

Isolation and functional characterization of cold stress inducible promoters from Tomato

^{1,3}Monika Bansal, ²M.S. Reddy, ³Amol Solanke, ³Arun Sharma

²Department of Biotechnology, Thapar University, Punjab, India

³Department of Plant Molecular Biology, University of Delhi, South Campus, India

¹Lovely Professional University, Jalandhar, Phagwara, Punjab-144411, India.

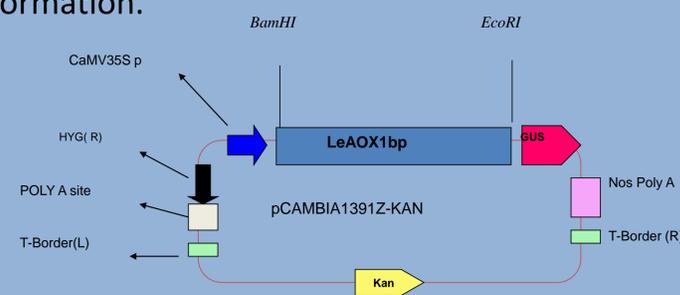
E-mail: monphd@gmail.com

ABSTRACT

Environmental stress such as cold stress leads to major changes in transcription of genes involved in developmental and physiological metabolism of plants. Constitutive over expression of transgenes imparting stress tolerance may hamper plant growth and productivity. It is desirable to produce transgenic plants that accumulate transgenic products only under stress conditions.

Successful Transformation in Tomato

- To identify stress related transcripts we had utilized cold subtracted cDNA library to monitor gene expression changes after 24 h of cold stress in tomato seedlings. Relative mRNA levels of cold stress associated gene AOX1a and Aox1b transcription factors from cold treated sample was compared with wild types. Sequence upstream of start codon from this transcript was selected to design the primers, promoter sequence was fused with GUS reporter gene and the recombinant transgenes was introduced into Tomato cv. Pusa Ruby with *Agrobacterium tumefaciens* mediated Genetic Transformation.



RESULTS

The Two promoter sequence were translationally fused to the gusA reporter gene and introduced into Tomato to study their effect on heterologous gene expression. The *Aox1b* promoter was found to be the most effective and desirable promoter among the three in terms of driving a low constitutive transgene expression under normal conditions and high induction in response to ABA, salt and drought stress, the highest being induction in response to cold stress. Further analysis of these promoter sequence revealed Several stress related motifs are present in them.

Discussion

Histochemical and fluorometric analyses revealed promoter is inducible under all abiotic stress conditions. This promoter is effective and desirable for deriving a low constitutive transgene expression under normal condition and high induction in response to cold, salt and drought stress. This method shall be advantageous as it will not have a major impact on plant biomass and yield.

Acknowledgement

UGC for providing Dr. D.S.Kothari Post-Doc Associateship

Dr. Arun Sharma, University of Delhi, South Campus, India

Dr. M.S.Reddy, Thapar University, Punjab, India