

# Biochemical and Comparative Proteomic analysis of Indian Mustard Genotypes under Salt Stress

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**Abstract**—The productivity of Indian mustard, an important oilseed crop of the world crop, is greatly affected by salinity, with a large inter-genotypic variation. Development of crop plants that can grow and yield well at high salt concentrations may help in maintaining the crop productivity. However, identification of appropriate genotypes and target candidates for developing salt tolerance poses a formidable challenge. Given this, we procured fourteen different Indian mustard genotypes, and analysed their growth performance and antioxidant defense capabilities at 50mM, 100mM, 150mM and 200mM NaCl treatments. There was a significant decrease in the biomass accumulation, chlorophyll content, salt tolerance index and protein content of leaves. Salinity induces oxidative stress by the overproduction of ROS.

The adaptive response of the Indian mustard plants to salt stress is a multifaceted. It is both genotype as well as salt dosage-dependent. The different NaCl concentrations affect the activities of antioxidants. Among the different genotypes, CS-54 responds well to salt stress, showing increase in the activity of different antioxidants. On the other hand, Pusa agrani exhibits more sensitivity to salt stress than the other genotypes, with substantial membrane damage and relatively lower antioxidant levels during salt stress. On the basis of sensitivity to physiological damage and strength of antioxidant defense system, salt-sensitive and salt-tolerant genotypes were identified. Moreover, a comparative proteomic analysis of these screened genotypes at the cellular as well as the chloroplast level was done to figure out the regulatory network of the plants under salt stress. Several regulatory novel proteins such as SOS2, oxygen-evolving enhancer protein 1, PII-like protein, PT4 transporter and Rubisco activase were figured out, which would pave the way for a better understanding of the complex response network involved in salt stress, and focus new possibilities for developing salt tolerance in Indian mustard.