DEVELOPMENT OF BASIC TECHNIQUES FOR NANO-ENCAPSULATION OF ASCORBIC ACID, AMOXICILLIN AND FOLIC ACID

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Controlled release of active compounds has gained much attention in the past decade. Due to high bio availability and minimization of toxicity, some of these active compound delivery systems have been developed as commercialized products. Different types of delivery vehicles have been developed using various liposomes, natural and synthetic biodegradable polymers.

This research was focused on development of active compound delivery systems using the natural biodegradable polymer, chitosan. Chitosan is a non-toxic biocompatible polymer which is a derivative of second most abundant natural polymer, chitin. In this study chitosan was cross linked with sodium sulphate and sodium tripolyphosphate for the encapsulation of model active compounds, ascorbic acid, amoxicillin and folic acid.

Active compound delivery systems were characterized using scanning electron microscope, particle size and zeta potential analyzer, FT-IR spectrophotometer. Loading efficacy and loading capacity of these model compounds with different delivery methods were calculated. Release behavior of ascorbic acid and folic acid were observed using UV-visible spectrophotometer. Microbial studies and high performance liquid chromatography was used in detecting activity and observation of release profile of amoxicillin.

It has been observed that encapsulation of ascorbic acid, amoxicillin and folic acid does improve the release profile over free non-encapsulates. The carrier system prepared for ascorbic acid using sodium sulphate as the cross linker showed formation of micro range particles and over 8 hour release profile, whereas non-encapsulates shows only 1 and half hour release profile. The carrier system prepared for amoxicillin using sodium tripolyphosphate cross linker showed formation of nano range particles and over 8 hour release profile with retaining the activity against *Staphylococcus aureus* (NCTC-6571 strain). From the carrier systems prepared using folic acid, loading capacity of the model compounds remained within the same order whereas loading efficacy showed significant improvement with both cross-linkers (sodium sulphate and sodium tripolyphosphate), suggesting that the structure of the active compound also affects the efficiency of loading.