

Preface

This book summarizes the information on different biomass converting enzymes and their potential use in the bioconversion of biomass into simple sugar to generate bioenergy and other value added co-/by products.

Biofuel produced from agricultural crops, e.g. cereals, maize, sugarcane, sugar beet, and sweet sorghum, is referred to as first generation biofuels while that produced from lignocellulosic materials is referred to as second generation biofuels. The global production of first and second generation biofuels is dependent upon the lignocellulosic materials available for bioconversion.

Microbes have been established as important mediators in the production of biofuels and other valuable biorefinery products. It is prevalent that microbes have been playing a key role by producing key enzymes for bioconversion of various biomasses for biorefinery applications. This selection of microbes is based upon their ability to selectively or simultaneously degrade lignocellulosic materials, the high redox potential of their enzymes, their engineering capabilities and/or their thermostability. The key to their degradative capabilities is the extracellular enzymes they secrete. These microorganisms are capable of producing an array of enzymes such as 1) Cellulase systems, comprised of endo-1,4- β -glucanase, cellobiohydrolase and β -glucosidases; 2) Hemicellulases include endo-1,4- β -xylanases, β -xylosidases, endo-1,4- β -mannanase and β -mannosidase; 3) Lignin degrading enzymes comprising laccase, lignin peroxidase, manganese peroxidase and versatile peroxidase. There are also accessory enzymes which aid the hemicellulases in their degradation of hemicellulose polymers through the cleavage of side chain residues; these enzymes include α -glucuronidase, α -L-arabinofuranosidase, acetylxylan esterase, ferulic acid esterase and β -galactosidase.

This book summarizes the information on different biomass converting enzymes and their potential use in the bioconversion of biomass into simple sugar to generate bioenergy and other value added co-/by products. The chapters have been contributed by the experts of the area across the globe and these chapters offer clear and concise information on both standard and new technologies and will serve as an

invaluable reference for undergraduates, post-graduates, researchers and practitioners studying and working in the field of microbial enzymes for biofuel and biorefinery applications.

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