PREFACE

Effective delivery of active pharmaceutical ingredient or drug has become a major challenge to pharmaceutical industry today. This problem is mainly because of poor solubility of drugs and around 40% of the oral marketed drugs have low bioavailability. Due to rising number of compounds having solubility and permeability issues, finding ways to enhance the solubility of drugs is one of the major concern in the pharmaceutical industry today. Drug absorption, sufficient bioavailability and pharmacokinetic profile of oral drugs are highly dependent on solubility of that compound in aqueous medium. Solubility is one of the important parameters to achieve preferred concentration of drug in systemic circulation for achieving required pharmacological response. Poorly soluble oral drugs having slow drug absorption that leads to gastrointestinal mucosal toxicity, variable bioavailability and undesirable side effects. The solubility behavior of poorly soluble oral drugs remains one of the most challenging aspects of formulation development. Use of nanotechnology in delivery of poorly soluble oral drugs especially antimicrobial agents could improve the bioavailability together with sustained delivery. Numerous advanced functional materials have been investigated.

Among them, nano-carriers strategies have been widely used to enhance the dissolution and oral availability of poorly soluble drugs by encapsulating the drugs into nano-carriers and changing the crystalline form into amorphous together with protection of drugs from enzymatic as well as chemical degradation. Polymeric nanoparticles possess many advantages over conventional and some novel dosage forms such as non-toxicity, biodegradability, stability, sustained delivery of drugs and reproducibility. Polymeric chitosan nanoparticles formulated and loaded with five different antimicrobial agents such as Amphotericin B, Ketoconazole, Ciprfloxacin, Vancomycin and Chloramphenicol. These drug loaded chitosan nanoparticle fromulations were then characterized on the basis of different factors and a comparative study was done to check the release status of drug from chitosan nanoparticles, thiolated chitosan nanoparticles and release of free drug itself.

This thesis comprise of mainly five chapters namely Introduction, Review of Literature, Material and Methods, Results and Discussion, and Conclusion. From the discussions on the results that we obtained I believe that it is possible for one to get a better understanding of stable formulation development of chitosan and thiolated chitosan nanoparticles loaded with poorly soluble oral antimicrobial drugs to increase its dissolution as well as absorption through GI tract. This research attempts to develop polymeric chitosan nanoparticles to meet the needs that are required for a successful nano delivery system for poorly soluble oral antimicrobial agents.