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High-pressure enzymatic hydrolysis to reveal physicochemical and thermal properties of bamboo fiber using a supercritical water fermenter (Article)

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Abstract

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Bamboo fiber was treated using a high-pressure enzyme hydrolysis process. The process performance was compared with the pulping and bleaching process for bamboo fiber. Several analytical methods, including field emission scanning electron microscopy, Fourier transform infrared spectroscopy, X-ray diffraction, thermogravimetry, and differential scanning calorimetry, were employed to determine the physicochemical and thermal properties of the treated cellulosic bamboo fiber. It was found that the pressurized enzyme hydrolysis treated bamboo fiber had the most uniform morphological structure, along with lowest crystallinity and highest thermal stability. Thus, utilizing high-pressure enzyme hydrolysis is the most effective process for treating fiber to remove non-cellulosic components from the raw material, including lignin, hemicelluloses, and waxy materials.

Author keywords

Bamboo fibers Cellulose Enzyme hydrolysis Morphological characterization Pressure water Thermal properties

Indexed keywords

Engineering controlled terms: Bamboo Cellulose Differential scanning calorimetry Enzymes Fibers Field emission microscopes Fourier transform infrared spectroscopy Hydrolysis Scanning electron microscopy Thermodynamic properties Thermogravimetric analysis X ray diffraction