

Title: Integrated Agro-waste Valorization and Biorefinery Approach: Prospects and Challenges

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Abstract: Agricultural commodities including fresh and processed foods are highly perishable in nature and resulting in the generation of significant agro-waste during harvesting, processing, and post-consumption. In recent years, agro-waste has received growing interest from the domestic and global perspectives, due to the growing concerns about food security and environmental impacts, such as greenhouse gas emissions attributed to intensified effects of global warming. Agricultural wastes are considered as hidden treasury for various bioactive compounds (e.g., cellulose, hemicellulose, and lignin), and potential sources of high-value products such as biogas, bioethanol, biodiesel, organic acids, enzymes, phenolic, and flavoring compounds. A novel approach for addressing the agro-waste is biorefinery which emerged as a sustainable way of valorization. Bio-refining food waste might help achieve sustainable zero-waste growth. Agro-waste biorefinery techniques urgently need a circular economy and contribute to a low-carbon, cleaner environment that is ecologically beneficial, economically, and technically feasible, and widely accepted. This chapter will comprehensively explain agro-waste with their sources, agricultural waste valorization status, and possible novel and green technology in an integrated biorefinery approach to recovery of the bioactive compounds and their application in the agro-processing sector. In addition, prospective research for managing waste and valorization approaches will be explored, along with their technical bottleneck and limitations.

Keywords: Agro-waste, Valorization, Biorefinery, Bioactive compound, Circular economy

DOI: https://doi.org/10.1007/978-3-031-58025-3_12

https://link.springer.com/chapter/10.1007/978-3-031-58025-3_12