Title Maximum slat width for cooling efficiency of horticultural produce in wooden crates

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Abstract

The influence of wood package design on airflow distribution was investigated for forced-air cooling using horticultural produce simulators. The position of grooves on the container walls was tested using slat width of 100–200 mm and airflow rates ranging from 0.0005 to 0.003 $m^3 kg^{-1} s^{-1}$. The package opening configurations were compared based on their impact on the energy added to the system using a methodology previously developed. For this purpose, apples and sweet corns were taken as examples of produce from two different extremes in the respiration activity range. For airflow rates as low as 0.0005 $m^3 kg^{-1} s^{-1}$ one groove at the bottom of the container produced a cooling process more uniform than the other one-groove configurations and even two grooves because of natural convection effect. If packing low respiration rate produce, increasing airflow rate could compromise the process energy efficiency because of air circulation obstruction for less vented containers. For high respiration rate produce enlarging open area above 2.4% would be recommended rather than increasing airflow rate to enhance cooling energy efficiency.