

**Title** Characterisation, measurement and factors influencing columella softening in kiwifruit  
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### **Abstract**

Kiwifruit (*Actinidia deliciosa*) are harvested in mature yet very firm state (approx. 80 N pericarp firmness) and required to soften substantially (to approx. 10- 5 N) to be palatable. Consumption of kiwifruit as a dessert item is often conducted by slicing the fruit in half equatorially, and using a spoon to scoop out the contents from the skin. In doing this the relatively blunt spoon is required to be able to separate the flesh from the skin including slicing through the columella (core) of the fruit. Despite softening of the pericarp, in some cases the columella of the fruit can remain hard, causing the extraction of the flesh from the skin to be difficult, and hence frustration for the expectant consumer. This paper provides a definition of the problem and introduces a method of measurement. With these definitions established, softening of the columella was characterised (for 'Hayward') in comparison to the standard firmness measurement of the pericarp during softening at both 20 and 0 °C. It was found that kiwifruit softening occurs in 3 phases, in which the first phase is dominated by pericarp softening with little columella softening, followed by a phase in which the columella softens rapidly with little pericarp softening and finally a phase in which both pericarp and columella soften in conjunction. In addition it would seem that softening at 0 °C results in more variability between pericarp and columella firmness than softening at 20°C. More work is required to determine which pre-harvest and harvest factors and postharvest conditions result in kiwifruit with eating quality pericarp and a hard columella that results in difficulties in consumption.