

**Title** Effect of whey protein and hydroxypropyl methylcellulose-based edible composite coating on color change of fresh-cut apples

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### **Abstract**

Edible films and coating can offer a possibility to extend the self life of fresh-cut produces by providing a semipermeable barrier to gases and water vapor, and therefore, reducing respiration, enzymatic browning, and water loss. Development of edible films and coatings has been focused upon barriers containing protein, polysaccharides, and lipids. Coating performance depends, among other factors, on composition. Therefore, the study of coating composition previous to the incorporation of additives, such as antioxidants and/or antimicrobials, is very important in order to optimize coating performance on fresh-cut produces. The objective of this work was to study the effect of coating composition of polysaccharide-lipid and protein-lipid based edible composite coatings without the incorporation of antibrowning agents in postponing enzymatic browning of fresh-cut apples. Edible composite coatings were prepared from whey protein isolate (WPI), whey protein concentrate (WPC) or hydroxypropyl methylcellulose (HPMC), as hydrophilic phase, and beeswax (BW) or canauba wax (CarW), as hydrophobic phase. Golden apples were cut, immersed in citric acid and sanitized in sodium hypochlorite solution. Apple pieces were dip-coated with the emulsion coatings and stored 1 day at 20 °C or 7 d at 5°C in open and sealed trays. Weight loss and color (CIE L\*, a\*, b\*, and browning index (BI) were measured during storage. Our results show that apples coated with whey protein-based coatings had higher L\*, and presented lower b\*, a\*, and BI than HPMC-based coated and uncoated apples. Coatings containing BW showed higher effectiveness decreasing enzymatic browning than coatings containing CarW. Coating application did not reduced weight loss in fresh-cut apples, which indicates that these coatings were not effective as moisture barrier under these storage conditions. These results indicated that whey proteins exert an antibrowning effect and application whey protein-BW coatings on cut apples can be beneficial reducing browning.