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Survey on Processing of Chitosan Microsphere Drug

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Abstract: **-** To minimize drug degradation and loss, to prevent harmful side effects and to increase drug bioavailability various drug delivery and drug targeting systems are currently under development. Handling the treatment of severe disease conditions has necessitated the development of innovative ideas to modify drug delivery techniques. Drug targeting means delivery of the drug-loaded system to the site of interest. Drug carrier systems include polymers, micelles, microcapsules, liposomes and lipoproteins to name some. Different polymer carriers exert different effects on drug delivery. Synthetic polymers are usually non-biocompatible, non-biodegradable and expensive. In this paper we study existing method of preparation metformin using chitosan.

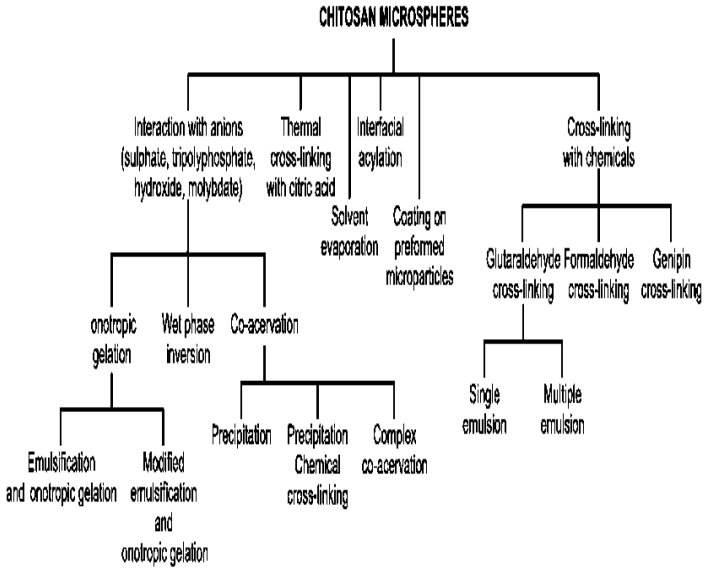
Keyword: Metformin, micro particles, drug, chitosan microsphere, Drug delivery systems

I. INTRODUCTION

Chitosan possesses no toxicity and can be applied onto the nasal epithelium. It swells and forms a gel like layer in aqueous environment (by absorbing water from the mucous layer in the nasal cavity), which is favorable for interpenetration of polymer and glycoprotein chains into mucous [1]. The positive charge on chitosan polymer gives rise to strong electrostatic interaction with mucus or negatively charged sciatic acid residues on the mucosal surface [2]. Chitosan also shows good bio adhesive characteristics and can reduce the rate of clearance of drug from the nasal cavity thereby increasing the bioavailability of drugs incorporated in it [3]. Membranes prepared from chitosan have shown greater permeability for acidic drugs than basic drugs.

In this review, chitosan was studied as a carrier for microsphere drug delivery. Chitosan microspheres are the most widely studied drug delivery systems for the controlled release of drugs viz., antibiotics, antihypertensive agents, anticancer agents, proteins, peptide drugs and vaccines.

II. METHODS FOR PREPARATION



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III. LITERATURE SURVEY IV.

V. R. Sinha, A.K. Singla, S. Wadhawan, R. Kaushik, R. Kumria, K. Bansal, S. Dhawan in year 2003 worked [4] that chitosan is a biodegradable natural polymer with great potential for pharmaceutical applications due to its biocompatibility, high charge density, non-toxicity and muco adhesion. It has been shown that it not only improves the dissolution of poorly soluble drugs but also exerts a significant effect on fat metabolism in the body. Gel formation can be obtained by interactions of chitosan with low molecular counter ions such as polyphosphates, sulphates and crosslinking with glutaraldehyde. This gelling property of chitosan allows a wide range of applications such as coating of pharmaceuticals and food products, gel entrapment of biochemical, plant embryo, whole cells, microorganism and algae. This review is an insight into the exploitation of the various properties of chitosan to microencapsulate drugs. Various techniques used for preparing chitosan microspheres and evaluation of these microspheres has also been reviewed. This review also includes the factors that affect the entrapment efficiency and release kinetics of drugs from chitosan microspheres.

Anal et al., (2006) prepared [5] pentasodium tripolyphosphate cross-linked chitosan microspheres with higher acid resistance for controlled release of ampicillin. The microspheres were prepared by two different microencapsulation procedures (by emulsification and by spray drying) and characterized by their particle size, surface morphology, stability, entrapment efficiency and drug release.

Li-Chun Lin et al., (2006) attempted to expand the versatilities and applications in chitosan microspheres [6]. They converted chitosan into micro-droplets by using a high voltage electrostatic field system, and then treated with TPP/NaOH solution of varying volume ratio to fabricate chitosan microspheres. By varying the pH values of these reacting agents, distinct morphological structure and properties of chitosan microspheres were further changed.

Rahul Nair, B. Haritha Reddy, C. K. Ashok Kumar, K. Jayraj Kumar, in year 2009, [7] Chitosan (CS) is a naturally occurring polymer which finds a wide array of pharmaceutical applications due to its low production costs, biodegradability, biocompatibility, nontoxic nature and muco adhesion. As a result of its cationic character, CS is able to react with polyamines giving rise to polyelectrolyte complexes. CS has found pronounced application in multi particulate drug delivery and it enhances the dissolution of drugs having poor solubility. CS microspheres can be prepared by chemical denaturation process, ion induced coagulation and spray drying methods. This review aims to compile the various application of CS in microspheres based drug delivery. This review also aims to include the process variables factors that affect the release of drugs from the microspheres.

Analava Mitra, Baishakhi Dey, in year 2011 The main aim in the drug therapy of any disease is to attain the desired therapeutic concentration of the drug in plasma or at the site of action and maintain it for the entire duration of treatment [8]. A drug on being used in conventional dosage forms leads to unavoidable fluctuations in the drug concentration leading to under medication

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or overmedication and increased frequency of dose administration as well as poor patient compliance. To minimize drug degradation and loss, to prevent harmful side effects and to increase drug bioavailability various drug delivery and drug targeting systems are currently under development.

Jain S K et al (2009) determined metformin hydrochloride content in gelucire (a lipid) microspheres. They dispersed 100 mg of drug in 100 ml of distilled water followed by heating at 65°C and agitation at 50 rpm with a magnetic stirrer and allowed to cool at room temperature. The lipid was solidified and the drug solution was filtered through a What man filter paper no 41. The sample was analyzed for drug content by UV spectrophotometry at 233 nm using UV–visible spectrophotometer after suitable dilutions.

V. CONCLUSION

Chitosan, a natural biopolymer of crustacean origin exhibiting a wide variety of physicochemical and biological properties has numerous applications in the fields of agriculture, textile, nutritional enhancement and food processing, waste water management, cosmetics, drug delivery and many other medical and pharmaceutical applications. Being characterized by biocompatibility, non-toxicity, lack of allergen city, biodegradability chitosan is really an attractive biopolymer for delivering a wide variety of drugs in a controlled/sustained manner and can be successfully targeted for site specific drug delivery.

Problems associated with dose dumping, burst out effect, unavoidable fluctuations in drug concentrations can be eliminated/reduced by use of such biopolymers resulting in enhanced efficacy and lesser incidences of adverse effects associated with the drugs.

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