

Green composites from waste chicken feather fibre and natural rubber:

Studies on mechanical properties

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ABSTRACT

Chicken feather fibres have potential application in light weight composites. This work was carried out to investigate the possibilities of utilizing chicken feather fibres (CF) as reinforcement in natural rubber (NR). Green composites of NR with 10, 15, 20, 25 and 30 phr of raw chicken feather fibre (RCF) were prepared using dicumyl peroxide (DCP) as vulcanizing agent. CFs was chemically modified with 2% sodium hydroxide (ACF) to enhance their compatibility with the hydrophobic rubber polymer matrix and it was characterized by FTIR and SEM. The properties such as tensile strength, tensile modulus, tear strength, elongation at break and hardness of both RCF-NR and ACF-NR composites were studied. Composites filled with 25 phr CF had the optimum set of mechanical properties. Compared with RCF-NR composites, the ACF-NR composites exhibited higher mechanical properties. These improvements were about 60% compared to RCF-NR composites. Composites were analyzed by SEM and FTIR. The morphology, evaluated by SEM, indicated that a uniform dispersion of CF in the NR matrix existed. The outcome obtained from this study is believed to assist the development of green composites from bio-based polymers, especially for converting poultry waste-chicken feather into useful products.

Keywords: Chicken feather fibre, Natural rubber, Mechanical Properties

References

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