ABSTRACT

Chitosan is made from chitin by a chemical process involving demineralization (DM), deproteination (DP), decolorization (DC), and deacetylation (DA). Very little work has been done to demonstrate the effects of altering or excluding any of the processing steps on chitosan characteristics. The present study was undertaken to evaluate the effects of process modification during chitosan production on the physiochemical properties of shrimpshell chitosans.

Five experimental chitosan samples (DCMPA, DMCPA, DMPCA, DMPAC, and DPMCA) were prepared with modified processing protocols and compared with one commercial chitosan (ISFC). All samples were subjected to physicochemical properties like moisture contents, degree of deacetylation, molecular weight, viscosity, and solubility. This study demonstrated that process modification of chitosan production affected physicochemical properties.

Nanotechnology has dynamically developed as an important field of modern research with potential effects in electronic and medicine. Nanotechnology can be defined as a research for the design, synthesis, and manipulation of structure of particles with dimension smaller than 100 nm. A new branch of nanotechnology is nanobiotechnology. Nanobiotechnology combines biological principles with physical and chemical procedures to generate nano-sized particles with specific functions.

Chitosan nanocomposites, chitosan derivatives, chitosan blended with other polymers like alginate, soyprotein and polycaprolactone were also prepared and were characterized by various methods like FTIR, SEM, and XRD.

The antimicrobial activity of chitosan and its crosslinked products were evaluated using various microorganisms like *E. coli*, *B. subtilis*, *B. mycoides*, *B. cereus*, *S. aureus*, and *S. typhimurium*.
Controlled drug delivery systems of chitosan, derivatives of chitosan and chitosan blended with other polymers like polycaprolactone and sodium-alginate were also studied by using broad spectrum antibiotics like Ofloxacin, Chloramphenicol, Doxycycline and anticancer drug like Pachtaxel respectively. The most conspicuous part of the present investigation is the postulation of various kinetic models for drug delivery systems and a simple kinetic method has been used by me for monitoring drug delivery kinetics.

The various kinetic parameters like $k$ and $n$ values have been computed and the mechanism of in vitro drug release of the model drugs have been postulated.