

Ethylene Response Factor BnERF from Brassica napus L. Enhances Submergence Tolerance and Alleviates the Oxidative Damage Caused by Submergence in Arabidopsis thaliana

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Abstract : Ethylene response factor proteins are known to play an important role in regulating a variety of stress responses in plants, but their exact functions in submergence stress are not completely understood. In this study, we isolated BnERF from Brassica napus L. to study the function of BnERF in submergence tolerance. The expression of BnERF gene in Brassica napus L. and the expression of antioxidant enzyme genes in transgenic Arabidopsis were analyzed by Quantitative RT-PCR. It was found that expression of BnERF is apparently induced by submergence in Brassica napus L. and overexpression of BnERF in Arabidopsis increases the tolerance level to submergence and oxidative stress. Histochemical method detected lower level of H₂O₂, O₂^{•-} and malondialdehyde (MDA) in the transgenic Arabidopsis. Compared to wild type, transgenic lines also have higher soluble sugar content and higher activity of antioxidant enzymes, which helps protect the plants against the oxidative damage caused by submergence. It was concluded that BnERF can increase the tolerance of plants to submergence stress and BnERF might be involved in regulating soluble sugar content and the antioxidant system in the defense against submergence stress.

Keywords : antioxidant enzyme, Arabidopsis, ethylene response factor, submergence

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