

Metabolic analysis of phenolic profiles reveals the enhancements of anthocyanins and procyanidins in postharvest peach as affected by hot air and ultraviolet C

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Abstract

Anthocyanins are one of the most critical components in peach fruit and are responsible for their visual appearance and nutritional value. In this study, hot air (HA) and UV-C treatments were applied to induce colour development. Peach fruit were treated with HA (40 °C, 4 h) or UV-C (1.5 kJ m⁻², 20 min for each side) and then stored at 1 °C for 35 d plus another 3 d at 20 °C. The results showed that anthocyanins, procyanidins (PAs) and cyanidin-3-glucoside (Cya-3-G) increased in response to HA and UV-C during the storage period. LC-MS/MS analysis indicated that most of the individual phenols increased in response to the two treatments. However, l-phenylalanine significantly decreased. HA and UV-C significantly upregulated the enzyme activity and gene expression of phenylalanine ammonialyase to promote the conversion of phenylalanine into downstream compounds. The activities of leucoanthocyanidin reductase and anthocyanidin reductase were enhanced by HA and UV-C, which led to the accumulation of PAs. Besides, the activities of dihydroflavonol reductase, anthocyanidin synthase and UDP-glucose: flavonoid 3-o-glucosyltransferase increased in response to the two treatments, with increased contents of Cya-3-G, leucopelargonidin and pelargonidin-3-G occurring in treated fruit. In summary, HA and UV-C promoted the synthesis of anthocyanins and PAs by enhancing the activities and expressions of enzymes involved in phenylpropanoid metabolism.