

**Physicochemical properties of Saba banana (*musa acuminata* x *balbasiana*)
alginate starch biofilm reinforced with orange peel extracts and its application on
lady finger banana**

ABSTRACT

This study employed the casting method to fabricate biofilms comprising banana starch and alginate, fortified with different concentrations of orange peel extract (0, 0.5, 1, and 2 % (w/v)). The resulting films of BA, BAO 0.5%, BAO 1% and BAO 2% were subjected to analysis using Field Emission Scanning Electron Microscopy (FESEM) and Fourier Transform Infrared Spectroscopy (FTIR). Additionally, various physical attributes of the films were investigated, encompassing parameters including thickness, density, colour, porosity, moisture content, water solubility, water absorption, and water vapor permeability. The addition of orange peel extract significantly reduced the water vapor permeability of the film from 4.25 ± 0.03 to 1.16 ± 0.02 $\text{gs}^{-1}\text{mPa} \times 10^{-7}$. Besides, FTIR analysis unveiled the presence of diverse functional groups within the film, notably alkanes (CH), hydroxyl (-OH), carbonyl (C=O), and carboxylic acid (-COOH), which contribute to the enhancement of fruit longevity. The empirical results indicated that a film composition comprising banana starch and alginate reinforced with 1% orange peel extract exhibited favourable effects on bananas, diminishing the occurrence of black spots and retarding the ripening process. Furthermore, the antimicrobial properties of the film were elucidated, wherein a discernible barrier effect was observed in films augmented with 1% and 2% orange peel extract. The film solution shows good potential in preserving the postharvest quality of fruits.