

ID 29

Effect of packaging material extracted from peanut shell on post-harvest storage parameters of guava fruits

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Abstract

Research on the usage of biodegradable packaging materials extracted from natural sources in the packing of food products increased recently in order to overcome the problems associated with synthetic petroleum-based packaging materials. The present study revealed the potential of agar bio-based films containing cellulose and microcrystalline cellulose extracted from peanut shells, as well as their effect on storage quality and shelf life of guava (*Psidium guajava*) fruits. Cellulose and microcrystalline cellulose films were made using the solution casting method by pouring the solution into the petri-dishes. Seven different packaging materials were prepared using peanut shell powder (1 and 2%), cellulose powder (1 and 2 %) and microcrystalline powder (1 and 2 %). Packaging film prepared from agar and glycerine used as control. The potential application of these packaging materials to fresh fruit preservation was tested. The guava fruits were covered with 1% and 2% (w/w) concentrations of peanut shell powder, cellulose and microcrystalline cellulose incorporated packaging materials and stored at 30°C (room temperature) and 10°C (refrigeration temperature). Post-harvest storage conditions such as physiological weight loss, ascorbic acid, pH, total soluble solids, reducing sugar, titratable acidity and ash content of fruits were measured at three days intervals up to nine days. According to Tukey's Studentized Range Test changes in physiological weight loss (0.35 ± 0.07), titratable acidity (0.03 ± 0.03), pH (0.02 ± 0.01), total soluble solids (1.15 ± 0.21), reducing sugar (0.78 ± 0.03) and ascorbic acid content (0.2 ± 0.12) were significantly ($p < 0.05$) lower in guava fruits stored in 2% microcrystalline cellulose packaging material at 10°C (between 6th day to 9th day of storage) compared to other packaging materials. The findings of this study indicate that the development of biodegradable packaging material for the preservation of guava fruits with minimal changes in the postharvest storage properties is a possible task.

Keywords: Biodegradability, Guava fruit, Post-harvest losses, Preservation, Shelf-life

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