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INDUSTRIAL BIOREFINERY OF LIGNOCELLULOSE FOR BIOETHANOL AND BIOMATERIALS IN CHINA

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An environmentally friendly industrial biorefinery of the lignocelluloses such as corn cob and other cereal straws for production of bioethanol and biomaterials by a combination of hydrothermal pre-treatment and alkali post-treatment will be reported. 30 thousands tonnes of bioethanol, 12 thousands tonnes of oligosaccharides and 10 thousands tonnes of xylitol with a purity of more than 97%, 300 hundred tonnes of arabinose with a purity of more than 98.5%, and 15 thousands tonnes of lignin with a purity of more than 94% have been produced from 200 thousands tonnes of corn cob per year at Shandong Longlive Bio-Technology Co., Ltd, China. The recovered lignin, which is a significant source of CO₂ emissions if burned, was activated under alkaline conditions and then used to produce lignin-phenol-formaldehyde (LPF) adhesives with a yield of about 10 thousands

tonnes per year for partially replacing the expensive phenols (50%) in the commercial production of biocomposite boards for construction. Finally, the cellulose-rich fraction, which has a large surface area and total pore volume, is enzymatically hydrolyzed and then fermented into bioethanol with a high conversion, in which 3 tonnes of the cellulose-rich fraction can produce one ton of bioethanol. These value-added hemicelluloses- and lignin-derived products have greatly improved the economy of both lignocellulose conversion and bioethanol production. Similar biorefinery of 400 thousands tonnes of maize stem and 600 thousands tonnes of wheat straw for bioethanol and multi-biomaterials production is under construction in China today.

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