

**EXTRACTION OF BIXIN FROM *BIXA ORELLANA*
AND ITS APPLICATION ON COSMETIC
PRODUCTS**

NUR NASUHA BINTI HUSA

**This thesis is submitted in fulfilment of the
requirements for Degree of Bachelor of Eng. (Hons)
Chemical and Bioprocess**

**FACULTY OF CHEMICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
SHAH ALAM**

2016

ACKNOWLEDGEMENT

In the name of Allah, The Most Gracious and Merciful. Alhamdulillah with His blessings, I was able to complete my report for Research Project and my thesis as the fulfilment for my Bachelor Degree in Chemical Engineering and Bioprocess.

Therefore, I would like to express my gratitude for those who were involved during the process of completing my Research Project. First and foremost, my appreciation goes to my supervisor, Dr. Fazlena Hamzah that has been guiding, nurturing, and assisting me throughout this study. I am completely thankful for all her helpful advices and ideas.

Throughout this study, I was also supervised by Miss Hasimah Mohd Said from Kelantan Biotech Corporation Sdn Bhd KBCSB. I am grateful for her ideas, encouragement and also her willingness to help me to complete this project.

Lot of thanks goes to my parents for their endless support and encouragement all these while. Not to forget to all lab assistants that have been helping me during the lab session, and also my friends that have been sharing ideas that really helping me in completing this study. Last but not least, I would like to say thank you to those that directly and indirectly involved in my project.

ABSTRACT

Additive is one of the most important components that have been used in most of industries. Colorant is a type of additive that is used to give a better appearance or improve the colour of the end product. However the arising issues that related on the safety, presence of potential nutrition and also the therapeutic effect has causing the users to become more concern about the ingredients in the product that they used. To counter the expanding issues, this research is focusing on the process of extracting natural colorant called bixin from *Bixa Orellana* or also known as annatto seeds. This extracted colorant then applied in the cosmetic products as an alternative to produce safer and natural based colour additives. The selected extraction process is by using the solvent extraction method and varying the type of solvents used. The extracted sample then undergoes several analyses to characterize the biochemical content which then proven to contain bixin. Methanol is identified to be the best type of solvent to be used for the extraction process in terms of quality of the extracted colorant. As the colorant applied to the product formation, it can be seen that the transparent soap producing a better coloration which is almost the similar to the extracted colour.

TABLE OF CONTENTS

DECLARATION.....	ii
SUPERVISOR’S CERTIFICATION	iii
ACKNOWLEDGEMENT	v
ABSTRACT	vi
TABLE OF CONTENTS	vii
LIST OF TABLE.....	x
LIST OF FIGURES	xi

CHAPTER 1: INTRODUCTION

1.1 Research Background	1
1.2 Problem Statement.....	3
1.3 Objective of Study	4
1.4 Scope of Study.....	4

CHAPTER 2: LITERATURE REVIEW

2.1 Cosmetics and Colorant.....	6
2.2 Natural Pigmentation	7
2.3 Type of Natural Pigmentation	8
2.3.1 Carotenoids.....	8
2.3.2 Anthocyanin	11
2.3.3 Chlorophyll.....	14
2.3.4 Betalains	15
2.4 Comparison between Natural Pigmentation	16
2.5 <i>Bixa Orellana</i> (General)	
2.6 Natural Compound and Extraction of <i>Bixa Orellana</i>	20
2.7 Biological Activity and Clinical Research of <i>Bixa Orellana</i>	22
2.8 Traditional and Current Practical Uses	23
2.9 Method of Pigment Isolation from Natural Resources	23
2.8.1 Solvent Extraction	23
2.8.2 Sonication	25

CHAPTER 1

INTRODUCTION

1.1 Research Background

An additive is one of the important component that has been used in most food, cosmetics and also pharmaceuticals industries. Linguistically, these additives can be defined as small quantities of component or substances that are added into other substances in order to improve the performance of the finished product (American Heritage, 2011). The additive can be divided into few different categories and the most commonly used additives in industries are colouring. According to US Food and Drug Administrative (FDA), the additives can be eliminated from the product if only the consumers are willing to produce the product from the ground zero. However, most of the consumers today are depending on the already developed technology, aesthetic and the convenience that all these additives provided.

Different types of additives are added on the product according to the desired characteristic for the end product. For example, the food additives are used to improve or maintain the nutritional value of the food itself. Vitamins and minerals are considered as food additives as they are added to cover the lacking nutrient in in the food produced. Another important additive is colouring that can come from any type of dye, pigment or substances that applied to the food, drug or cosmetics to give a better appearance or improve the colour of the product. There are few different types of colour additives and two most commonly known are synthetic and natural colorant. According to a survey conducted by Grand Review Research 2014, the market demand for both of this natural and synthetic colorant are approximately in the same volume and this is shown by the Figure 1.1 below.