

**SYNTHESIS AND CHARACTERIZATION OF  
CHROMIUM(III)-CURCUMIN COMPLEX**

**NUR AFIQAH BINTI MUHAMAD LUDIN**

**BACHELOR OF SCIENCE (Hons) CHEMISTRY  
FACULTY OF APPLIED SCIENCES  
UNIVERSITI TEKNOLOGI MARA**

**APRIL 2010**

## ACKNOWLEDGEMENTS

Firstly, I would like to express my heartfelt gratitude to Almighty ALLAH SWT for blessing me with the strength and ability to prepare this project on the time required.

Special recognition is extended to my supervisor Puan Ruhani Ibrahim who had given me a lot of guidance, advice and ideas throughout the preparation and also valuable comments to ensure this project successfully completed. And also thank you to Assoc. Prof. Dr Rahmah Mohamed for being my co supervisor that always give encouragement and help me out when in difficulties in this project.

Sincere thanks to all lecturers of the Bachelor of Science (Hons.) in Chemistry especially Prof Madya Dr. Hadariah Bahron and Puan Kamariah Muda for their assistance, guidance, cooperation and information that they had been given to me in order to complete this project.

I also would like to express my gratitude to every persons involved in this project, all lab assistants and technicians, especially En. Khairul Tajudin, En. Adnan Ismail, En. Yazid Yusof, En. Kamarudin Ismail and En Zulhairi Radzi for their help, cooperation and assistance during my project progress. Not forget thanks to all my friends especially Siti Nor Aini Md Shari, Nor Hazwani Mohd Noor and Mawar Hazwani for supporting, ideas and advice during this project.

Finally, recognition and acknowledgement is also given to my parents and family for their blessing and support upon completing this project.

Nur Afiqah Binti Muhamad Ludin

## TABLE OF CONTENT

<b>ACKNOWLEDGEMENT</b>	iii
<b>TABLE OF CONTENT</b>	iv
<b>LIST OF TABLES</b>	vii
<b>LIST OF FIGURES</b>	viii
<b>LIST OF ABBREVIATIONS</b>	ix
<b>ABSTRACT</b>	x
<b>ABSTRAK</b>	xi
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background	1
1.1.1 Structure of Curcumin	1
1.1.2 Properties of Curcumin	2
1.1.3 Properties of Transition Metal	2
1.1.4 Properties of Chromium(III)	3
1.1.5 Formation of Metal and Ligand Complex	3
1.1.6 Problem Statement	3
1.2 Significance of Study	4
1.3 Objective of Study	4
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Ability of Curcumin to Form Complex with Metal	5
2.2 Characterization of Curcumin Complex	6
2.2.1 Fluorescence Spectroscopy	6
2.2.2 UV Visible Spectroscopy	9
2.2.3 Fourier Transform Infrared Spectroscopy	9
2.2.4 Thermo Gravimetric Analysis	11
2.3 Ability of Transition Metal as Photovoltaic	12
2.4 Preparation of Complexes	12
<b>CHAPTER 3 METHODOLOGY</b>	
3.1 Instruments	14
3.2 Materials	
3.2.1 Apparatus	14
3.2.2 Chemicals	15
3.2.3 Sample	15
3.3 Method	
3.3.1 Preparation of Curcumin Complex	15
3.4 Characterization	
3.4.1 UV Visible Spectroscopy	16
3.4.2 Fluorescence Spectroscopy	16
3.4.3 Fourier Transform Infrared Spectroscopy	16
3.4.4 Thermo Gravimetric Analysis	17

## **ABSTRACT**

### **PREPARATION AND CHARACTERIZATION OF CHROMIUM (III)- CURCUMIN COMPLEX**

Curcumin can form strong colored chelates with transition metal's ions. In this study, six samples are prepared at different temperature and ratio. The samples are prepared at room temperature and 40°C. Meanwhile, the ratio of Chromium(III) : curcumin is prepared at 1:1, 1:1.5 and 1:2. The aim of this study is to find out the best ratio and temperature for the metal complexation. The samples are prepared using reflux and characterized using UV Vis Spectrometer, Fluorescence Spectrometer, FTIR and TGA. From the result, ratio of 1:2 is the best for reaction of metal complex. Thus the recommendation is to further study on ratio 1:2 in the application of photonic devices.

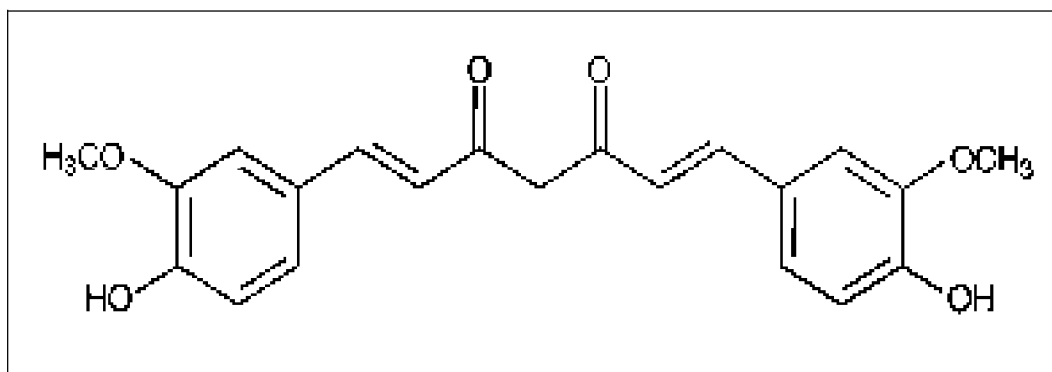
## CHAPTER 1

### INTRODUCTION

#### 1.1 Background

Curcumin (*Curcuma Longa L.*) is a naturally occurring yellow pigment obtainable from the rhizomes of turmeric which belong in ginger family. The main constituent of curcuma species is curcumin which is responsible for the biological activity of turmeric. Curcumin commonly used in spices, cosmetics and traditional Chinese and Indian medicine.

##### 1.1.1 Structure of Curcumin



**Figure 1.1** Structure of Curcumin