

## Extraction of Nanocellulose from Sri Lankan Agricultural Waste

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Polymers are widely used in domestic and industrial applications because of their diverse functionality, lightweight, low cost and excellent chemical stability. They are mainly classified into naturally occurring or bio-based polymers and synthetic polymers. Bio-based polymers have the potential to replace petroleum-based synthetic polymers and solve some of the most urgent problems caused by the overuse of petroleum-based polymers, such as environmental pollution especially water and soil pollution and harmful influence to human health.

Rice is the major agricultural food and *it* is cultivated in all parts of Sri Lanka today. Rice straw is the waste product of the rice harvest. Rice straws have a considerable amount of cellulose. Cellulose is the mostly used bio-polymer material for various applications today. *Nanocellulose* is a light solid substance obtained from agricultural waste which comprises of Nano-sized cellulose fibrils. In this research, rice straw of BG 352 variety was collected from Polgahawela paddy cultivation area in Sri Lanka. Cellulose and nanocellulose materials were extracted from rice straw of BG 352 rice variety. Cellulose was extracted from rice straw using de-waxing, delignification, hemicellulose and silica removal treatments. Extracted cellulose was characterized by Fourier Transform Infrared spectroscopic techniques (FTIR). SEM images indicated that isolated cellulose fibers showed diameters ranging from 2-8 $\mu$ m. Approximately 21wt. % of cellulose was extracted from the rice straw. Nanocellulose was extracted from cellulose by subjecting to acid hydrolysis, quenching, centrifugation, dialysis, sonication and freeze-drying processes. SEM images showed that extracted nanocellulose materials having 5-70 nm diameters. Therefore, Sri Lankan agricultural waste can be used as a source to synthesis value-added product of nanocellulose.

**Key words:** *Nanocellulose, Rice Straw, Agricultural Waste*