

UNIVERSITI TEKNOLOGI MARA

**EFFECT OF CHITOSAN-PALM STEARIN
EDIBLE COATING ON THE POSTHARVEST
LIFE OF STAR FRUITS (*Averrhoa carambola* L.)**

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledge as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

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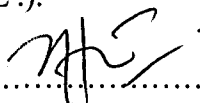
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ABSTRACT

This study was conducted to develop an edible coating containing combined hydrophilic (chitosan) and hydrophobic (palm stearin) components and investigate its effect on the postharvest life of star fruits (*Averrhoa carambola* L.). The emulsions of chitosan (C) and palm stearin (S) were prepared by using different concentrations of C:S which were in the ratios of 1:0, 1:1, 1:2, 1:3. The chitosan-palm stearin emulsion were characterised in terms of viscosity, particle size and stability. Each coating emulsion was then applied on star fruits by using dipping technique and after complete drying, star fruits were stored at room temperature (26-28 °C) and chilled temperature (5-7 °C). The physicochemical properties of the coated star fruits were evaluated for weight loss, firmness, ethylene and respiratory gases concentrations, colour, glossiness, pH, total soluble solids (TSS) and visual appearance. Microscopic observation also was carried out by using scanning electron microscopy (SEM). The results obtained showed that increasing stearin concentration increased the viscosity but decreased the stability and particle size of emulsions ($P < 0.05$). C:S=1:1 was the most stable emulsion and had the lowest viscosity. Results obtained on coated fruits showed that coating reduced weight loss, slowed down the production of respiratory gasses and ethylene production, and maintained the firmness and appearance of star fruits. Generally for both storage temperatures, the effectiveness of coating decreased as the concentration of stearin increased as observed by increases in weight loss, lower firmness retention, higher ethylene and carbon dioxide concentrations and lower oxygen concentration. However, changes in pH, TSS, colour and glossiness were generally not significant. SEM results revealed that increase in stearin concentration resulted in rough appearance of coated fruits. Overall, C:S=1:1 was the best coating formulation as it showed good moisture barrier properties as reflected by significant reduction in weight loss and high firmness retention. C:S=1:1 also showed good gas barrier properties as reflected by significantly lower ethylene and carbon dioxide concentrations, thus slowing down the ripening of star fruits. C:S=1:1 could extend the postharvest life of star fruits by five days at room temperature and by ten days at chilled temperature of storage.

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