

**Validation of a packaging design tool: Case studies with apple packaging**

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**Abstract**

In the design of horticultural product packaging, the designer seeks a level of package ventilation that achieves the best compromise between the need for rapid removal of heat from products packed at ambient temperatures and optimisation of product mass loss at the desired storage temperature. Mathematical models have been developed which quantify rates of the important heat and mass transfer processes, and their effects on product quality. An overview of the dynamic model is presented, and model predictions are compared with experimental cooling data for both experimental and commercial apple packaging in an industrial pre-cooler. There was good agreement between the model and the measured data. Alternative packaging and storage scenarios were assessed using the model and a number of operational and system design recommendations were developed for the system studied.