PREFACE

Development and use of nanocarriers is the fastest growing field of research and drwing significant attention for the delivery of drugs because of the benefits they offered. Their flexibility to target either by passive or acing targeting to especially to cancer cells explains their great potential for their use in efficient cancer treatment. In addition, their targeting to cancer cells also reduces the toxicity to the normal. Lapatinib (LP) is a 4-anilinoquinazoline derivative and inhibitor of intracellular tyrosine kinase. It is a potent anit-cancer agent as it has shown to inhibit both HER2 and EGFR receptors expressed by breast cancer cells. However, poor aqueous solubility and bioavailability limits its clinical use. Also, its high doses induce serious side effects to the human body. Somehow, very less research has been done for the formulation of delivery systems for such a potent drug candidate; one of the reasons is commonly used surfactants like cremophore EL, tweens, etc. are unable to enhance its solubility. Therefore, this lacuna inspired the idea to work for the present thesis and was envisaged from drug and dose-related problems of LP.

In this perspective, rationale for this research was developed for the combination of potent anticancer activity of LP and the benefits of nanocolloidal micelles pertaining to improvement of drug solubility and bioavailability; thereby developing efficient drug delivery system to treat the breast cancer. We hypothesized that the micelles would encapsulate the hydrophobic drug inside their hydrophobic core whereas hydrophilic external surface conveys stability in aqueous environment. In addition, micelles were proven to provide a sustained release of drug. These two facts would definitely benefit to passive targeting and reduction in dose of LP; thereby resulting in reduced dosing frequency, reduced toxicity to normal cells and higher efficacy of overall drug delivery

system for breast cancer treatment. The hypothesis was evaluated by developing the micellar delivery systems for LP and its extensive and appropriate evaluation for demonstrating its efficacy.

The thesis is organized as follows.

Chapter 1: The chapter deals with the introduction of breast cancer and its currents status globally. Further, it throws light on drug properties, its clinical and pharmaceuticals pitfalls, and need for the development of its nanocarriers systems. In addition, the chapter also provides introduction to micelles, their advantages and various amphiphilic polymers used therein. The last part deals with the objective of the thesis work.

Chapter 2: This chapter includes the comprehensive literature review regarding types of breast cancer, various nanocarriers, drug and the excipients used for this research. Later part describes the micellar drug delivery systems which had already attempted for the delivery of LP.

Chapter 3: The chapter explains the rationale and plan of work of the study.

Chapter 4: The chapter describes various materials, equipments and softwares used therein the study as wells as various methodologies, in detail, employed for design, developments and evaluation of the prepared micellar dosage forms

Chapter 5: The chapter focused on the compilation of all the results and their appropriate discussion with the support of proper evidences in the literature.

Chapter 6: The chapter summarizes the major outcomes followed by the conclusion of the study undertaken.

References: In the last, the references, which have been cited in the entire thesis, are enlisted.