



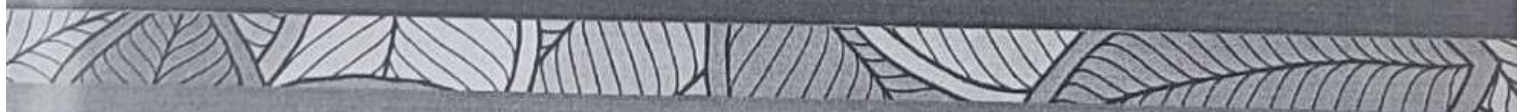
Biomass-Based Green Technology for Circular Economy

Edited by

Riti Thapar Kapoor and Mika Sillanpää



CRC Press
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Biomass-Based Green Technology for Circular Economy

This book provides up-to-date information on advanced technologies and future directions for management of waste biomass for carbon neutrality and development of circular economy. It addresses critical environmental issues and challenges related to agro-waste management. It provides practical solutions to the readers on how to meet these challenges.

Features:

- Summarizes the application of waste biomass for development of value-added products for sustainable development using green technologies.
- Provides detailed work on biomass-based green technology.
- Highlights biofuel production with wastewater remediation simultaneously with microbial fuel cell.
- Offers a substantial contribution for solving the problem of biomass waste which can be used as a feedstock for valuable biofuel and fine chemicals production.
- Explores different aspects of biological methods and use of nanomaterials for removal of contaminants, recycling, and reusing.

The book is aimed to provide wide information to researchers and professionals on state-of-art of biotechnology, circular economy, and waste treatment.

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Microalgae Biomass as a Source of Renewable Energy:

Recent Advances and Future Perspectives

Syed Khalida Izhar, Shareen Fatima Rizvi, Saba Siddiqui, and Uzma Afaq

ABSTRACT

Due to the economic devastation and rapid depletion of fossil fuel resources, there is a pressing requirement for the establishment of a low carbon economy. Traditional energy sources are fraught with concerns regarding security and sustainability. Consequently, the quest for alternatives to fossil fuels has garnered considerable attention. Microalgal biomass emerges as a compelling solution to this modern quandary, offering a renewable and environmentally friendly energy source. With their abundant oil content and rapid growth rates, microalgae present themselves as highly promising candidates for biofuel production. Significant strides in catalytic reaction research have facilitated the efficient conversion of biomass into biofuels. Processes like hydrolysis, trans-esterification, hydrogenation, and isomerisation have seen notable advancements in recent years, enabling the extraction of high-grade hydrocarbons from microalgal lipids. A plethora of processing methods underscores the vast potential of microalgae in bioenergy production, showcasing their adaptability and effectiveness.

16.1 Introduction

The biological material obtained from microalgae is referred to as microalgal biomass. Phytoplankton are microscopic photosynthetic organisms that are found in freshwater and marine environments. Due to their rapid growth rates and high lipid content, microalgae show great promise as a biomass source for sustainable energy production. They are a desirable alternative for sustainable biomass production because they do not compete with food crops for resources because they may be grown on non-arable soil with non-potable water (Kiran and Deshmukh, 2014). The escalating apprehensions regarding climate change, diminishing fossil fuel supplies, and ecological contamination have heightened the worldwide quest for sustainable and