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Effect of Oil Palm Empty Fruit Bunch and Acrylic Impact Modifier on Mechanical Properties and Processability of Unplasticized Poly(Vinyl Chloride) Composites

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Abstract: Interest in the use of natural fibers as fillers has grown over the past few years due to the advantages it offers. The use of oil palm empty fruit bunch (EFB) as a filler in the unplasticized poly(vinyl chloride) (PVC-U) is a new attraction in polymer composite technology. The objectives of this study are to investigate the effects of EFB fillers on processability and mechanical properties of unmodified and acrylic-impact modified PVC-U. To produce the compound, the PVC resin and the additives were first dry blended using a laboratory blender before being milled into sheets using two-roll mill. Test specimens were prepared using a hot press, after which impact and flexural properties were determined. The processability studies of the dry blend were carried out by using a Brabender Torque Rheometer model PL2200. The results showed that the incorporation of EFB filler into unmodified PVC-U decreased the fusion time, but increased the fusion time of acrylic-impact modified PVC-U. The end torque decreased upon the addition of EFB filler for both samples. The addition of 9 phr of acrylic impact modifier into the unfilled and EFB-filled PVC-U compound decreased the fusion time. The flexural modulus showed improvement upon addition of EFB filler, with a sacrifice in impact and flexural strength. The overall results show that the incorporation of EFB filler modified the processability and mechanical properties of both the unmodified and acrylic-impact modified samples.

Keywords: Oil palm empty fruit bunch; Acrylic impact modifier; Unplasticized poly(vinyl chloride) composite; Mechanical properties; Fusion characteristics

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