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FORMATION OF CHITOSAN-ALGINATE NANOPARTICLES AND ENCAPSULATION OF CURCUMIN

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Curcumin is a well known anticancer drug and colouring agent which is a poly phenolic compound. It can be extracted from the *Curcuma longa* rhizome via a simple laboratory method. Since it is water insoluble, handling of Curcumin is extremely difficult in biological systems. The main aim of producing nano drug delivery systems is for targeting delivery and slow release. Natural polymers are widely used for this purpose because they are biocompatible, and ecologically safe. Chitosan and Alginate, are highly hydrophilic polysaccharides. Formation of drug loaded gel beads with Chitosan or Alginate only, has been reported. However the sizes of these gel beads which are in the micrometer range are not very effective for sustained and gradual release of the drug. The size of the gel beads is important to obtain a successful drug delivery and desired solubility. Therefore, Chitosan-Alginate nanoparticles have been used as the mediator in drug delivery systems and other applications as they are water soluble and this blend of polysaccharides gives the drug loaded gel beads in nanometer scale. Particulate dispersion of solid in size 10-100 nm is defined as nanoparticles.

Nanoparticles were obtained from the two step Rajaonarivony method with modifications. CaCl_2 was used to obtain Calcium Alginate smooth ionic pre gel. Since Alginate and Chitosan are oppositely charged polymers, cross linking enhances the gel strength and also the sustained release of Curcumin from nanoparticles via a diffusion control mechanism or a swelling control mechanism. Therefore nanoparticles were obtained from a spontaneous nanoparticles formulation method. The Polymers were blended with different amounts of Curcumin to examine whether the invitro release is affected by the amount of drug initially loaded. All the release studies were done in pH 7.4 Phosphate Saline Buffer to provide physiological conditions. The release of the drug was analysed spectrophotometrically. The structural and morphological characterizations of nanoparticles were done using IR spectroscopy and Polarized Light Microscopy.

Since Curcumin is highly hydrophobic Chitosan-Alginate nanoparticles formulation is the best method to prepare water soluble nanoparticles making Curcumin a drug with successfully enhanced slow release.