

Production of High Purity Cellulose Products from Sawdust Waste Material

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Abstract : Approximately half of the wood processed in the Forestry, Timber, Pulp and Paper (FTPP) sector is accumulated as waste. The concept of a “green economy” encourages industries to employ revolutionary, transformative technologies to eliminate waste generation by exploring the development of new value chains. The transition towards an almost paperless world driven by the rise of digital media has resulted in a decline in traditional paper markets, prompting the FTTP sector to reposition itself and expand its product offerings by unlocking the potential of value-adding opportunities from renewable resources such as wood to generate revenue and mitigate its environmental impact. The production of valuable products from wood waste such as sawdust has been extensively explored in recent years. Wood components such as lignin, cellulose and hemicelluloses, which can be extracted selectively by chemical processing, are suitable candidates for producing numerous high-value products. In this study, a novel approach to produce high-value cellulose products, such as dissolving wood pulp (DWP), from sawdust was developed. DWP is a high purity cellulose product used in several applications such as pharmaceutical, textile, food, paint and coatings industries. The proposed approach demonstrates the potential to eliminate several complex processing stages, such as pulping and bleaching, which are associated with traditional commercial processes to produce high purity cellulose products such as DWP, making it less chemically energy and water-intensive. The developed process followed the path of experimentally designed lab tests evaluating typical processing conditions such as residence time, chemical concentrations, liquid-to-solid ratios and temperature, followed by the application of suitable purification steps. Characterization of the product from the initial stage was conducted using commercially available DWP grades as reference materials. The chemical characteristics of the products thus far have shown similar properties to commercial products, making the proposed process a promising and viable option for the production of DWP from sawdust.

Keywords : biomass, cellulose, chemical treatment, dissolving wood pulp

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