Gels Horizons: From Science to Smart Materials

Amit Kumar Nayak
Md Saquib Hasnain
Dilipkumar Pal *Editors*

Ionically Gelled Biopolysaccharide Based Systems in Drug Delivery

Springer

Editors
Amit Kumar Nayak
Department of Pharmaceutics
Seemanta Institute of Pharmaceutical Sciences
Jharpokharia, Odisha, India

Md Saquib Hasnain
Department of Pharmacy
Palamau Institute of Pharmacy
Daltonganj, Jharkhand, India

Dilipkumar Pal
Department of Pharmaceutical Sciences
Guru Ghasidas Vishwavidyalaya
Bilaspur, Chhattisgarh, India

ISSN 2367-0061 ISSN 2367-007X (electronic)
Gels Horizons: From Science to Smart Materials
ISBN 978-981-16-2270-0 ISBN 978-981-16-2271-7 (eBook)
https://doi.org/10.1007/978-981-16-2271-7

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Contents

Chapter 1
Ionically Gelled Pectinates in Drug Delivery

Amit Kumar Nayak, Md Saquib Hasnain, and Dilipkumar Pal

Abstract Pectins are hydrophilic linear anionic polysaccharide extracted from plant cell walls. These are inexpensive, biodegradable and biocompatible in nature. Pectins are being employed as additives, thickeners and gelling agents in many foods, cosmetics and pharmaceutical applications. Since past few decades, pectins have widely been investigated for its unique nature of forming hydrogels (mainly, low methoxy pectin) by the influence of various divalent metal ions. These ionically gelled pectinate hydrogels are being investigated as potential carriers in controlled release delivery of many drugs. The current chapter deals with a comprehensive and functional discussion on the mechanism of ionically gelled pectinates and their potential uses for controlled drug release.

Keywords Pectin · Cross-linking · Ionic gelation · Hydrogels · Drug delivery

1 Introduction

At present, the socio-economic condition of the modern world has elevated the interest of natural polymers [1, 2]. Usually, low manufacturing cost of natural polymers related to their large availability in nature is recognized as the main advantage for their extensive uses in almost all aspects of daily uses [3, 4]. Besides these, biocompatibility and biodegradability are the two important advantages that favor their biomedical applications including delivery of drugs, proteins and peptides, tissue engineering, wound dressing, orthopaedics, dentistry, etc. [1, 5–8]. Among various

A. K. Nayak
Department of Pharmaceutics, Seemanta Institute of Pharmaceutical Sciences, Jharpokharia, Mayurbhanj 757086, Odisha, India

M. S. Hasnain (✉)
Department of Pharmacy, Palamau Institute of Pharmacy, Chianki, Daltonganj 822102, Jharkhand, India

D. Pal
Department of Pharmaceutical Sciences, Guru Ghasidas Vishwavidyalaya, Koni, Bilaspur 495009, Chhattisgarh, India

A. K. Nayak et al. (eds.), *Ionically Gelled Biopolysaccharide Based Systems in Drug Delivery*, Gels Horizons: From Science to Smart Materials,
https://doi.org/10.1007/978-981-16-2271-7_1