Title (Methylsulfanyl)alkanoate ester biosynthesis in *Actinidia chinensis* kiwifruit and changes during cold storage

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Abstract

Four 3-(methylsulfanyl)propionate esters, ethyl 3-(methylsulfanyl)prop-2-enoate, two 2-(methylsulfanyl)acetate esters and their possible precursors 2-(methylsulfanyl)ethanol, 3-(methylsulfanyl)propanol and 3-(methylsulfanyl)propanal were quantified from the headspace of *Actinidia chinensis* 'Hort 16A' kiwifruit pulp by GC–MS–TOF analysis. The majority of these compounds were specific for eating-ripe fruit and their levels increased in parallel with the climacteric rise in ethylene, accumulating towards the very soft end of the eating firmness. No ethylene production could be observed after long-term storage (4–6 months) at 1.5 °C and the levels of all methylsulfanyl-volatiles, except methional, declined by 98–100% during that period. This depletion of (methylsulfanyl)alkanoate-esters after prolonged cold storage points towards little flavour impact of these compounds on commercial 'Hort 16A' kiwifruits. However, ethyl 3-(methylsulfanyl)propionate is suggested to be odour active in ripe 'Hort 16A' fruit that has not been stored. Gene expression measured by q-RT PCR of six ripening-specific alcohol acyltransferase (AAT) expressed sequence tags and (methylsulfanyl)alkanoate-ester production of cell-free extracts were also significantly decreased after prolonged cold storage. However, (methylsulfanyl)alkanoate-ester synthesis of cell-free extracts and AAT gene transcript levels could be recovered by ethylene treatment after five months at 1.5 °C indicating that the biosynthesis of (methylsulfanyl)alkanoate-esters in 'Hort 16A' kiwifruit is likely to depend on ethylene-regulated AAT-gene expression. That the composition but not the concentration of (methylsulfanyl)alkanoate-esters in fresh fruit could be restored after ethylene treatment suggests that substrate availability might also have an impact on the final levels of these volatiles.