

The effect of strontium carbonate on cross-linking of pectin based free

Aida Abrishami Kafi^a, Adele Mehrabi^a, Abbas Akhgari^b

Authors' Affiliations:

^a Student Research Committee,
Faculty of Pharmacy, Mashhad
University of Medical Sciences,
Mashhad, Iran;

^b Targeted Drug Delivery
Research Center, Faculty of
Pharmacy, Mashhad University of
Medical Sciences, Mashhad, Iran

Abstract Presener:

Aida Abrishami Kafi ; Student
Research Committee, Faculty of
Pharmacy, Mashhad University of
Medical Sciences, Mashhad, Iran;
Email:abrishamia941@mums.ac.ir

***Correspondance:**

Adele Mehrabi ; Student Research
Committee, Faculty of Pharmacy,
Mashhad University of Medical
Sciences, Mashhad, Iran;
Abbas Akhgari ; Targeted Drug
Delivery Research Center ,
Faculty of Pharmacy, Mashhad
University of Medical Sciences,
Mashhad, Iran

Abstract

Introduction: Recently, considerable attention has been devoted to biopolymers because of their unique properties and high usage in different fields such as pharmaceutical industry, health promotion and cosmetic applications. Pectin is a high-molecular weight and anionic natural heteropolysaccharide extracted from cell walls of higher plants which is non-toxic and biocompatible.(1)

A cross-link is a bond that links one polymer chain to another. Strontium (Sr^{+2}) establish covalent bonds (chemical method) and physical interaction (physical method) between anionic pectin chains that makes polymer stronger.

Methods and Results: Firstly, specific amounts of pectin were dissolved in distilled water. Then, a fixed amount of triethyl citrate (1:6 ratio related to total polymer content) was added to solution as a plasticizer. After 24 hour, free film was cross-linked with 1% strontium carbonate solution for 1 minute. For swelling experiment, a piece of dried cross-linked and non cross-linked pectin based free film was weighted and immersed in flasks of dissolution test containing 250 ml of acidic media (PH=1.2) and phosphate buffer media (PH=6.8) at 37 °C. sampling time was started from 2 minutes to 60 minutes. To quantify the swelling process, the swelling index, I_s (%), was calculated(2).

Thickness of both cross-linked and non cross linked pectin based free film was 0.16μ . I_s for cross-linked free film in buffer media was 104% and in acidic media was 94%. Non cross-linked free film was ionized in buffer media while I_s was 163% for non cross-linked free film in acidic media.

Conclusions:

Cross-linker greatly reduced the ionization of the free film in phosphate buffer media and resisted against excessive swelling of the free film in acidic media. Due to positive charge of acidic media and negative charge of pectin free film, more swelling was expected in acidic media versus buffer media. The Cross-linking had no significant effect on thickness. According to investigate the effect of cross-linker on free film, more experiments needed to be done.

Key words: Free film, Pectin, Strontium, Cross-linking.