

Postharvest UV-C irradiation increased the flavonoids and anthocyanins accumulation, phenylpropanoid pathway gene expression, and antioxidant activity in sweet cherries (*Prunus avium* L.)

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Abstract

Ultraviolet (UV) influences postharvest changes in secondary metabolites of fruit. In this study, sweet cherries were treated with UV-C irradiation (1.05, 2.10, and 4.20 kJ/m²) for different treatment periods, they were stored at room temperature (25.0 ± 2.0 °C) for 6 days. The results showed that the total phenolics, flavonoids, and anthocyanins increased in response to UV-C during storage. UPLC-ESI-MS analysis indicated that the individual flavonoids and anthocyanins contents increased, including cyanidin 3-*O*-galactoside, cyanidin *O*-syringic acid, cyanidin 3-*O*-glucoside, pelargonidin 3-*O*-glucoside, tricetin 5-*O*-hexoside, luteolin *C*-hexoside, Di-*O*-methylquercetin, and naringenin-7-*O*-glucoside. Furthermore, UV-C (2.10 kJ/m²) treatment upregulated the enzymes activity and genes expression of phenylpropanoid pathway. Highly significant correlations were found among flavonoids, anthocyanins, phenylalanine ammonia lyase (PAL) and genes expression of *ANS*, *DFR*, *UFGT* ($r > 0.6$, $p < 0.01$) and cinnamate 4-hydroxylase (*C4H*) and *PAL*, *C4H*, *4CL*, *CHI*, *ANS*, *DFR* expressions ($r > 0.6$, $p < 0.01$). These results contribute to illustrating the molecular mechanism of flavonoids and anthocyanins biosynthesis under the UV-C irradiation in sweet cherries and promote the development of postharvest in agriculture.