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TITLE: CHARACTERIZATION OF PREPARED BIOPLASTIC FROM TAPIOCA STRACH AND ITS DEGRADATION IN SOIL

SUPERVISOR: PROF. MADYA SYARIFAH FAUZIAH SYED DRAMAN

SCHOOL OF CHEMICAL ENGINEERING
COLLEGE OF ENGINEERING

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AUTHOR'S DECLARATION

" I hereby declare that this report is the resof my own work except for quotations and summaries which have been duly acknowledged."

Name of Student	:	HAZIQ ZIKRI BIN RAZAK
Student I.D. No.	:	2022679124
Programme	:	Diploma in Chemical Engineering
College/School	:	College of Engineering/School of Chemical Engineering
Signature of Student	:	.....
Date	:	25/1/2024

ABSTRACT

With growing environmental concerns on petroleum-based plastic, the needs for biodegradable and sustainable alternative plastic have increasingly critical. Tapioca starch has gained attention as a promising raw material due to its abundancy, renewability, and biodegradability. However, the effectiveness of tapioca starch-based plastic is depending on their physical and chemical properties. Additionally, understanding how the plastic breaks down in the soil is crucial to evaluate the environmental sustainability with comparison to conventional plastic. Therefore, this study aims to characterize the prepared tapioca-based plastic by conducting burial test, soaking in water test, water absorption test, moisture absorption test and solubility test. The functional group of bioplastics present in the soil were studied through Fourier Transform Infrared (FTIR) spectroscopy. The soil sample were collected from Al-Muktafi Billah Shah (AMBS), (4°36'12.8"N 103°12'38.3"E) and UiTM Cawangan Terengganu, Campus Kuala Terengganu, (5°15'48.5"N 103°09'53.7"E) with one which is a fresh soil that has been used for agriculture and one which has been exposed to the plastic waste over time. The findings indicate that the bioplastic has significant swelling and softening after expose to the water for too long. The material absorbed 109.79% water and 21.35% moisture in the air. Solubility test confirmed that the plastic is highly soluble in the water and showed the interactions with the alcohol-based solvent and alkaline solution under room temperature and elevated temperature at 60°C. Based on the FTIR spectrum analysis, the peak at 3200–3600 cm^{-1}, 2850–3000 cm^{-1}, 1700-1750 cm^{-1}, and 1000-1300 cm^{-1}, which shows the O-H stretching, C-H stretching (Alkyl group), C=O stretching (carbonyl group) and C-O bending respectively. This study provides useful information on practicality and environmental behaviour of tapioca starch-based bioplastic. However, further studies need to be carried out to investigate the effect of the present of bioplastic to soil quality.

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