

# Preface

Rising oil prices and uncertainty over the security of existing fossil fuel reserves, combined with concerns over global climate change, have created the need for new transportation fuels and bioproducts to substitute for fossil carbon-based materials. Ethanol is considered to be the next-generation transportation fuel with the most potential, and significant quantities of ethanol are currently being produced from corn and sugarcane via a fermentation process. Utilizing lignocellulosic biomass as a feedstock is seen as the next step toward significantly expanding ethanol production. The biological conversion of cellulosic biomass into bioethanol is based on the breakdown of biomass into aqueous sugars using chemical and biological means, including the use of hydrolytic enzymes. From that point, the fermentable sugars can be further processed into ethanol or other advanced biofuels. Therefore, pretreatment is required to increase the surface accessibility of carbohydrate polymers to hydrolytic enzymes. The goal of the pretreatment process is to break down the lignin structure and disrupt the crystalline structure of cellulose, so that the acids or enzymes can easily access and hydrolyze the cellulose. Pretreatment can be the most expensive process in biomass-to-fuels conversion but it has great potential for improvements in efficiency and lowering of costs through further research and development. Pretreatment is an important tool for biomass-to-biofuels conversion processes and is the subject of this e-book.

Pretreatment of Lignocellulosic Biomass for Biofuel  
Production

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2016, XI, 87 p. 5 illus., 4 illus. in color., Softcover

ISBN: 978-981-10-0686-9