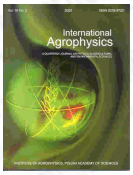

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Finite element modelling of heat transfer in avocados

(get PDF)

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abstract A two-dimensional finite element model was developed to predict temperature distribution in individual avocados subjected to air precooling. The proposed model, suitable for axisymmetrical shaped fruit, takes into account heat generation due to respiration, evaporative cooling effect due to transpiration as well as convection and radiation transfer on the fruit surface. The developed model was then applied to the cooling tests of avocado samples to estimating convection coefficient from experimentally measured temperature-time data for two locations within the fruit. An optimization procedure based on the minimization of the differences between experimental and calculated temperatures was used. The mean convection coefficients obtained for the two varieties (Fuerte, Hass) were not found to be significantly different (P=0.05). The values obtained using the finite element model were lower than those measured by an analytical method involving an aluminium avocado shaped model.

keywords precooling, heat transfer, modelling, finite element, avocado