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Transcript profiling of stress associated proteins in wheat (*Triticum aestivum*) under heat stress and their biochemical characterization for thermotolerance

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Plant small heat shock proteins (sHSPs) and antioxidant enzymes are known to be important for environmental stress tolerance and involved in various developmental processes. In this study, two full length cDNAs encoding sHSP and superoxide dismutase, designated TasHSP and SODI were identified and characterized from wheat. An alpha crystalline domain was observed in TasHSP and manganese iron binding domain in case of SOD. Quantitative real time PCR showed very high transcript level of TasHSP in C-306 compare to PBW343 at different stages of growth and against differential HS. Quantitative transcript profiling of superoxide dismutase showed 1.3, 1.8, 1.9 fold increase (C-306) and 1.1, 1.3, 1.5 fold increase (PBW343) at pollination, milky dough and seed hardening stages. Expressions of many new heat stable proteins were observed in C-306 compare to PBW343 against heat stress. Western blot analysis revealed the accumulation of one cross-reacting protein band corresponding to the calculated size of 18KDa and the result was well consistent with the mRNA expression pattern of TasHSP in case of C-306 and PBW343 at different stages of growth. Isoenzymes analysis of superoxide dismutase showed expression of three (C-306) and two (PBW343) prominent isoenzymes against heat stress with highest activity at pollination and seed hardening stages. Thermotolerance capacity was analyzed using cell membrane stability and C-306 showed highest CMS (74%) compare to PBW343. TasHSP and superoxide dismutase plays very important role in enhancing thermotolerance capacity of the plants and need to be further characterized and used for developing tolerant cultivar.

Keywords: small heat shock protein, Heat stress, protein profiling, Isoenzymes, western blotting, superoxide dismutase.

Biography

Ranjeet Ranjan Kumar has completed his PhD degree from Indian Agricultural Research Institute, Pusa New Delhi. He got 1st rank in All India Competitive ARS examination during the year 2008 and joined IARI as a scientist in Division of Biochemistry, IARI. He has published many research articles, technical bulletins, manuals, book chapters and scientific reviews in national as well as International journals. He received two young scientist awards by Indian Society of plant physiology and in National symposia by SVPUAT.

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