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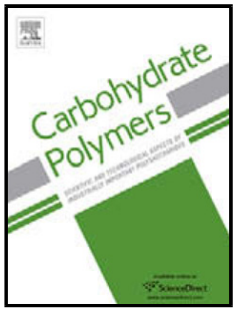

Title: Comparison of nanocrystals and nanofibers produced from shrimp shell α-chitin: <!–<query id="Q1">The author names have been tagged as given names and surnames (surnames are highlighted in teal color). Please confirm if they have been identified correctly.</query>–>From energy production to material cytotoxicity and Pickering emulsion properties

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Comparison of nanocrystals and nanofibers produced from shrimp shell α-chitin: From energy production to material cytotoxicity and Pickering emulsion properties

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HIGHLIGHTS

- Effects of the production process on the morphology of nanochitins.
- Pickering emulsions of both nanochitin were comparatively investigated
- In vitro cytotoxicity assays demonstrate that both nanomaterials are non-toxic.
- Economics of production using process engineering simulation were performed

Abstract

Chitin nanocrystals (ChNCs) and chitin nanofibers (ChNFs) are nanomaterials with great innovative potential for sustainable applications in academic and industrial fields. The research related to their isolation and production, characterization, and utilization is still new. The aim of this study is to investigate the effects of the production process on the morphology and properties of ChNFs and ChNCs produced from the same source of chitin. ChNCs were prepared by acid hydrolysis of commercial shrimp shell α-chitin, and ChNFs were prepared by mechanical defibrillation using closed loop supermass colloidal grinding. Differences in their shape, size, and crystallinity were observed. ChNFs were observed to have higher aspect ratio, higher viscosity, and better thermal stability than ChNCs. Although the ChNC casting film had a higher degree of transparency, it had lower mechanical properties than ChNF film.