

UNIVERSITI TEKNOLOGI MARA

**PACLITAXEL LOADED AND SURFACE
COATED POLYACRYLIC ACID-PEG-
CHITOSAN BASED NANOPARTICLES FOR
BREAST CANCER DELIVERY**

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**Dissertation submitted in partial fulfillment of the requirements for
the Bachelor of Pharmacy (Hons.)**

Faculty of Pharmacy

2013

ACKNOWLEDGEMENTS

First of all, I would like to give my greatest appreciation to Allah S.W.T because of His blessings, I am able to finish this research successfully. My greatest gratitude to my father, Mr. Zainal Abidin and my mother, Mrs. Rohanah, my supervisor, Prof. Dr. Abu Bakar Abdul Majeed, and my co-supervisor Dr Rakesh Kumar Mishra, Faculty of Pharmacy, Universiti Teknologi MARA for their guidance and support throughout the research. I would wish to thank Assoc. Prof. Dr. Vasudevan Mani for the guidance and sharing abundance of knowledge to complete the research. . Also, I would like to thank my colleagues, Muhammad Mustaqim and Muhammad Syafiq for the uttermost cooperation and the ideas and knowledge we shared. Not to forget, the members of laboratory and research assistant who were always helpful in giving advices and teaching on technical aspects during my laboratory work.

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	x
ABSTRACT	xi
CHAPTER 1: INTRODUCTION	
1.1 Introduction	1
1.2 Objectives of the study	4
1.3 Statement of problem	5
1.4 Hypothesis	5
CHAPTER 2: LITERATURE REVIEW	
2.1 Breast cancer	6
2.2 Chemotherapy	8
2.3 Drug delivery system	9

ABSTRACT

Paclitaxel is one of the best anticancer drugs, which has excellent therapeutic effects against a wide spectrum of cancers. The formulation of paclitaxel used in the currently clinical administration includes Cremophor EL, which has been found to cause serious side effects. Nanoparticle formulation of paclitaxel may provide an ideal solution to overcome this problem and achieve a sustained chemotherapy. Anticancer drugs, such as paclitaxel (PTX), are indispensable for the treatment of a variety of malignancies. However, the application of most drugs is greatly limited by the low water solubility, poor permeability, or high efflux from cells. Nanoparticles have been widely investigated to enable drug delivery due to their low toxicity, sustained drug release, molecular targeting, and additional therapeutic and imaging functions. A suitable management of the pharmaceutical property is needed and helpful to design a desired nanoparticulate delivery system, which includes nature of the carrier, particle size and size distribution, morphology, surfactant stabilizer according to the technique applied, drug loading ratio and encapsulation efficiency, and surface property, etc.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Breast cancer is the top cancer in women both in the developed and developing world. The incidence of breast cancer is increasing in the developing world due to increased life expectancy, increased urbanization and adoption of western lifestyle (WHO). Statistics of breast cancer in Asia showed that in female, 1.15 million cases were reported in 2002 (CH YIP et al, 2005). The latest Malaysian Health Ministry Report 2007, it was mentioned that 29 out of every 100,000 Malaysian women had breast cancer. The age standardized rate (ASR) of female breast cancer is 47.4 per 100,000 populations (National Cancer Registry Report 2003-2005). Amongst the Chinese, it is higher at 59.9 per 100,000 population, for Indians, the ASR is 54.2 per 100,000 and it is lowest in the Malays at 34.9 per 100,000 population.

In recent years, there has been an explosion of life-saving treatment advances against breast cancer, bringing new hope and excitement. The types of treatment are surgery, radiation, hormonal (anti-estrogen) therapy, and chemotherapy (Zhou SH et al, 2007). The management of breast cancer is undertaken by a multidisciplinary team based on national and international guidelines. A patient generally first goes through a staging