Cellulose dissolution for edible biocomposites in deep eutectic solvents: A review

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ABSTRACT

Organic solvents are vital in chemical synthesis, storage, and separation processes. However, the widespread use of these solvents in industries and research laboratories raises concerns regarding their high volatility, lipophilicity, and toxicity, which pose significant risks to the surroundings and human well-being. In light of these issues, Deep eutectic solvents which is known as a green solvent have become a promising substitute with the potential to alleviate these concerns. DESs have shown remarkable progress in production and manufacturing across various fields. Extensive work investigated the dissolution of renewable materials, mainly cellulose, in multiple solvents, thereby bringing DESs to the forefront of scientific inquiry. These DESs have greatly improved production and manufacturing processes in diverse industries. However, it is important to note that DESs have considerably lower levels of cellulose solubility for edible biocomposites. Cellulose derived from edible fibers finds extensive applications in food and beverage, agriculture, cosmetics, textiles, medical and pharmaceutical industries, agro-industries, and furniture industries. This review includes a comparative analysis of various DES-based solvents, which addresses concern pertaining to the toxicity of DESs, outlines essential properties to consider when selecting DESs for diverse applications, and highlights recent advancements in the fields of extraction media, biofilm production, nanomaterial synthesis, composite material manufacturing, and plasticizer applications.

KEYWORDS

Cellulose, Nano-cellulose, Edible biocomposites, Dissolution, Deep eutectic solvents

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