Abstract

Waxing of citrus is a common practice in the food industry aimed to reduce weight loss and add gloss. However, waxing can adversely affect fruit flavor due to the overproduction of volatiles associated with anaerobic conditions, since gas permeance of many waxes and resins is very low. Consumer increased interest for food quality, convenience and safety has lead to the development of new edible coatings based on proteins, polysaccharides, and/or lipids. Edible coatings provide a semi-permeable barrier to gases and water vapor, which creates a modified internal atmosphere into the fruit and delays dehydration. The response that the coatings offer depends, among other factors, on coating composition. The objective of this work was to study the effect of fatty acid type and amount on the performance of hydroxypropyl methylcellulose (HPMC)-beeswax (BW) composite coatings on postharvest quality of mandarins cv. Ortanique. Edible coatings consisted of HPMC and BW , as hydrophilic and lipidic phase, respectively. Glycerol and fatty acid were added as plasticizer and emulsifier, respectively. The emulsion coatings had 4% total solid content and 40% BW content (dry basis). Stearic, palmitic or oleic acid were studied at two different BW: fatty acid ratios (2:1 and 5:1). After coating, the fruits were stored for 3 and 6 weeks at 5BC, followed by one additional week at 20BC. Another set of samples was also stored for 2 weeks at 20BC, simulating retail handling conditions. The coatings were effective reducing weight loss and maintaining texture of mandarins compared to the control. Coatings with oleic acid were more effective reducing weight loss than coatings with palmitic acid, and these ones more effective than those with stearic acid. However, oleic acid increased the gas barrier, ethanol level and off-flavor of coated mandarins in a greater extend that palmitic and stearic. Levels of internal CO_2 were lower in coatings with a BW: fatty acid ratio of 2:1 than in coatings with 5:1 ratio, which translated in lower ethanol level in juice. This could be due to the lower amount of HPMC in the 2:1 ratio-coatings since hydrophilic materials, such as HPMC, are known to present low oxygen permeability. The results suggest the importance of controlling coating composition in order to extend shelf-life of citrus fruits with good quality