

UNIVERSITI TEKNOLOGI MARA

**THE EFFECT OF CALCINED EGGSHELL
POWDER ON THE PROPERTIES OF
EGGSHELL/PURPLE POTATO STARCH
BIOPLASTICS**

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Thesis submitted in fulfillment
of the requirements for the degree of
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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 results of my own work, unless otherwise indicated or acknowledged 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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ABSTRACT

THE EFFECT OF CALCINED EGGSHELL POWDER ON THE PROPERTIES OF EGGSHELL/ PURPLE STARCH BIOPLASTIC

This study was conducted to investigate the effect of calcined eggshell powder (CESP) on the starch matrix's physical and mechanical properties. Purple Sweet Potato (PSP) starch was extracted and mixed with glycerol as a plasticizer and 0-20% by weight of CESP to manufacture this bioplastic PSP / CESP using casting method and dried with oven at 60°C for 24 hours. Fourier Transform Infrared Spectroscopy (FTIR-ATR), Differential Scanning Calorimetry (DSC) and Universal Testing Machine (Instron) have been used to analyze the physical and mechanical aspects of this bioplastic. It can be summarized from the FTIR analysis that the PSP / CESP bioplastic synthesized the presence of the four functions from this study. It can be summarized from the FTIR analysis that the PSP / CESP bioplastic synthesized from this study the presence of the four functional stretches corresponding to the O-H stretch, C-H stretch, C= O stretch and C-O stretch. The thermal analysis using the DSC experiment led to a thermal increase of 15% when CESP was scaled up to 20 wt%. This bioplastic's tensile strength and module increase from 0.166327 MPa to 0.28288 MPa and 1.9501 MPa to 6.3898 MPa respectively, with the addition of CESP up to 10 wt%, making it the best composition to make this bioplastic PSP / CESP. This is because the addition of CESP over 10 wt% reduces this bioplastic's tensile strength and elasticity module. In addition, soil burial testing has proven the biodegradability of this bioplastic. Adding CESP to PSP bioplastic has a higher biodegradability rate than adding up to 20 wt%. CESP filler is capable of rising this sample's weight loss rate to 74% in seven days. Such bioplastics therefore have good physical and mechanical properties that can be used as alternatives to synthesis

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