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Role of natural and functional polymers in drug delivery systems

Functional and smart polymers are currently playing a significant role in formulations of controlled drug delivery systems due to their responsive behavior towards environmental stimuli. The delivery systems must be non-toxic, non-immunogenic and must be having optimum trapping and release properties for an active agent. To be more effective and economical the controlled devices should be able to release active agent in a control and site-specific manner. The physical and chemical properties of the polymers provide opportunities to design therapeutic devices for various applications. Though various delivery systems based on electrical, mechanical and viral systems have been fabricated with great successes but these delivery systems have shown poor transfection efficiency and found to be immunogenic; hence delivery systems based on functional polymers such as poly (ethylene glycol) and dendric poly (amidoamine) found to be of great significance. The delivery systems using natural and biodegradable polymers such as chitosan, pectin and polysaccharides proved to be more acceptable due to their biocompatibility and biodegradability in physiological fluids in comparison to synthetic polymer systems. Considering the importance of natural polymers, the pH and ion responsive drug delivery systems have been designed using different forms and derivatives of the chitosan. These delivery systems have been tested for efficiency of loading and delivery of active agents as a function of solution pH and ionic strength of the medium. The naturally occurring chitosan has provided enormous opportunities for controlling its properties to fabricate control site specific delivery systems. The degree of deacetylation in chitosan proved to be significant in controlling its stimuli responsive properties for drug delivery systems. The nano sized chitosan delivery systems found to be more therapeutic in comparison to macro and micro sized delivery devices for controlled and sustained delivery of the active agents. The role of various parameters would be discussed and highlighted in this talk.

Biography

Gupta obtained D.Phil. Degree in Chemistry from University of Allahabad in 1984 on Polymer Chemistry and has been awarded fellowships by Govt. of France, USSR, Denmark, Poland and Japan under cultural exchange programs of Govt. of India. Prof. Gupta worked as Scientist at IIT, New Delhi and then moved to IIT, Roorkee as Lecturer in 1987 and now working as Professor since 2004. Gupta has published more than 100 research articles in International Journals of Polymer Science and actively engaged in guiding PhD and M.Tech students from various streams. He has also supervised research projects funded by DST, CSIR, UGC and AICTE, New Delhi, India. Gupta served as member on editorial board of National and International Journals of Polymers and Chemistry. He is a member of several International Scientific Societies including American Chemical Society, Washington and USA.

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