Title	Effect of stresses on glucosinolates and hydroxy-cinnamic acids profile in broccoli florets during postharvest storage
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Abstract

Stresses cause production of reactive oxygen species in plant bodies and high levels of stress can be harmful to plant tissues. When sub-acute doses of stresses are applied to postharvest crops, beneficial effects can occur through activation of protection mechanisms. In broccoli (*Brassica oleracea*), such mechanisms can be induction of glucosinolates and phenolic compounds which are also beneficial to human health. The objective of this work was to examine sub-acute or hormetic doses as well as extreme doses of UV-B, ozone and hydrogen peroxide on the enhancement of glucosinolates and hydroxy-cinnamic acids during postharvest storage. Broccoli florets were exposed to hormetic and high doses of UV-B (0,1.5 and 7.5 $kJ.m^{-2}$; ozone (5ppm for 0, 60 and 720 min) and H_2O_2 (0, 1.25 and 5mM for 3 hour). The profile of glucosinolates and hydroxy-cinnamic acids was determined for up to 14 days in broccoli florets stored at 4 °C by LC-MS. The expression of glucosinolate pathway genes (p450 of the CYP79 familyA2, B3 and F1) and phenylpropanoids pathway genes (PAL, CS and F3H1) were also monitored. Titer of neoglucobrassin in UV-B treated broccoli florets at 1.5 kJm^{-2} was the highest at the end of the 14 days of storage. However, an overexpression of genes CYP79B3 and CoL were observed with the high UV-B dose of 7.5 kJm^{-2} throughout and at the beginning of the storage, respectively. Both ozone and H_2O_2 increased the titers of 4-methoxyglucobrassicin and 4-hydroxy-glucobrassicin; and the florets treated with high ozone dose (5ppm for 720min) exhibited an overexpression of genes CYP79F1 and CYP79B3, at the beginning of the storage. Results showed a good correlation between gene expression of CYP79B3, and the titers of indole glucosinolates in treated broccoli florets, suggesting that the target of the applied stresses is likely to be the branch pathway of indole glucosinolates.