Impacts of minimal processing and hot water dipping of 'Sonata' strawberries on volatiles emitted during storage

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Scientia Horticulturae 243: 385-391. (2019)

Abstract

Strawberries flavour attributes are important quality parameters that have a significant impact on consumer acceptability. Minimal processing and postharvest treatments in many cases neglect the importance of flavour attributes or sacrifice them for better appearance and/or longer shelf life. In addition, only few information is available on the impact of postharvest handling on flavour attributes. Thus, the objectives of this paper were to investigate: i) the effects of minimal processing on changes in composition and relative abundance (%) of volatile organic compounds (VOCs) emitted from strawberries; and ii) the effects of hot water treatments (45 °C) at different dipping duration (5 and 10 min) on the shift in VOC composition of 'Sonata' strawberries. Based on gas chromatography-mass spectrometry (GC–MS) analysis, the volatile profiles obtained for strawberries were significantly ($p \leq 0.05$) influenced by minimal processing. Aldehydes were most abundant in strawberry puree (34.1%) compared to sliced samples (17.5%) and none were detected in the headspace of intact fruit. Esters were most abundant in the sliced samples (62.9%) compared to intact strawberries (51.2%) and fruit puree (≈ 49%) samples. Hot water treatment and dipping durations had significant impact on the synthesis of methyl and ethyl esters and acetaldehyde in comparison to the untreated (control) samples ($p \leq 0.05$). At the end of storage, concentrations of methyl acetate (4.9 ± 0.86 mg mL^{-1}), methyl butanoate (6.7 ± 0.05 mg mL^{-1}), ethyl butanoate (0.6 ± 0.37 mg mL^{-1}), and acetaldehyde (3.1 ± 0.99 mg mL^{-1}) were lowest in strawberries dipped in hot water at 45 °C for 10 min. In contrast, hot water treatment with dipping duration of 5 min best maintained and enhanced the synthesis of methyl butanoate and prevented the accumulation of methyl isobutyl ketone. This study showed that minimal processing had a significant impact on the volatile profile of 'Sonata' strawberries, and that hot water treatments play a crucial role on the emission of volatile compounds.