

**THE SYNTHESIS AND CHARACTERIZATION OF THE
BIODEGRADABLE BIOPLASTIC FROM THE CASSAVA,
POTATO AND SWEET POTATO STARCH**

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ABSTRACT

THE SYNTHESIS AND CHARACTERIZATION OF BIODEGRADABLE BIOPLASTIC FROM THE CASSAVA, POTATO AND SWEET POTATO STARCH

Conventional plastic is produced mainly from the petroleum source. During its manufacture, it costs a lot of energy and also emits gases that affect the environment. Meanwhile during its decomposition it also causes high amount of CO₂ emission to the atmosphere. The process of the petroleum production also take thousands years, thus make the petroleum become a limited resource. Due to all these problems, an alternative strategy was carried out by producing plastic from the biological resource such as starch and cellulose. This type of plastic is known as the bioplastic. This experiment is to identify which type of plant tubers are containing high starch content, to synthesis starch-based bioplastic from the starch extracted, to determine which amount of glycerol are suitable to synthesis starch-based bioplastic and to characterize the mechanical, thermal, chemical and biodegradable properties of the starch-based bioplastic. In this experiment, the starch was extracted from the three types of tubers, which were cassava, sweet potato, and potato tubers. These starches then were synthesized into bioplastic film with different amount of glycerol. Glycerol is functioning in improving the flexibility, ductility and reducing the intermolecular forces along the polymer chain. Then the starch-based bioplastic were tested for mechanical, thermal, chemical and biodegradable properties. For the mechanical properties, the result shows that less the amount of glycerol added, the higher the tensile stress at break of the bioplastic. While for the thermal properties, the results showed that the bioplastic had a higher thermal stability compared to plastic and the increasing amount of glycerol will decrease the thermal stability. The results for the chemical properties shows that the bioplastic also consists the functional group of plastic that derived from the petroleum and the amount of glycerol does not affect the presence of the functional group in the bioplastic. The biodegradable test shows that bioplastic can be degraded in short time period compared to the conventional plastic. Thus this shows that the starch-based bioplastic has excellent characteristics in thermal and biodegradable properties that make it has the potential in replacing the conventional plastic. Less amount of glycerol is better for the production of bioplastic.