Title Finite element modelling and MRI validation of 3D transient water profiles in pears during postharvest storage.

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Abstract

A diffusion model based on Fick's second law was used to simulate water transport in pear fruit at various conditions (20DGC and 75% RH; 1DGC and 60% RH). The finite element method was used to discretise the governing differential equations over the actual 3D pear geometry. For the first time, water transport in Conference pear fruits was described at the mesoscale level by incorporating different tissues (cuticle, inner and outer cortex) with different diffusion properties. The validated model explained water transport well as validated through nuclear magnetic resonance imaging techniques and was able to predict mass loss of intact pear during postharvest conditions. It was noticed that, at high temperature conditions, the model can be improved further by taking into account respiration and shrinkage effects.