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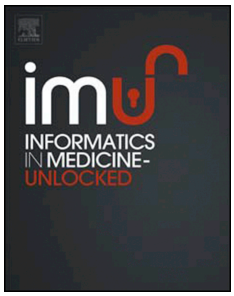

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Synthesis of Curcumin Loaded Polymeric Nanoparticles from Crab Shell derived Chitosan for Drug Delivery

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ABSTRACT

In this study, chitosan was derived from crab shell using two concentrations of hydrochloric acid i.e.1.5M and 2MHCl during demineralisation step. The obtained chitosan was utilised for synthesis of polymeric nanoparticles using sodium tripolyphosphate and barium chloride as chelators. The nanoparticles were encapsulated with hydrophobic curcumin and analysed for drug delivery *invitro*. Also, the synthesised nanoparticles were characterised by FTIR, SEM and AFM analysis and also subjected for drug encapsulation efficiency, *invitro* drug release kinetics and controlled drug delivery studies *in vitro* against *Pseudomonas aeruginosa*. Barium chloride was found to produce spherical shaped drug loaded nanoparticles of size below 500nm.

Keywords: Chitosan; chelators; characterization; curcumin; drug delivery

INTRODUCTION

In the recent days, researchers are focussed on an efficient drug delivery system where the drug is encapsulated and further used to deliver the drug at the targeted site [1]. If the formulation is of nanosize, it protects the loaded drug from degradation by inappropriate pH and increases its half-life [2, 3]. When nanoformulations are to be considered, then biopolymers are the best option. Ionic gelation, solvent displacement method, solvent evaporation method, complex coacervation, emulsion crosslinking and spray drying are the different methods commonly used for the preparation of polymer based nanoparticles [4]. Among these methods, ionic gelation and complex coacervation are very similar and are ideal for maintaining the biostability of drugs [5, 6]. Biopolymers are synthesized by the living organisms; they are highly biodegradable and non toxic unlike the synthetic polymers [7].

Biopolymer based nanoparticles can be used for *invitro*/*invivo* studies due to their versatile traits, including biocompatibility, biodegradability and low immunogenicity [8]. Biopolymers such as chitosan, carboxymethyl cellulose, polyhydroxyalkanoates (PHA), poly