

## Effect of Sodium Hydroxide Treatment on the Mechanical Properties of Crushed and Uncrushed *Luffa cylindrica* Fibre Reinforced rLDPE Composites

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**Abstract :** The use of suitable engineering materials which poses less harm to ,an and the environment is sort for in recent times, thus giving rise to polymer composites filled with natural organic reinforcement which are biodegradable. Treatment of natural fibres is essential in improving matrix to filler adhesion, hence improving its mechanical properties. In this study, investigations were carried out to determine the effect of sodium hydroxide treatment on the tensile, flexural, impact and hardness properties of crushed and uncrushed luffa cylindrica fibre reinforced recycled low density polyethylene composites. The LC (*Luffa Cylindrica*) fibres were treated with 0%, 2%, 4%, 6%, 8%, and 10% wt. NaOH concentrations for a period of 24 hours under room temperature conditions. The compounding of the waste LDPE was done using a two roll mill at a temperature of 150 oC and cured in a hydraulic press at a temperature of 150oC for 3 minutes at 3 metric tonnes. A formulation of 20/80g (reinforcement to matrix ratio in grams) was maintained for all fabricated samples. Analysis of the results showed that the uncrushed luffa fibre samples gave better mechanical properties compared with the crushed luffa fibre samples. The uncrushed luffa fibre composites had optimum tensile and flexural strengths of 7.65MPa and 17.08Mpa respectively corresponding to a young modulus and flexural modulus of 21.08MPa and 232.22MPa for the 8% and 4%wt. NaOH concentration respectively. Results obtained in the research showed that NaOH treatment with the 8% NaOH concentration improves the mechanical properties of the LC fibre reinforced composites when compared with other NaOH treatment concentration values.

**Keywords :** LC fibres, NaOH concentration, LC/rLDPE composite, tensile strength, flexural strength

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