

Expression of Hydrogen peroxide-generating Glucose Oxidase in tobacco confers enhanced tolerance to drought and salt str

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ABSTRACT

Plant acclimation to salt and drought stresses involves the production and accumulation of hydrogen peroxide (H₂O₂) in cells, and is crucial in signaling adaptive responses. This study developed a transgenic tobacco (Nicotiana tabacum L. cv. SR1) constitutive expressing Aspergillus niger glucose oxidase (GO) gene, which encodes a H₂O₂-generating enzyme. Western-blot and GO activity analysis confirmed the expression of transgene in the transgenic lines in parallel with changes in H₂O₂ levels of transgenic plants. Root elongation analysis demonstrated that transgenic tobacco exhibited tolerance to 500 mM sorbitol and mannitol, but not to 500 mM NaCl. Detached-leaf water-loss assay also demonstrated higher tolerance to dehydration in the transgenic plants the wild-type plants. The strong tolerance to non-ionic salt and dehydration stresses of transgenic lines was mediated by raised level of H₂O₂. Thus, elevated H₂O₂ level in plants is a feasible means of conferring broad spectrum stress tolerance in plants.

Keywords : drought stress、glucose oxidase、hydrogen peroxide、salt stress、tobacco

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