

Abstract

Air pathways were investigated for peripheral and central opening configurations of package during horticultural produce forced-air cooling process using a research tool previously developed. Total opening areas of 0.67, 2, 4, and 8%, formed by combining three, four or eight holes of 0.67, 1, or 2% distributed at the bottom and top, corners or center line of the package surface, were tested for airflow rates ranging from 0.125 to 3.9 L s⁻¹ kg⁻¹ and compared to the fully open configuration. Air pressure drop, rates, and uniformities of cooling were measured. Enlarging opening area increased the cooling efficiency. The higher the airflow the greater the rate and the uniformity of cooling process. However, gravity force effect influenced the enhancement of air distribution uniformity at the minimum airflow rate studied. When the container design options are limited to central or peripheral openings, the bottom and top opening configuration is preferred for greater cooling performance.