

UNIVERSITI TEKNOLOGI MARA

**CURCUMIN, A NATURAL COMPOUND FROM
RHIZOMES OF *CURCUMA LONGA* INHIBITS
CELL GROWTH OF LIVER CARCINOMA CELLS**

**NUR SHAZWANI MOKHTAR
2006200582**

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

Faculty of Pharmacy

November 2009

ACKNOWLEDGEMENT

Firstly, I would like to thank God as for His blessing, I was able to complete my final year project and thesis writing accordingly. My heartfelt appreciations especially to those who rose the occasion and provided extra time to help me in completing this project. In this regard, I would like to take the opportunity to thank Miss Noor Jannah for her patience, kindness, supervision, helps, and guidance through her comments, suggestions, and encouragements throughout this project. Without her supervision, I would not be able to complete this project to this extend.

Special thanks to Dr. Mizaton and Prof Aishah Adam who assisted my friends and me. Their recommendations and thoughts indirectly help me to plan for my project and fueled me to be more dedicated in completing the project. Special thanks also to Mr.Hafiz, a research assistant from FRIM for helping me with chemical extraction of the turmeric.

I am also want to convey my deepest gratitude to staffs of Toxicology & Pharmacology laboratory especially Mr. Saad for giving me the necessary knowledge about the equipments and chemicals in the laboratory and for teaching me the exact way to use the equipments and the basic techniques involved in cell culture.

TABLE OF CONTENTS

	Page
TITLE PAGE	
APPROVAL	
ACKNOWLEDGEMENTS	ii
TABLE OF CONTENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF EQUATIONS	ix
LIST OF ABBREVIATIONS	x
ABSTRACT	xi
CHAPTER ONE (INTRODUCTION)	
1.1 Background of study	1
1.2 Statement of problem	2
1.3 Objective	2
1.4 Hypothesis	3

ABSTRACT

Hepatocellular carcinoma is the most common liver cancer form in adults. Curcumin, a non-volatile, yellow colouring agent, contained in turmeric (*Curcuma longa L.*) was claimed to have anticancer activities on most cancers, including liver cancer. The aim of this study is to evaluate the anticancer activities of curcumin from rhizomes of *Curcuma longa L.* on human liver cancer cells. In this study, two types of cell lines, HepG2 (human hepatocarcinoma) cells and WRL 68 (non-tumourigenic fetal liver) cells were used. Cells were plated in 96-well plates and incubated in conditions of 95% O₂, 5% CO₂, at 37°C. Five concentrations of curcumin extracts; 0.1, 1, 10, 100, and 1000 µg/ml were used and MTS assay was used to measure cell viability. Concentration response curve for ethyl acetate extract of curcumin and methanol extract of curcumin were constructed to determine the effects of concentration on cell viability and to calculate the median inhibitory concentrations (IC₅₀) for each extract. IC₅₀ for curcumin (MeOH) in HepG2 cells and curcumin (EA) in HepG2 cells were 125.3 ± 41.1 µg/ml and 146.5 ± 52.0 µg/ml respectively. While, IC₅₀ for curcumin (MeOH) in WRL 68 cells and curcumin (EA) in WRL 68 cells were 224.3 ± 57.2 µg/ml and 263 ± 55.7 µg/ml respectively. The result showed that methanol extract of curcumin was having greater anticancer activity on HepG2 cells. This study can contribute to the development of more effective, safer and cheaper natural based cancer drugs.

CHAPTER 1

INTRODUCTION

1.1 Background of study

The liver is the largest solid organ in the human body. It has a rich blood supply coming from both arterial and venous systems, namely the hepatic artery and portal vein, making it a common site of spread for cancers from other organs, such as the colon and breast. Primary liver cancer, or hepatocellular carcinoma is very common in the Asian region. The incidence of hepatocellular carcinoma increases with age and it is commoner in men than in women (Malaysian Oncology Society, 2009). The exhaustive research and numerous investigations carried over the last few decades suggest that curcumin has great potential in the prevention and cure of cancer (Curr Probl Cancer, 2007).

Curcuminoids refer to a group of phenolic compounds present in turmeric, which are chemically related to its principal ingredient curcumin. The biochemical pathways involved in the carcinogenesis process have been investigated extensively over the last four decades. Numerous studies over the last two decades have demonstrated that curcumin targets several steps in these biochemical pathways, thus showing immense promise for the treatment of cancers, including liver cancer. Curcumin modulates several biochemical pathways and numerous targets involved in carcinogenesis. Recent investigations suggest that curcuminoids are active in the external treatment of certain