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LIGNOCELLULOSIC BIOMASS CHARACTERISTICS FOR BIOENERGY APPLICATION: AN OVERVIEW

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Abstract

Considering world energy demand and its security, much attention has been focused on identifying promising lignocellulosic substrates to generate a variety of downstream fuels and chemicals. In response, a recent key research area has centered on hydrolysis of cell wall polysaccharides by various physical, chemical and biological means. Due to their complex chemical and molecular structure, there is a substantial knowledge gap in understanding of biomass recalcitrance and its relationship with cell wall structure. It has delayed the response in meeting the target to achieve economically feasible large-scale conversion of lignocellulosic biomass to biofuel and market entrance. Biomass of wheat straw, rice straw, corn stover, sugarcane bagasse and switchgrass has been characterized to assess their potential for bioenergy application. The mechanism involved in digestibility of lignocellulosic biomass is complex since it is hindered by many physico-chemical, structural and compositional factors. This paper highlights recent advances in analytical methods employed for physico-chemical characterization of lignocellulosic biomass and its deconvolution to maximize the benefit of biomass as a material and energy feedstock.

Key words: characterization, FTIR, lignocellulose, TGA, XRD

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