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Synthesis and Characterization of Chitosan Nanoparticles in the Pharmaceutical Application

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Nanoparticles have been widely studied for applications in drug release systems. To prevent a drug from rapid release, the use of biodegradable polymers, which serve as protective drug coatings, has been developed. Chitosan, as a biodegradable and biocompatible polymer, is extensively used as a carrier for encapsulation of drugs and biological substances in the pharmaceutical industry due to: its ability in a drug controlled-release system, its solubility in aqueous acidic solution which avoids the use of hazardous organic solvents while fabricating particles, its cationic nature that allows ionic to crosslink with multivalent anions, the capacity of chemical crosslink applied by its amino groups and its muco adhesive character of increasing residual time at the site of absorption. Emulsion cross linking, coacervation/precipitation, ionic gelation methods are usually used in preparing chitosan nanoparticles.

Water-soluble drugs can be loaded by using the emulsion crosslinking technique with high encapsulation efficiency. In this method, a water/oil (W/O) emulsion was prepared by emulsifying the chitosan aqueous solution in the oil phase and aqueous droplets are stabilized by using a suitable surfactant. Then the stable emulsion is solidified by an appropriate crosslinking agent.

Keywords: Nanoparticles- chitosan-emulsion crosslinking-ionic gelation.