

## Optimization of processing parameters and fiber content of cocoa pod husk fiber-reinforced thermoplastic polyurethane composites by Taguchi method

### ABSTRACT

A composite of cocoa (*Theobroma cacao*) pod husk (CPH) fiber reinforced thermoplastic polyurethane (TPU) was prepared by melt-blending method followed by compression moulding. Specimens were cut from the sheets that were prepared by compression moulding. The criteria of optimization was testing the specimens by tensile test and comparing the ultimate tensile strength. The aim of this study is to optimize processing parameters and fiber loading using Taguchi approach. These four parameters were investigated in three levels each. The L9 orthogonal array was used based on the number of parameters and levels that have been selected. Furthermore ANOVA was used to determine the significance of parameters. The processing parameters chosen for this study were temperature, speed and time of processing and fiber content. The results showed that optimum values were 190°C, 40 rpm, 11 min and 30% for processing temperature, processing speed, processing time and fiber content; respectively. Using ANOVA; fiber content showed the highest significance value followed by processing time. Processing temperature and speed showed no significance in the optimization of TPU/CPH.

**Keyword:** Cocoa podhusk fibers; Natural fiber composites; Taguchi method; Thermoplastic polyurethane