J Biotechnol Biomater 2017, 7:4 (Suppl)
DOI: 10.4172/2155-952X-C1-080

18th Biotechnology Congress

October 19-20, 2017 | New York, USA

Mutated and wild type Gossypium universal stress protein-2 (GUSP-2) gene confers resistance to abiotic stresses in transgenic cotton plant

Nadeem Hafeez
Center for Excellence in Molecular Biology (CEMB), Pakistan

Gossypium arboreum is considered to be a rich source of stress responsive genes and EST data base revealed that mostly of its genes are uncharacterized. The full length *Gossypium universal stress protein-2 (GUSP-2)* gene (510bp) was cloned in *E.coli*, Pichia pastoris and *Gossypium hirsutum*, characterized and point mutated at three positions separately at 352-354, Lysine-60 to proline (M1-usp-2) and 214-216, aspartic acid-26 to serine *(M2-usp-2)* & 145-147, Lysine-3 to proline *(M3-usp-2)* to study its role in abiotic stress tolerance. It was found that heterologus expression of one mutant *(M1-usp-2)* provided enhanced tolerance against salt and osmotic stresses, recombinant cells have higher growth up to 10-5dilution in spot assay as compared to *W-usp-2* (wild type *GUSP-2), M2-usp-2* and *M3-usp-2* genes. *M1-usp-2* in *Pichia pastoris* transcript profiling exhibited significant expression (7.1-fold) to salt and (9.7) and osmotic stresses. *M1-usp-2* gene was also found to enhance drought tolerance and significant expression (8.7) in CIM-496-*Gossypium* hirsutum transgenic plants. However, little tolerance against heat and cold stresses both in recombinant yeast and bacterial cells was observed. The results from our study concluded that activity of *GUSP-2* was enhanced in *M1-usp-2* but wipe out in *M2-usp-2* and *M3-usp-2* response remained almost parallel to W-usp-2. Further, it was predicted through in silico analysis that *M1-usp-2*, *W-usp-2* and *M3-usp-2* may be directly involved in stress tolerance or function as signaling molecule to activate the stress adaptive mechanism

chnadeemhfz@gmail.com