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ORIGINAL PAPER

Novel Cellulosic Natural Fibers from *Abelmoschus Ficulneus* Weed: Extraction and Characterization for Potential Application in Polymer Composites

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Abstract

Owing to the mounting environmental consciousness, natural fibers in composite materials have become inevitable, especially for lightweight semi-structural applications which includes the door panels, side body structures, stressed shell structure and hood components in automotive and aerospace industry. This study represents the properties of raw and NaOH treated novel cellulosic *Abelmoschus ficulneus* weed plant fibers. The extracted fibers were characterized by physicochemical analysis, fourier transform infrared spectroscopy, X-ray diffraction, thermogravimetric analysis, and Differential scanning calorimetry, single fiber tensile test, optical microscopy, and scanning electron microscopy. The physicochemical analysis found that the extracted fiber possessed higher cellulose content (80.86%). The extracted fiber was also chemically modified by NaOH treatment, which enhanced the tensile and thermal properties. The peak load at which the fiber failure occurred improved from 2.87 N for the untreated fiber to 3.57 N for the treated fiber while the modulus improved from128 MPa to 159 MPa for the untreated and treated fiber. Further, the inflection degradation increased from 349 °C to 352 °C. Hence, with better functional properties, the novel *Abelmoschus ficulneus* weed fibers can be a potential reinforcement material for the composites used in semi-structural applications.

Keywords *Abelmoschus ficulneus* · Physico-chemical analysis · Single fiber tensile and thermal properties

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