

Three different recycle codes of plastic/Acacia fibre composites: physical and morphological properties

ABSTRACT

In this study, the term wood-plastic composite (WPC) refers to three different recycle codes of plastics combine with Acacia fiber namely polypropylene-wood fiber (PP-WF), high density polyethylene-wood fiber (HDPE-WF), and low density polyethylenewood fiber (LDPE-WF). Each WPC was produced at different percentage combination (100:0, 90:10, 80:20, 70:30, 60:40, and 50:50). The relationship between plastic content and the physical properties (water absorption, thickness swelling, and density) of WPC were investigated. Water absorption and thickness swelling were evaluated after 15 days of water immersion. It was found that WPC of PP-WF, HDPE-WF and LDPE-WF had a significant difference at $P \leq 0.05$ for water absorption, thickness swelling, and density. While water absorption and thickness swelling increased when the plastic content decreased. At combination of 50:50, WPC of PPWF, HDPE-WF, and LDPE-WF showed range value between 52.03% and 56.27% of water absorption. While for thickness swelling at combination of 50:50 WPC of PP-WF showed 4.62%, HDPE-WF and LDPE-WF showed 4.61% and 4.77%, respectively. WPC of PP-WF, HDPE-WF, and LDPE-WF showed density 1.033 g/cm³ , 0.862 g/cm³ , and 0.870 g/cm³ respectively, at 100% plastic content. This finding revealed due to the present of hydroxyl group in wood fiber and some voids in WPC. The evidence of the poor interfacial bonding in WPC was analyzed using scanning electron microscope