

**Title** Postharvest structural changes of Hayward kiwifruit by means of magnetic resonance imaging spectroscopy

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### **Abstract**

In the present study magnetic resonance imaging (MRI) was used to evaluate the effect of storage conditions, 0 °C and 90% relative humidity (RH) or 20 °C and 70% RH, on minimal structural changes of kiwi tissue. Storage time was 35 days at 20 °C and 65 days at 0 °C including shelf life. Ethylene and respiration were followed during the experiment as well as commercial quality parameters such as sugars and firmness. MRI images weighted for proton density ( $\rho$ ) and transverse relaxation times ( $T_2$ ), were recorded after 10, 20, 35, 55 and 65 days. A decrease of the diameter was clearly visible in samples stored at 20 °C after 3 weeks and a coarse contour of the pericarp appeared after 40 days. Accumulation of water in the pericarp was found, suggesting a migration towards the outer regions occurs and that the fruit water loss due to evapo-transpiration is slower than the migration process. Samples stored at 0 °C showed no relevant changes in dimension and structural features for the whole period considered except after removal to shelf life. The observed variations of the internal morphology were correlated with the transverse relaxation times of defined areas and with softening of fruits. Measured  $T_2$  profiles showed double-exponential decays, a fast- and a slow-relaxing component, indicating the existence of two different types of water molecules within cellular tissues: strongly and weakly bound, respectively. The relation among MRI data, ethylene and softening is discussed.