Wood Plastic Recycle Composite from Mangosteen Peel Powder and Plastic Bottle Wastes

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Abstract:

The purpose of this project was to study and produce wood plastic composite (WPC) from mangosteen peel and plastic bottle wastes in order to add value to waste materials. Mangosteen peel powder was mixed either with waste polyethylene (PE) bottles or with commercial PE pellets at the ratio of 30:70 by weight in the internal mixer at temperature of 150 °C for 0,5, and 10 minutes. All mixed materials were then hot-pressed at stress of 1,500 psi and temperature of 160 °C for 15 minutes. Subsequently, they were pressed at stress of 1,500 psi and temperature of 50 °C for 10 minutes. Hardness and bending testes were conducted according to Thai Industrial Standard (TIS no.2998-2562). The hardness values of WPC from waste PE bottles were higher than that of commercial PE pellets. Additionally, the highest hardness value of 65.3 ± 0.84 was achieved with WPC made from waste PE bottles with an internal mixing time of 10 minutes. Flexural strengths of WPC from waste PE bottles ranged from 14 to 18 MPa, which qualifies them for “External 2” and “Internal” applications according to TIS no. 2998-2562. The WPC made from commercial PE pellets had a flexural strength of less than 10 MPa.

Keywords:

Wood plastic composite, Mangosteen peel powder, Polyethylene (PE).