THE PRODUCTION OF BIODEGRADABLE MULCH FILM BY USING SPENT COFFEE GROUND AS FILLER AND WASTE COOKING OIL AS BIO-RESIN

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ABSTRACT

THE PRODUCTION OF BIODEGRADABLE MULCH FILM BY USING SPENT COFFEE GROUND AS FILLER AND WASTE COOKING OIL AS BIO-RESIN

Coffee is the second most popular beverage in the world next to the water. Spent coffee grounds (SCGs) are the leftover grounds from coffee consumption that are typically thrown away and eventually land in landfills. Due to the huge amount of SCG, it will give the negative effects on the environment which it requires a lot of oxygen to breakdown the SCG in landfills. Therefore, to save the environment SCG need to be develop into product with added value. In this research, SCG was used as filler with added of PLA as a natural polymer into the biodegradable mulch film. The biomass tested in this study are spent coffee ground (SCG), and poly(lactic) acid(PLA) was used to mix with the biomass in a different compositions (0, 10, 20, 30, and 40 wt%). Three main tests including Fourier Transform Infrared Spectroscopy (FTIR), soil burial test and tensile strength test were taken place to study the characterize of biodegradable PLA mulch film. As a result of soil burial test, the percentage of weight loss of PLA/SCG film after 10 days was 7, 6.25, 6.19, 5.96 and 5.5%. It means that the higher the SCG content, the lower the weight loss of PLA/SCG film. Next, at ratio of 40% of SCG and 50% PLA has the tensile strength of 0.1880 MPa, elongation at break at 2.9430 MPa and the Young's Modulus is 12.72 MPa. It has the highest of tensile strength and elongation at break which causes the mechanical characteristics of the composite material has been improved and the SCG filler have increased the flexibility and ductility of the PLA/SCG film. 40 wt% of SCG: 50 wt% PLA is the best among the ratio, in terms of higher tensile strength and increase of elongation at break. Hence, ration of 40 wt% of SCG and 50 wt% of PLA is the most suitable biomass to use as biodegradable mulch film.

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