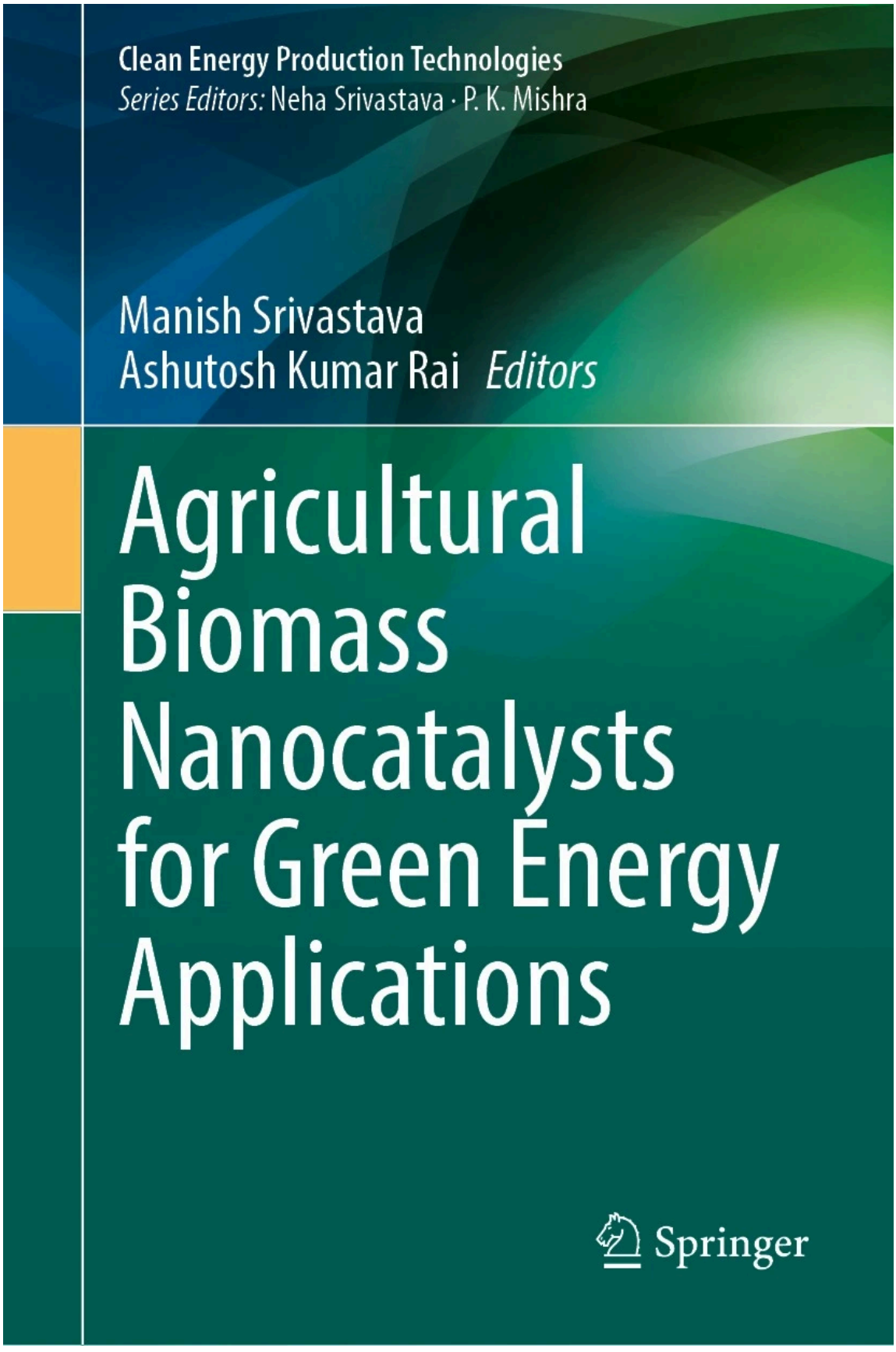
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Ashutosh Kumar Rai Editors
Agricultural Biomass Nanocatalysts for Green Energy Applications
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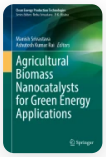

Agricultural Biomass Nanocatalysts for Green Energy Applications

Akhtar Hussain, Ayush Saxena, Irum, Alvina Farooqui & Mohammad Ashfaque

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Abstract

Under the major crises of environmental degradation and global warming, the world's environment is failing. Green energy solutions must be taken into consideration in order to address these issues, which calls for increased efforts to minimize carbon dioxide emissions. Reducing dependence on fossil fuels and lowering greenhouse gas emissions are two major goals of renewable energy sources. Attention has already been drawn globally to the use of renewable biomass resources for the manufacture of biofuels. Current research and technology advancements have made it possible to produce second-generation biofuels from a variety of feedstocks, including agricultural waste, crop leftovers, and cellulosic biomass from high-yielding grass species. An environmentally responsible, sustainable, and possibly effective alternative to fossil fuels is the manufacture of biofuels from lignocellulosic biomass. However, because of their heterogeneous multiscale structure, lignocellulosic materials are difficult to valorize and show resistance to enzyme hydrolysis or saccharification. Various pretreatment techniques involving chemical, physical, and biological methods have been widely used to overcome this problem. These pretreatment methods can be combined to increase the yield of second-generation biofuels. The second generation has the greatest potential for producing biofuels; hence, this chapter primarily concentrates on modern techniques in research and development.

Article CAS Google Scholar

Yachmenev V, Condon B, Klasson T, Lambert A (2009) Acceleration of the enzymatic hydrolysis of corn stover and sugar cane bagasse celluloses by low intensity uniform ultrasound. J Biobaased Mater Bioenergy 3:25–31

Article CAS Google Scholar

Yousuf A (2012) Biodiesel from lignocellulosic biomass—prospects and challenges. Waste Manag 32(11):2061–2067. https://doi.org/10.1016/j.wasman.2012.03.008. ISSN 0956-053X

Article CAS PubMed Google Scholar

Yousuf A, Pirozzi D, Sannino F (2020) Chapter 1: Fundamentals of lignocellulosic biomass. In: Yousuf A, Pirozzi D, Sannino F (eds) Lignocellulosic biomass to liquid biofuels. Academic, pp 1–15. https://doi.org/10.1016/B978-0-12-815936-1.00001-0. ISBN 9780128159361

Chapter Google Scholar

Zhang Q, Zhang Z (2018) Chapter 4: Biological hydrogen production from renewable resources by photofermentation. In: Li Y, Ge X (eds) Advances in bioenergy, vol 3. Elsevier, pp 137–160. https://doi.org/10.1016/bs.aibe.2018.03.001. ISSN 2468-0125, ISBN 9780128151990

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