

**LebZIP2 Induced by Salt and Drought Stress and Transient Overexpression
by *Agrobacterium***

Eun Soo Seong¹, Eun Jeong Goh¹, Soon Sung Kwon¹, Bimal Kumar Ghimire¹,
Eun Hye Shin¹, Jung Dae Lim³, Ill Min Chung⁴, Myoung Jo Kim^{1,2}, Chang Yeon Yu^{1,2*}

¹College of agriculture and Life Science, Kangwon National University, Chuncheon 200-701

²Kangwon National University BioHerb Reseach Center

³College of department of Herbal Medicine Resource, Kangwon National University, Samcheok 245-711

⁴Kon-Kuk University, Seoul 143-701, Korea

Objectives

The objective of this experiment was to characterize a tomato bZIP transcription factor, which was expressed in tomato leaves in response to elicitors related to environmental stresses. In this experiment we showed that LebZIP2 can be a transcriptional regulator of NbNOA1 or NbNR genes by *Agrobacterium*-mediated transient overexpression.

Materials and Methods

○ Materials

Full length nucleotide and deduced amino acid sequences to obtain the tomato bZIP2 gene clone. 'MicroTom' tomato seeds.

○ Methods

- **Chemical treatments of tomato** : The tomato plants were treated NaCl, Mannitol and MV. And the leaves of whole plant were sprayed on treatments with ABA and H₂O₂. For cold treatment, they were kept in 4°C cold room.

- **RNA gel blot hybridization and RT-PCR** : For northern-blot analyses, total RNA was separated on formaldehyde containing agarose gels and blotted onto nylon membranes following standard procedures.

- **Transient expression of LebZIP2 in *N. benthamiana***

Results

The full-length cDNA of LebZIP2 (*Lycopersicon esculentum* bZIP2) encodes a protein of 164 amino acid residues and contains a domain of the basic-region leucine zipper (BRLZ) in the N-terminal. Analysis of the deduced tomato LebZIP2 amino acid sequence revealed that it shares a sequence identity with tobacco bZIP (85%) and pepper CcbZIP (85%; GenBank accession nos. AAK92213 and AAD21199, respectively). LebZIP2 mRNA is expressed at a high level exclusively in flowers. LebZIP2 was strongly increased also following NaCl and mannitol treatments. No significant LebZIP2 expression was evident following cold treatment. Transient overexpression of the LebZIP2 resulted in increased NbNOA1 and NbNR transcript levels in *Nicotiana benthamiana* leaves. Our results indicate that LebZIP2 might play roles as an abiotic stress-signaling pathway and as a transcriptional regulator of the NbNOA1 or NbNR gene.

* 시험성적

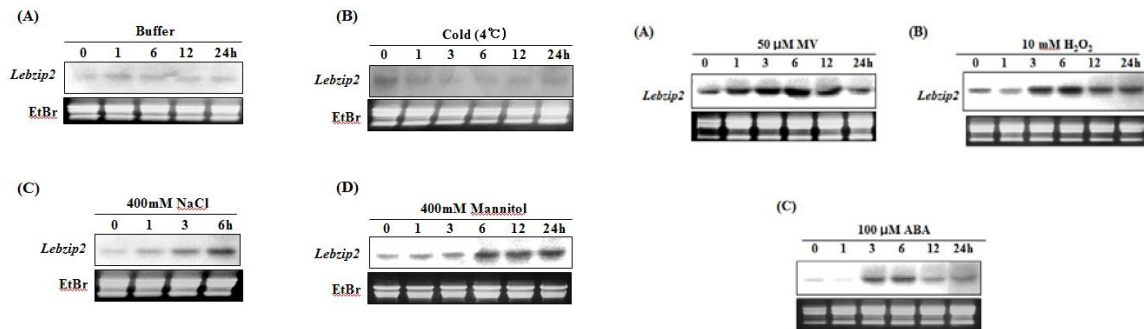


Fig 1. Expression patterns of LebZIP2 by environmental stresses.

Fig 2. Expression patterns of the LebZIP2 gene in tomato leaf tissues treated with abiotic elicitors.

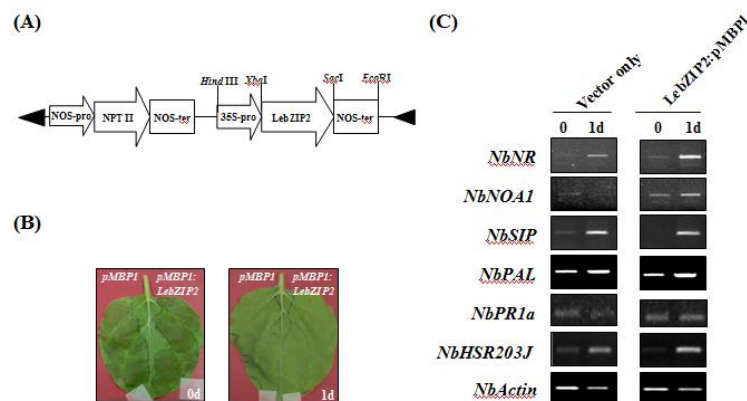


Fig 3. Vector construction of LebZIP2: pMBP1 to transient overexpression in leaves of *Nicotiana benthamiana*.