

Title Identifying volatile compounds associated with sensory and fruit attributes in diploid *Actinidia chinensis* (kiwifruit) using multivariate analysis

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Citation [Euphytica](#), **181, Number 2**, 179-195, 2011

Keywords Kiwifruit; Breeding; Flavour; Volatiles; Multivariate analysis

Abstract

While the roles of sugars and acids in fruit flavour are well known and described, the roles of volatile compounds that contribute to flavour and odour are more difficult to define. The determination of volatiles that make a significant contribution to the flavour of kiwifruit (*Actinidia chinensis*) is essential for efficient and cost effective flavour breeding. The aims of this study were to explore associations between volatile compounds, sensory and fruit attributes of *A. chinensis* fruit and to identify potential key flavour impact volatiles, superior parents and selection methods, using multivariate analysis. We investigated the volatiles produced by ripe fruit of 24 genotypes selected by principal component analysis (PCA) to represent the diversity of taste and fruit characteristics in a breeding population. Seventy-two volatiles were detected. Extended use of multivariate analysis proved powerful for gaining maximum information from the limited plant material. The volatiles were successfully grouped into four clusters, using hierarchical clustering of variables based on phenotypic correlations between volatiles to avoid a singular correlation matrix in PCA. Based on these clusters, associations between volatiles, sensory and fruit attributes were explored using PCA and multiple linear regressions. Principal components provided a measure of the balance of complex volatiles that is likely to affect consumer responses. Thirteen potential key impact volatiles that made a substantial contribution to the flavour of *A. chinensis* fruit were identified. Five esters were strongly associated with the flavours and odours characteristic of 'Hort16A'. Volatiles associated with 'sour taste', 'fruit ripeness', 'atypical 'Hort16A'-like odour' and 'atypical kiwifruit flavour' were also recognized. Parents with potentially desirable volatile profiles and a possible selection method for flavour breeding were identified.

<http://www.springerlink.com/content/5v711445183p2752/fulltext.pdf>