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Alginate/chitosan polyelectrolyte complexes: a comparative study of the influence of the drying step on physicochemical properties

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Highlights

- Alginate and chitosan were used to form polyelectrolyte complexes (PECs)
- PECs were dried using three different techniques
- Structures and physico-chemical properties were studied and compared
- PECs were evaluated as potential internal wound dressings

Abstract

Polyelectrolyte complexes (PECs) based on Alginate and Chitosan were prepared for biomedical application. These two biopolymers are valuable resources for biomedical applications. In the present work, three PECs materials were produced using three different drying techniques: hot air drying, lyophilization and supercritical CO₂ drying. The choice of the drying technique allowed producing different type of structures, with different porosity scale. In order to evaluate their potential as intra-abdominal wound dressings, swelling ability in various media, enzymatic resistance and drug release behavior of the resulting materials were studied. It was shown that the increase of the porosity improved the swelling ability, without altering the resistance of the materials, whereas drug release studies revealed that the majority of the drug was released within the first 24h whatever the drying process.

Keywords: Alginate, Chitosan, Freeze drying, Supercritical CO₂ drying, Hot air drying, Physical-chemistry

1 Introduction

Polysaccharides have been widely used in recent decades as potential biomaterials. They have

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