

## **Exploring the Value Addition Potential of the Local Rice Straw Varieties**

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Polymers play a critical role in engineering applications today. Cellulose is the most abundant renewable natural biopolymer on earth. It is present in a wide variety of living species including plants and some marine animals. Rice is the main food of the inhabitants of Sri Lanka. The total land devoted for paddy is estimated to be about 708,000 hectares at present in Sri Lanka. Rice straw is a rice by-product produced after harvesting paddy. Rice straw is a major agricultural waste product in Sri Lanka. There is no effective value addition to local rice straw today. Rice straw contains considerable amount of cellulose with hemicelluloses and lignin. This research is based on investigating the possibility of extraction of cellulose from most frequently used traditional rice varieties (Suwandel and Raththal) and technically modified rice varieties (BG300 and BG352) in Sri Lanka.

The dried and cleaned rice straw was milled using a grinder to produce fine powder of rice straw. Sieve analysis method was used to analyze the rice straw powder and equal or less than 150  $\mu$ m particle size was selected for the cellulose extraction. Pure cellulose was extracted from BG 352 rice straw variety after following de-waxing, delignification, hemicellulose and silica removal processes. Same extraction procedure was followed for BG 300, Suwandel and Raththal rice varieties. The complete removal of non-cellulosic materials from rice straw was confirmed by FTIR spectroscopy after each chemical purification step.

According to the experimental results, highest cellulose yield was obtained from rice straw of Suwandel (35.2%). Other types of rice varieties showed cellulose yield of BG300 (27.8%), BG352 (29.3%) and Raththal (26.8%). Key feature of this research is developing new processes and technologies to convert Sri Lankan agricultural waste into value - added product of cellulose. These extracted cellulose material can be used for different engineering applications.