

Transgenic expression of the glucose oxidase gene of aspergillus niger increases nicotiana tabacum r

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ABSTRACT

Hydrogen peroxide is known as a signal molecule for adapting plants to abiotic stresses. In current study, we developed the transgenic tobacco (*Nicotiana tabacum* L. cv. SR1) constitutive expressing *Aspergillus niger* glucose oxidase (GO) gene, which encodes a H₂O₂-generating enzyme. Semi-quantitative RT-PCR and Western-blot analysis demonstrated the expression of GO transgene in the transgenic lines. The GO activity and H₂O₂ assay further demonstrated that the accumulation of functional GO protein did lead to a parallel increasing of H₂O₂ levels in transformed plant tissues. As expected, transgenic plants expressing the GO gene exhibited enhanced tolerance and to heat stress in comparison with wild-type plants. The heat tolerances of transgenic lines were found correlated closely with elevated levels of total antioxidant activity in plant cells. However, the transgenic lines had no increased transcript levels of the heat-shock protein 70 (HSP70) and heat-shock protein 101 (HSP101) genes. Overall, our results indicate that GO enhanced heat tolerance was mediated through, at least in part, the elevation of total antioxidant activity, but the expression of HSP genes in plant cells.

Keywords : Glucose Oxidase、Heat-Shock Protein、Heat stress、Tobacco、Hydrogen Peroxide、Tobacco、Heat tolerance

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