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on Chilling injury, firmness and quality of Lisbon lemons [Citrus limon (L.) Burm.] at the yellow-green state, were treated with  $CaCl_2$  solutions up to 7.5% (w/v) by normal vacuum infiltration (NVI, 15°C, -33 kPa, 10 min), or hot vacuum infiltration (HVI, 45°C, -33 kPa, 10 min) before storage at 1.5°C and 85% RH for 6 and 12 weeks and 1 additional week at 20°C. Vacuum infiltration maintained firmness best following 6 weeks, but reduction in the Chilling Injury (CI) index observed following 12 weeks of cold storage and additional week at 20°C. By both infiltration regimes, the different concentrations of  $CaCl_2$  only affected CI, weight loss and

firmness of fruit, but did not alter other parameters. Among the treatments, NVI at 1.5% CaCl $_2$  and hot water infiltration alone (45°C, -33 kPa, 10 min) were the most effective and reduced the severity of CI by 53.2 and 19.3%, respectively. The fruit treated with 7.5% CaCl $_2$  by NVI and >=

 $4.5\%~{\rm CaCl}_2$  by HVI showed significantly lower values of deformation (more firmness) than non-

treated ones. Combination of  $CaCl_2$  and hot water (HVI) increased the efficiency of  $CaCl_2$  in terms of firmness retention, but had no additive effects in reduction of CI. As compared to NVI, HVI increased CI index and the rate of  $K^+$  leakage and decreased total soluble solids and acidity levels of fruit. A significant correlation was also found between CI index and each of other parameters. As CI increased, weight loss and ion leakage increased too, but ascorbic acid and acidity levels decreased. Similar trends were observed as the storage period advanced and CI increased.

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