

Book review

Bioprocessing technologies in biorefinery for sustainable production of fuels, chemicals, and polymers

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This book is intended for chemical engineers and researchers that are working on bioprocessing technologies for the production of fuels, chemicals and polymers. It contains 465 pages which are divided to 24 chapters. The 24 chapters provide a comprehensive review of bioprocessing technologies important to corn, soybean, and lignocellulosic biomass-based biorefineries for production of ethanol, biodiesel, chemicals, and other value-added products.

The first chapter gives an overview of the concept and current trends in integrated refinery for sustainable production of fuels, chemicals and polymers. Then the biorefinery with sugar and starch crops, oil crops, energy crops, as well as microalgae as the feedstock are introduced in chapters 2–5. The pretreatment of lignocellulosic biomass in a biorefinery is specially introduced in chapter 6. In chapters 7–10, different enzymes used in biorefineries for the hydrolysis of starch and lignocelluloses are introduced. It provides a detailed review of enzyme source, type and characteristics, protein and genetic engineering of the enzymes, and their industrial production and applications. After the hydrolytic enzymes, the production processes for different biofuels (ethanol, diesel, butanol, alcohol, etc.) and the following applications like fuel cell technology by using biohydrogen are introduced in chapters 11–15. Chapters 16–23 cover some of the most important specialty chemicals, building block chemicals, and biopolymers that can be produced via fermentation. The final chapter discusses phytochemicals and

functional food ingredients that can be extracted from plant materials.

In the following text, Chapter 2 will be taken as an example to show the structure and content. The authors start with introducing the advantages of biomass-based refinery and point out the important biomass for biorefinery are cultivated crops while the starch and sugar crops are recognized as major feedstock for the first generation of biorefinery. Following that, the authors give detailed information for the production of raw crops, their chemical composition, as well as the sugar or starch production processes from raw crops are given for different sugar and starch crops, for example, sugarcane and corn. The authors also talk about the concerns that need to be taken into consideration in order to effectively manage feedstock for large-scale biorefinery, for example the agronomic traits, the price, the storage, etc. Finally the refinery by using sugar and starch are respectively introduced, for example by introducing different processes and products produced in refinery of cereal grains. In the conclusion, the future of these crops for biorefinery is summarized.

This book covers quite a broad range of topics regarding bioprocessing technology and allows both experts and non-experts to comprehend recent progress in this field. You can quickly reach your interested topics by using the index at the end of the book. If the authors would have included one more chapter about the sustainable analysis for bioprocessing technology and benchmarking to conventional technology, the book would have had a stronger close.

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