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A novel solution blending method for using olive oil and corn oil as plasticizers in chitosan based organoclay nanocomposites

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Highlights

- EtOH facilitates the direct interaction of chitosan with oil chains
- Olive oil is more effective plasticizer of chitosan with limited phase separation
- OrgMMT facilitates chitosan- lipids interactions, minimizing phase separation
- Both olive and corn oil reduce water gain, water and oxygen permeability

Abstract

In the current study a novel reflux-solution blending method is being followed with the introduction of small ethanol volumes into chitosan acetic acid aquatic solution in order to incorporate olive oil and corn oil in chitosan and its organoclay nanocomposites. Ethanol enables the direct interaction of chitosan with oils and results in effective plasticization of chitosan/oil films with remarkable increase of the strain at break from 8% of chitosan and chitosan/oil aquatic samples to app. 22% for chitosan/oil ethanol samples. Compared with olive oil, corn oil is less effective as plasticizer (max strain at break app. 14%). Addition of oils is beneficial for water sorption, water vapor permeability and oxygen permeability

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