

PRODUCTION OF BIODEGRADABLE PACKAGING MATERIAL INCORPORATED WITH MICROCRYSTALLINE CELLULOSE (MCC) EXTRACTED FROM PEANUT SHELL AND ITS CAPABILITY TO PRESERVE GUAVA (*Psidium guajava*) FRUIT

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ABSTRACT

The study revealed the extraction of microcrystalline cellulose from peanut shells to produce agar-based biofilms and its effect on the preservation of guava fruit (*Psidium guajava*). The microcrystalline cellulose extraction process was carried out at specific optimum parameters. The film made with agar and glycerine was used as a control. Films made with the incorporation of peanut shell powder, cellulose powder and microcrystalline cellulose powder were the other six treatments. The mechanical and physical characteristics of these packaging films were tested. Packaging film made with 2% microcrystalline cellulose exhibited less swelling ratio ($34.21\% \pm 3.03$) while having a higher bio-degradation rate ($41.49\% \pm 2.26$) significantly ($p < 0.05$). The capability of these packaging materials to preserve the fruits was tested using fresh guava fruit. According to Tukey's Studentized Range Test, changes in physiological parameters such as weight loss, titratable acidity, pH, total soluble solids, reducing sugar, and ascorbic acid content were significant ($p < 0.05$) in the guava, stored at refrigeration temperature in 2% microcrystalline cellulose packaging film. And the shelf life was higher in guava fruits stored in 2% microcrystalline cellulose packaging material at 10 °C. The development of biodegradable packaging materials would provide an innovative solution for the fruits and vegetable preservation industry, enhancing commercial potential with new benefits to meet consumer and market demands while protecting the environment.

Keywords: Biodegradability, Fruit Preservation, Packaging material, Peanut shell, Waste utilization
