

## Effect of fibre size and fibre loading on tensile properties of hybridized kenaf/PALF reinforced HDPE composite

### ABSTRACT

Hybridization, especially where only variant natural lignocelluloses are combined, is fast receiving encouraging attention because it offers range of properties that are quite difficult to obtain with a single kind of reinforcement. In this work, tensile strength and modulus of hybridized kenaf/PALF reinforced HDPE composite was examined. Pellets were produced from the mixture of the composite in an internal mixer at 190°C, 40rpm and 25minutes for processing temperature, speed and duration of mixing respectively. The composite sheets with thickness of 1mm produced from pellets were prepared using compression moulding. Then the tensile specimen were prepared and tested using an INSTRON bluehill universal testing machine according to ASTM D638 requirements. All samples were prepared at 1:1 kenaf:PALF ratio; 0.25mm and 0.5mm fibre length; fiber loading of 10 to 40% were utilized. Linear relationship of tensile modulus was observed with about 26% reduction in tensile strength at 10% fibre loading that subsequently reduced but with a reversal increase at 40% fibre loading. This was attributed to a better supportive load at that fibre content and a better interaction between fibre and matrix. Furthermore, the result also corroborates with the one obtained for the tensile modulus at same fibre loading. The best tensile strength and tensile modulus obtained was 32.43MPa;642.61MPa and 30.01MPa;636.73MPa for 0.25mm and 0.5mm fibre length respectively. Increase in fibre length did not show any significant improvement in tensile strength which may have been caused by fibre attrition. It is possible to achieve improved mechanical properties if the fibres are given some kind of treatment.

**Keyword:** Hybridization; Tensile; Modulus; Fibre; Loading; Length