

# Molecular Cloning and Characterization of Unique Heat Shock Factor 2 Gene in Wheat (*Triticum Aestivum*) under Heat Stress

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**Abstract**—Heat stress is one of the major abiotic stresses which adversely affects the growth and productivity of crops all around the world. Plants cope up with these stresses by bringing changes at cellular and sub cellular level. One of those changes is expression of Heat Shock Factors (HSFs). Very limited number of HSFs has been identified and reported in wheat. Here, we have cloned a unique HSFs gene of 1.4 kb from C-306 cultivar of wheat. BLASTn search showed 98% homology with HsfA gene reported from *Triticum aestivum* (accession no. FJ790791). The cloned sequence was submitted in NCBI GenBank with accession no. JQ801451. Conserved domain search showed the presence of characteristic HSF binding motif in the amino acid sequence. Expression analysis showed positive correlation between the transcripts accumulation of HSF2 and HSP17 in thermotolerant and thermosusceptible wheat cultivars under heat stress; abundance was observed more in thermotolerant, as compared to thermosusceptible. The gene was further cloned in binary vector pRI101AN and successfully mobilized in *Arabidopsis* through floral dip method. The screening is under process. The functional validation of the identified HSF2 in model plant will explore the area for the modulation of stress-associated chaperones involved in regulating the thermotolerance of wheat. The candidate HSF gene can be used as potential marker for screening wheat germplasm for thermotolerance – a novel step towards development of ‘climate-smart’ wheat crop.

**Keywords:** HSF, Floral dip, Wheat, Heat stress, *Arabidopsis*, Stress-associated genes.