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Abstract

Overexpression of a tomato annexin gene AnnSp2, enhances Abiotic stress tolerance in transgenic tomato through ABA synthesis and modulation of ROS production.

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Abstract:

Drought and high salinity are two major abiotic stresses that affect the agricultural crops worldwide. Annexins belongs to a multigene protein family that play an essential role in plant stress responses and various cellular processes. Here, AnnSp2 gene was cloned from wild tomato (Solanum pennelli) and functionally characterized in cultivated tomato. AnnSp2 was found to be induced after exposure to drought, salt, H2O2 and ABA. Tomato plants overexpressing AnnSp2 remarkably increased plant tolerance to drought and salt stress, as determined through physiological analyses of the germination rate, root growth, survival rate, leaf water loss and Chl content. AnnSp2 transgenic plants were observed to be less sensitive to ABA during seed germination and seedling stages. However, under drought stress the ABA content significantly increased in the AnnSp2- Over expressing plants, reduced water loss, attributed to the enhancement of stress tolerance. Furthermore, we found that AnnSl2 reduced sensitivity of plants to drought by influencing ABA-induced stomatal movement, and expression of ABA-inducible genes, including AREB, DREB, NCED, ERD were clearly up regulated under drought and salt stress conditions. Consistent with the accumulation of reactive oxygen species (ROS), lower lipid peroxidation level, increased peroxidase activities including APX, CAT and SOD all of which contributed to increased tolerance to oxidative stress compared with wild-type plants. These results therefore indicate that AnnSp2 play an important role in the abiotic stress response, and that overexpression of AnnSp2 in in transgenic tomato improves salt and drought tolerance through ABA signaling and the regulation of ROS production in plants.

Biography:

Raina Ijaz is emerging young innovative Biotechnologist, She has completed her PhD at the age of 28 years from Huazhong Agricultural University China under the guidance of Prof. Dr. Ye zhibiao supported by China Scholarship Council (CSC).

Recent Publications:

1. Zhu, j. and K, 2002. Salt and drought stress signal transduction in plants. Annu. Rev. Plant Biol., 53; 247– 273.
2. Cutler, S.R., Rodriguez, P. L., Finkelstein, , R.R and Abrams, S.R. 2010. Abscisic acid: emergence of a core signaling network. Annu. Rev. Plant Biol. 61: 651–679.