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**Characterization of citrus pectin films integrated with clove bud essential oil:
Physical, thermal, barrier, antioxidant and antibacterial properties**

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Highlights:

- The effects of clove bud essential oil on properties of the citrus pectin films were investigated
- CEO improved the mechanical and physicochemical properties
- Pectin/CEO films were more resistant, more elongable and less hydrophilic
- Antioxidant and antimicrobial properties of pectin film were enhanced by CEO
- The interactions between CEO and pectin were confirmed by FTIR analysis

Abstract:

The increasing demand for bio-based materials to be used in food packaging has stimulated the development of novel, environmentally-friendly edible films. Antimicrobial films were developed by incorporating different levels of clove bud essential oil (0.5%, 1.0%, and 1.5%) into the citrus pectin in order to modify the functional properties of the films. Fourier-transform infrared spectroscopy (FTIR), differential scanning calorimetry analysis (DSC) and X-ray diffraction (XRD) were performed, together with the determination of

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