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Chitosan adsorption on nanofibrillated cellulose with different aldehyde content and interaction with phosphate buffered saline

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Highlights

- Aldehyde content of nanofibrillated cellulose affects chitosan adsorption.
- The adsorption behaviour chitosan completely changes after acetic acid treatment.
- Acid treated chitosan has more capacity to uptake PBS.
- Liquid interaction with chitosan/NFC matrix is limited by chitosan presence.

ABSTRACT

The chitosan adsorption on films prepared using nanofibrillated cellulose (NFC) with different content of aldehyde group was studied by means of Quartz Crystal Microbalance with Dissipation (QCM-D). Results showed that frequency change (Δf) was higher when the chitosan adsorbed on NFC film consisting more aldehyde group indicating the higher adsorption. The (Δf) and dissipation (ΔD) factors completely changed during adsorption of chitosan pre-treated with acetic acid: Δf increased and ΔD decreased, oppositely to un-treated chitosan adsorption. After acid treatment, molecular weight and crystallinity index of chitosan decreased addition to change in chemical structure. It was found that more phosphate buffered saline (PBS), as a model liquid for wound exudate, adsorbed to acid treated chitosan-NFC film, especially to film having more aldehyde groups. Comparing with bare NFC film, chitosan-NFC

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