

Effect of nitrous oxide against *Botrytis cinerea* and phenylpropanoid pathway metabolism in table grapes

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Abstract

Nitrous oxide (N₂O) was investigated for the potential use on inhibiting the postharvest decay of the grape. In this study, 50 µL L⁻¹ N₂O gas was used for fumigating the ‘*Munage*’ grape which was used as the test material at room temperature for 6 h. Results indicated that N₂O had no direct effect on the *Botrytis cinerea* inhibition. But N₂O can promote the accumulation of total phenolic, flavonoids and lignin, as well as increase the activities of phenylalanine ammonia-lyase (PAL), cinnamate-4-hydroxylase (C4H), and 4-coumarate CoA ligase (4CL), which were the key enzymes in the metabolism of phenylpropanol. N₂O also induced PAL family genes expression in a short time at the molecular level. Thereby the N₂O significantly reduced the lesion diameter and incidence of the grape fruit inoculated with *Botrytis cinerea*. These results suggested that N₂O participated in enhancement of disease resistance by improving the phenylpropanoid pathway metabolism of the grape fruit and it could be a promising strategy to suppress postharvest disease.