Chilling injury is associated with changes in microsomal membrane lipids in guava fruit (*Psidium guajava* L.) and the use of controlled atmospheres reduce these effects

J. E. Alba-Jiménez, P. Benito-Bautista, G. M. Nava, D. M. Rivera-Pastrana, Ma. E. Vázquez-Barrios and E. M. Mercado-Silva

Scientia Horticulturae 240: 94-101. (2018)

Abstract

Storage of guava fruit cv 'Media china' at temperatures below 8 °C causes chilling injury associated with changes in cell membrane lipids. The aim of the present study was to evaluate the effects of two temperatures (4 and 10 °C) and three controlled atmospheres (air; 10 kPa O_2; 5 kPa CO_2 and 10 + 5 kPa of O_2 and CO_2) on microsomal lipid profiles in ripened fruit or fruit storage during three weeks. The study revealed that chilling injury is associated with a decrease in microsomal membrane volume and microsomal protein and phospholipids content (5%, 47% and 22%; respectively). Also, it was observed a decrease in Monogalactosyldiacylglycerol (MGDG), digalactosyldiacylglycerol (DGDG), Phosphatidylinositol (PI), phosphatidic acid (PA), cardiolipin (CL) contents and a substitution of saturated fatty acids (FA) for unsaturated FA in the microsomal membrane. Importantly, it was found that storing guava fruit 'Media China' at 10 °C under 5 kPa CO_2 reduced chilling injury prevalence and increased shelf life, suggesting that these storage conditions maintained membrane functionality. Overall, these results indicate that CI is associated to deep alterations in membrane lipids pathway.