PREPARATION AND CHARACTERIZATION OF BIOPLASTIC DERIVED FROM VARIOUS BANANA PEEL RIPENING STAGES

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ABSTRACT

PREPARATION AND CHARACTERIZATION OF BIOPLASTIC DERIVED FROM VARIOUS RIPENING STAGES OF BANANA PEEL

The pollution caused by synthetic plastic packaging can be reduced by using bioplastic as an alternative. These bioplastics are created using peel from *Musa* ABB cv. Awak and *Musa acuminita* cv. Berangan at various stages of ripeness. The purpose of this study is to characterise the bioplastic properties resulting from different banana peel ripening stages and to assess how banana peel ripening stages effect bioplastic properties. Banana peel and rice starch are combined to create bioplastic, which is then moulded with glycerol-sorbitol as the plasticizer. This study's methodology involves combining pureed peel with HCl, glycerol, sorbitol, rice starch, and NaOH, which is then dried in an oven for one and a half hours at 130 C. This process produce bioplastic in the form of film and its chemical compounds has been characterized by using ATR-FTIR. FTIR spectra exhibit slightly same trend for both banana species. Based on the analysis BP film from over ripe banana peel most soluble in water. Solubility in alcohol showed that unripe ‘awak’ peel film and over ripe ‘Berangan’ peel film soluble more in alcohol. Water absorption confirmed that unripe peel absorbs more water than ripe and over ripe peel. All bioplastic film reduces their weight when contact with acidic and alkali solution. However, in salt solution, film from ‘Awak’ unripe and ripe increase in mass at the end of day four. This has due to the fact that NaCl prevents starch from retrograding and increases its stability. The bioplastic from more ripen peel showed more darker, rough and slightly sweet smell.

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CHAPTER 1

INTRODUCTION

1.1 Background of study

Plastics are produced from synthetic organic polymers (Chen et al., 2021) such as polyethylene (PE), polystyrene (PS), and polypropylene (PP) (Shams et al., 2021). The interest characteristics of plastics, such as their durability, inertness and versatility, have increased their uses (Proshad et al., 2017). Reuters (2020) reported that Malaysia is the highest consumer of plastic packaging among Asian countries. Less recycling habits and deficiency in plastic degradation, cause accumulation of plastic in the environment (Boyle & Örmeci, 2020).

Over the past year, bioplastic has brought intention to people with good characteristics and advantages to the environment. Previous studies reported, that these bioplastics were derived from orange peel, dragon fruit peel and pineapple peel. They are generated from industrial food processing, such as canned fruit, fruit juice, and flavouring (Ibrahim et al., 2017).