

UNIVERSITI TEKNOLOGI MARA (UiTM)

**CYTOTOXIC EFFECT OF PACLITAXEL LOADED AND
SURFACE COATED POLYACRYLIC ACID-PEG-CHITOSAN
BASED NANOPARTICLES**

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ABSTRACT

Paclitaxel (Taxol®) is a natural drug isolated from *Taxus Brevifolia*. It has been successfully used for the cancer treatment, especially breast and ovarian cancer. However, it is highly lipophilic and poor water solubility. To overcome these problems, it was formulated with non-aqueous vehicle containing Cremophor® EL, which consequently causes serious toxicity such as allergic reaction. Nowadays, nanotechnology had widely being exploited in anticancer research, and one of them is Paclitaxel. Development of new PTX formulation which gives better efficacy and fewer side effects becomes extremely urgent. Therefore, in this study, nanoparticle Polyacrylic acid-PEG-chitosan bound paclitaxel was developed and used as delivery system for PTX.. The cytotoxicity of new formulation of paclitaxel was evaluated for in vitro anti-tumour activity against MCF-7 cell lines by using SRB assay. The results from the present study demonstrated that nanoparticle Polyacrylic acid-PEG-chitosan bound paclitaxel developed cytotoxic effects against MC-7 cells, although with high concentration compared to PTX. It also showed that the formulation alone also was able to act as anti-tumour agent. We did plan to test the novel formulation on the normal body cell, which are BJ cells in order to detect any negative impacts. However, the steps need to be terminated due to restriction of time.

TABLE OF CONTENTS

	PAGE
TITLE PAGE	
APPROVAL FORM	
ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	vii
LIST OF FIGURES	ix
LIST OF TABLES	x
LIST OF ABBREVIATIONS	xi
CHAPTER ONE (INTRODUCTION)	
1.1 Background of study	1
1.2 Objectives	4
1.3 Problem Statement	4
1.4 Hypothesis	4
1.5 Significance of the Project	4

CHAPTER 1

INTRODUCTION

1.1 Background of study

1.1.1 Cancer and statistics

Cancer is a disease caused by the abnormal growth and spread of cells. Due to the abnormal division of cells, they form over excessive formation of new cells that will lead to the formation of too many tissues. These extra tissues are referred to as tumour, which can be benign or malignant. The abnormal cells can invade adjoining parts of body and spreading to other organs may occur. This process is known as metastasis, which is the major cause of death from cancer.

According to the findings of World Health Organization, cancer was the leading death disease worldwide and involved around 13% of all death in 2008. They also expected that death due to cancer may continue rising to over 13.1 million in 2030. In 2007, Ministry of Health Malaysia (MOH) Hospitals had come out a list of chronic diseases that can cause death. Based on the figures, cancer (11.28 %) was the third common chronic disease in Malaysia after heart disease and disease of pulmonary circulation (16.49 %) and septicaemia (13.38 %) (Zainal and Saleha, 2007). National Cancer Registry of Malaysia (NCR) recorded that 21, 773 Malaysians are diagnosed with cancer, and estimates almost 10, 000 unregistered cases each year.