

Title The effect of exogenous ethylene and methyl jasmonate on PAL activity, phenolic profiles and antioxidant capacity of carrots (*Daucus carota*) under different wounding intensities

Author J. Basilio Heredia and Luis Cisneros-Zevallos

Citation Postharvest Biology and Technology, Volume 51, Issue 2, February 2009, Pages 242-249

Keywords Carrots; Chlorogenic acid; Antioxidant capacity; Methyl jasmonate; Ethylene; Wounding; PAL activity

Abstract

In this study it was shown that wounding in combination with hormone stresses synergistically enhanced the accumulation of bioactive phenolic compounds in carrot tissue. Whole carrots and carrots cut in slices, pie-cuts and shreds were exposed to 250 $\mu\text{L/L}$ methyl jasmonate and 1000 $\mu\text{L/L}$ ethylene treatments. Results indicated that hormone stress-induced phenolic compounds and phenylalanine ammonia lyase enzyme activity were dependent upon wounding intensity. The synthesized phenolics correlated to an increase in antioxidant capacity (AOX). In addition, both stresses affected the phenolic profiles. The different proportions of chlorogenic acid, dicaffeoylquinic acid and ferulic acid, for each stress and combinations, influenced the specific AOX of the phenolic profiles (the effectiveness of the phenolic compounds to neutralize free radicals). The bitter compound isocoumarin was mostly affected by the ethylene treatment compared to methyl jasmonate or wounding alone. Exposure to combined abiotic stresses could provide more AOX to regular diets and be a less expensive alternative to genetic modifications and breeding programs.