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Enzyme-assisted cellulose nanofibers production

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Abstract

Due to unique properties of cellulose nanofibers, this nanomaterial has been widely used in various applications such as nanocomposites, coatings, electronics, and medical. The features of nanocellulose specifically its dimensions and properties depend on the sources of lignocellulosic materials and the chosen method to extract and further fibrillating into nano size. However, it is still required to develop more sustainable and economical processing methods to ensure its continuous supply for commercial purposes in various industries. Generally, the pretreatment step plays an important role prior to further fibrillating the treated cellulose into nanoscale via mechanical method. It is because it will facilitate the subsequent process which always requires high energy, cost, and low efficiency to obtain the desired features of nanocellulose. Biological, chemical, physical, or combination pretreatment are common approaches which exhibit pros and cons that need to compromise in achieving high yield of nanocellulose with desired properties. Recently, it is encouraged to adopt circular economy principles by avoiding usage of toxic and hazardous chemicals, minimizing the number of processing steps, designing safer processes, and producing biodegradable residues. Thus, this book chapter focuses on the utilization of enzymes in treating the lignocellulosic materials to assist the mechanical method in producing cellulose nanofibers. © Springer Nature B.V. 2024. All rights reserved.

Author Keywords

Cellulose nanofibers; Desired properties; Enzyme; Fibrillating; Yield

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