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Chapter 7

Production of Nanomaterials from Forest Resources

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Abstract

Renewable resources such as lignocellulose are prospective alternatives for the development of different products in connection with climate change. Cellulose, lignin, and hemicellulose can be extracted from wood and non-wood through a chemical process, subsequently, nanocellulose, nanolignin, and nanohemicellulose can be obtained through mechanical, chemical, and a combination of these two processes. Nanocellulose is suggested for application in improving barrier properties, drug delivery, energy storage, composite film, scaffolds for tissue regeneration, and other smart materials due to its nanoscale dimension, hydrogen bond formation capability, and high surface area. This chapter presents various methods for the extraction of lignin nanoparticles and their applications. Due to the high reactivity, large surface area, and homogeneity, nanolignin is applied in the preparation of nanocomposites, and so far, various thermally stable composites have been suggested. Though very little information is available on nanohemicellulose, it is a very promising nanomaterial from forest resources to show a definite improvement in the tensile strength of biofilm.

Keywords

Lignocellulose, Nanocellulose, Nanolignin, Nanohemicellulose, Barrier Properties, Biofilm

Contents