Preface

Oral route still remains the most preferred route for the administration of wide range of therapeutic drug molecules for clinical applications. According to BCS, drugs having high water solubility and low permeability are termed as BCS class-III drugs, which generally follow the paracellular pathway for permeating through intestinal epithelium. However, the poor physicochemical properties, i.e., ionic charge at physiological pH, high hydrogen bonding property, low lipophilicity and high molecular weight etc., confine their permeation across gastrointestinal tract, which results in poor oral bioavailability and thereby, restrict their clinical applications.

Cromolyn sodium is a poorly permeable hydrophilic drug, which is presently being used for the pharmacotherapy of various allergic conditions. However, its poor physico-chemical properties pose an obstacle to its entry into systemic circulation upon oral administration and renders itself orally less bioavailable (<1%). In this perspective, the idea of the research work conducted in the present thesis was conceived with an objective to design various nanocarrier systems for successful oral delivery of poorly permeable hydrophilic drug, cromolyn sodium.

To this context, thorough literature search was conducted with special emphasis on designing of different nanocarrier systems for oral bioavailability enhancement. The entire research work has been carried out systematically by developing and optimizing four different types of nanocarrier systems; polymeric nanoparticles, solid lipid nanoparticles, polymer-lipid hybrid nanoparticles and poly-ε-caprolactone-chitosan based core-shell polymeric nanoparticles. The optimized different nanocarriers were further characterized for their physiochemical properties, solid state characteristics, morphological properties, *in-vitro* performance, stability

study and *in-vivo* behaviour for establishing their oral delivery potential, which have been discussed in detail in this study.

The experimental findings are convincing and provided a deep insight into the captivating features of various nanocarrier systems for enhancing the oral bioavailability of cromolyn sodium, a poorly permeable hydrophilic drug molecule, which can be further extrapolated to numerous therapeutic molecules for harnessing their clinical potential. The present research work would be an enormous contribution in the existing scientific literature for opening a new avenue in the field of oral drug delivery.