

Title Effect of heat treatment uniformity on tomato ripening and chilling injury
Author Jianbo Lu, Marie Thérèse Charles, Clément Vigneault , Bernard Goyette and G.S. Vijaya Raghavan
Citation Postharvest Biology and Technology, Volume 56, Issue 2, May 2010, Pages 155-162
Keywords Non-uniform; Heat treatment; Chilling injury; Firmness; Color; Tomato; Taste

Abstract

An experimental set-up consisting of a forced-air twin-chamber insulated device was built to investigate the effect of heat treatment uniformity on color, firmness, titratable acidity (TA), total soluble solids (TSS), and severity of chilling injury (CI) in tomatoes. With this set-up, tomatoes could be subjected to non-uniform heat treatment, with one half of a tomato exposed in one chamber to a heated airflow maintained at a temperature of 39 °C and a velocity of 0.24 m s^{-1} , while the other half was held in the second chamber at room temperature under controlled conditions (23 °C , 0.24 m s^{-1}). Suitable instrumentation was used to control the temperature of both chambers and provide the desired fixed airflow rate. The tomatoes were randomly divided into five lots: one lot was used as a control (Ctrl), two were uniformly treated, and the other two were non-uniformly treated. Immediately after treatment, the tomatoes were transferred to storage at one of three different temperatures: 14 °C (regular storage), 20 °C (ripening), or 4 °C (CI). Color, firmness, TA, TSS, and severity of CI were evaluated at predetermined times. A significant difference was found between the heated and unheated tomato halves in terms of color and CI. No significant difference was found in the taste indicator, the TSS/TA, or sugar/acid, ratio (TSS/TA). The results suggest that, in the heated tomato halves, the postharvest ripening process was delayed, and that this delay was similar to the difference in ripening period between the uniformly heated tomato halves and the corresponding Ctrl group. The observed difference gives support to the hypothesis of a localized rather than systemic effect of heat treatment on postharvest quality parameters of tomatoes and shows that ensuring uniform heating conditions is of paramount importance for attaining the desired beneficial impact of postharvest heat treatment.