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Enhanced Production and Selected Use of Nanocellulose from Fruit and Vegetable Residues: A Brief Review

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Nanocellulose is a cellulose-based material that possesses at least one of its dimensions in the nanometer range. Due to its unique characteristics, including its excellent mechanical properties, high degrees of thermal stability and water holding capacity, biodegradability and biocompatibility, nanocellulose is a promising naturally-derived material that can be used for various biomedical as well as agriculture and food applications. Typically, nanocellulose is produced from wood-based sources but interest in producing nanocellulose from fruit and vegetable by-products is on the rise as these residues are available in large quantity. The residues can also be more easily transformed into the desired material with less use of chemicals since the fibers of fruits and vegetables are more vulnerable than those of the woody plants. Increasing the yield of nanocellulose produced from such residues remains a challenge, however. Hydrothermal, chemical or enzymatic pretreatment methods may need to be applied to help disintegrate the inter-fibrillar hydrogen bonds of native cellulose microfibrils into nanosized fibrils to achieve such an objective. In this presentation, a brief review on how selected pretreatment methods can help enhance the defibrillation process will be mentioned. Use of nanocellulose in various food-based applications, including its use as a food additive or as a starting material for the production of edible packaging films will also be highlighted.

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