

“PREPARATION AND EVALUATION OF CHITOSAN
BASED POLYMERIC HYDROGELS”

A Major Dissertation Submitted To Faculty of Technology

Towards The Partial Fulfillment of the Requirement

For

The Award of the Degree

MASTER OF ENGINEERING

IN

POLYMER TECHNOLOGY

Submitted By

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UNIVERSITY ROLL NO. 14001

COLLEGE ROLL NO. 01/POLY/09(P.T.)

Supervised By

Dr. A.P.GUPTA

Professor

DEPARTMENT OF APPLIED CHEMISTRY



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CERTIFICATE

This is to certify that the dissertation titled “Preparation And Evaluation Of Chitosan Based Polymeric Hydrogels” submitted by Mr. Anil Kumar to Faculty of Technology, University of Delhi, Delhi College of Engineering in Applied Chemistry and Polymer Technology is a record of bonafide work carried out by him. Mr. Anil Kumar has worked under the guidance and supervision to fulfill the requirement for the submission of this dissertation.

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ABSTRACT

The present investigation was carried out with the objective to synthesize physically cross-linked Hydrogels without using any cross-linker to reduce cytotoxicity of the Hydrogels. The objective of the project is to study the effect of increase in concentration of Chitosan in Poly(Vinyl Alcohol) on water absorption, fat absorption, de-swelling and percent swelling in different pH mediums. This also includes characterization of the Hydrogels by Fourier Transform Infrared Spectroscopy(FTIR), Scanning Electron Microscopy(SEM) and X-Ray Diffraction(XRD).

During the course of the project Hydrogels were synthesized by Freeze and Thaw Cycle. The number of cycles are confined to three only so that characteristics of the Hydrogels can be compared. The increase in water absorption was observed with decrease in Poly(Vinyl Alcohol) concentration. The absorption of water decreases after certain increase in concentration of Chitosan. The same behavior of Hydrogels is observed in case of fat absorption which decreased after certain optimum Chitosan concentration. The effect of deswelling of Hydrogels depends on surface characteristics which are compatible with SEM images. The Hydrogels are crystalline in nature which is clear from the X-Ray images of the Hydrogels due to use of method of Freeze and Thaw cycle in which crystallite formation takes place.