SOD activity in response to Si; maximum was observed under SI+HS treatment during pollination stage. During mealy-ripe stage, we observed increase in the activity of SOD in response to Si and HS; maximum activity was observed in thermo tolerant cv., as compared to thermo susceptible. Si was observed to mitigate the effect of HS in wheat during both the critical stages of growth and development. SOD activity was comparatively higher in HD3086 compared with BT-Schomburgk in response to both the treatments. The finding in present investigation suggests a potential role of silicon in modulating the thermo tolerance of wheat by triggering the activity of SOD in wheat under heat stress. The effect was more pronounced in thermo susceptible cv., as compared to thermo tolerant.

Keywords: *Triticum aestivum*, SOD, ROS, HD3086, BT-Schomburgk, Silicon.