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Antimicrobial and antioxidant properties of polyvinyl alcohol bio composite films containing seaweed extracted cellulose nano-crystal and basil leaves extract

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Highlights

- Active PVA films with seaweed-based CNC and basil leaf extract were prepared
- Films showed reduced transparency, and improved WVP and tensile properties.
- Films showed good antimicrobial and antioxidant activity.
- PVA film added with CNC and BE can be used as active packaging material for food.

Abstract

Polyvinyl alcohol (PVA) films containing seaweed extracted cellulose nanocrystal (CNC) (5% w/v) and 5, 10, and 20 % (w/v) basil leaves extract (BE) were prepared using the solvent casting method, and their physical properties, and antimicrobial and antioxidant activity were analyzed. The addition of 5 % (w/v) CNC to PVA improved the tensile strength and water vapor permeability. Addition of BE to film the antioxidant activity and antimicrobial properties of the films were enhanced. Further, increasing the amount of BE slightly affected the color of the bio-nanocomposites. The thermal stability of films was improved with addition of CNC. Due to functional groups and linkage properties of the CNC surface and macromolecular chains of the PVA were responsible for improvement of the interfacial interactions between the CNC

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