

Expression and Functional Characterization of Serine Hydroxy Methyltransferase (SHMT) Gene from Salt Tolerant Rice

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Abstract Salt is one of the most important environmental constraints that limits plant growth and agricultural productivity. Identification and characterization of salt responsive genes is first step to understanding the problem of salinity. Serine hydroxymethyltransferase (SHMT), catalyzes the transfer of hydroxymethyl group of serine to tetrahydrofolate and form 5, 10 methylenetetrahydrofolate and glycine have been studied in details for its m-RNA expression in salt-tolerant (CSR27) and salt-sensitive (MI48) indica rice (*Oryza sativa* L.) varieties. Among five SHMT genes present in rice genome, SHMT3 has been used for detailed analysis and in spatiotemporal study (3h, 6h, 12h, and 24h) at 150mM NaCl stressed, the maximum expression was observed at 24hrs NaCl stressed in CSR27 roots as compared to MI48. The full length SHMT3 cDNA was amplified from 150mM NaCl stressed roots of CSR27, cloned in pET29a expression vector and expressed in *E. coli* cells. Recombinant protein was purified with Ni-NTA affinity chromatography, used for catalytic reaction and antibody production. Salt tolerance of SHMT3 was confirmed by growth of *E. coli* in up to 200mM NaCl supplemented media.

Keywords: SHMT, NaCl, Rice, Salt tolerance, chromatography.