

## **Polysaccharide-Based Oral Delivery Systems for Site Specific Delivery in Gastro-Intestinal Tract**

**Authors :** Kaarunya Sampathkumar, Say Chye Joachim Loo

**Abstract :** Oral delivery is regarded as the facile method for the administration of active pharmaceutical ingredients (API) and drug carriers. In an initiative towards sustainable nanotechnology, an oral nano-delivery system has been developed that is made entirely of food-based materials and can also act as a site-specific delivery device depending on the stimulus encountered in different parts of the gastrointestinal tract (GIT). The delivery system has been fabricated from food grade polysaccharide materials like chitosan and starch through electrospraying technique without the use of any organic solvents. A nutraceutical extracted from an Indian medicinal plant, has been loaded into the nano carrier to test its efficacy in encapsulation and stimuli based release of the active ingredient. The release kinetics of the nutraceutical from the carrier was evaluated in simulated gastric, intestinal and colonic fluid and was found to be triggered both by the enzymes and the pH in each part of the intestinal tract depending on the polysaccharide being used. The toxicity of the nanoparticles on the intestinal epithelial cells was tested and found to be relatively safe for up to 24 hours at a concentration of 0.2 mg/mL with cellular uptake also being observed. The developed nano carrier thus serves as a promising delivery vehicle for targeted delivery to different parts of the GIT with the inherent conditions of the GIT itself acting as the stimulus. In addition, being fabricated from food grade materials, the carrier could be potentially used for the targeted delivery of nutrients through functional foods.

**Keywords :** bioavailability, chitosan, delivery systems, encapsulation

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