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Preparation of chitosan from natural Waste Product and evaluation of its use as a retardant in Sustained release tablets

A Thesis
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ABSTRACT

This study was carried out in order to prepare a polymer from natural waste product that has a retardation effect to be used in sustained release tablets. Chitosan polymer was prepared from waste prawn shells by alkaline N-deacetylation of chitin which was separated from those shells by demineralization with acid and deproteination with alkaline at 95^{o} C.

The average molecular weight range of the prepared chitosan using viscosity method was (12225-12745) gm/mole. Chitosan retardation effect was studied by formulation of chitosan matrix tablets that were prepared by direct compression technique containing serial percentages of chitosan utilizing the model drugs orphenadrine citrate as sparingly water soluble and theophylline as slightly water soluble.

Hardness and dissolution tests of the prepared tablets were determind. Results showed that chitosan had a retardation effect. The mechanisms of release were erosion at pH 1.2 and diffusion at pH 6.8 dissolution media.

On the other hand, the release of drugs was found to be affected by type of drug, percentage of chitosan and compression force. It appears that the release of drug from chitosan matrix tablets increased as the solubility of drug in dissolution media increased. While the release rate of drug decreased as the percentage of chitosan increased. Further more, the release of drug increased as the compression force decreased by (1000psi) and the hardness had a linear regression with logarithm of compression force.

The data also showed that chitosan matrix tablets containing 40% chitosan had a sustained effect more than that filled in hard gelatin capsules. The

compressed chitosan appeared to be responsible for sustaining the release of drugs.

The release of orphenadrine citrate from norflex® tablets was compared with the prepared chitosan matrix tablets containing 30% of chitosan and compressed at $37 \cdot 10^3$ psi. No significant difference between two products was observed.

Chitosan HCl and acetate salts were also prepared. The effect of chitosan HCl and acetate on the release of orphenadrine citrate and theophylline in their matrix tablets was studied. The results showed that they increased the disintegration time, i.e they had a disintegrant property.

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