UNIVERSITI TEKNOLOGI MARA

A STUDY ON THE EXTRACTION AND STABILITY OF RED AND PURPLE PIGMENT FROM ROSELLE AND DRAGON FRUIT FOR FOOD COLORING

WAN NUR MADIHAH BINTI WAN HARUJAN

THESIS submitted in fulfillment
of the requirements for the degree of
Bachelor of Chemical Engineering
(Bioprocess)

Faculty of Chemical Engineering

July 2018

ABSTRACT

In this research, *Hibiscus Sabdariffa*, Roselle and Dragon fruit used as natural sources for red and purple food colorant which being compared with artificial of red and purple colorant. Natural food colorant contains less toxicity and carcinogenic effect towards human body and provides abundance of benefits to human health. There is less production for natural food colorant gives highly in market demand due to increasing awareness about the harmful effect usage of artificial color which highly chemical content. Several extraction methods apply consist of supercritical fluid extraction (SFE), hydro distillation and ultrasonic homogenizer. SFE is carried out for extraction of natural product with a solvent of CO_2. The research study has conducted to investigate the effect of extracted natural colorant on different condition of storage, toxicity, temperature and light in compared with artificial color. The stability of natural color powder form from spray dryer is measured by using Chroma meter for 7 days. Absorbance reading for red and purple color measured by spectrophotometer at wavelength of 700 nm and 420 nm. The scopes of the research project are based on the stability study of natural and artificial or artificial food coloring in different temperature, light and storage time, determination of chemical elements in food coloring through ICP and analysis of anthocyanin stability is conducted through a storage test, muffin and toxicology study. Stability test for temperature is conducted at temperature 25, 30, 40, 50, 60 and 70℃. In addition, usage of spray dryer must be used at optimum condition of 130℃ and 4 rpm to avoid from color degradation and less flavor taste. As a conclusion, usage of SFE, hydro distillation and ultrasonic homogenizer does not suitable to carry out the oil extraction from sample of purple dragon fruit and red Roselle because there is no oil content in both samples.

ACKNOWLEDGEMENT

Firstly, all praise to Allah for the strength and His blessing until I have completed this research project. Most particularly thankful to my thesis supervisor, Dr. Siti Noor Suzila Maqsood Ul Haque. I am deeply indebted to her because without her constructive feedback, encouragement and careful supervision this research project would not be success. Her valuable advice and suggestion for correction, modification and improvement did enhance the perfection in my research. I am gratefully to Madam Siti Fatma Abd Karim, Dr. Norhidayah Ideris and Dr. Farah Hanim Ab Hamid as coordinator of my research project for contribution to manage our research project.

My special appreciation and gratitude to my both parents Tuan Haji Wan Harujan Bin Sulaiman and siblings for their understanding and support continuously until I complete this research. Thanks to my foster family in Perak for always supports and helps me to find my main source of this research which is Roselle. I would like to express my deepest appreciation to my truly friend, Zulaikha Binti Abu Hassan for her advice and helping a lot in order to complete my research.

Thankful to the Research Management Institute, Universiti Teknologi MARA, Malaysia for the financial support. My special appreciation and gratitude to my both parents and family for their understanding and support continuously until I complete this research. Furthermore, I am so bless and thankful to Faculty of Chemical Engineering, Universiti Teknologi MARA Shah Alam for providing the facilities and assistance during doing my experiment or sampling. Special thanks to my colleagues and friends for helping me with this project.

TABLE OF CONTENT

CHAPTER ONE
INTRODUCTION

1.1 Overview

Hibiscus Sabdariffa which is widely known as Roselle and dragon fruit were used in this study due to contain of anthocyanin. The anthocyanin carries a colour appearance of the fruit such as red and purple. Dragon fruit is a good natural source which has some of phytonutrients that rich in antioxidants, vitamin C, polyunsaturated (good) fatty acids, and several B vitamins for carbohydrate metabolism. The objectives of this research conducted are to study the extraction method to obtain red and purple colour from Roselle and dragon fruit through supercritical liquid extraction and hydro distillation and to investigate the effect of extracted natural colorant on different condition of storage, toxicity, temperature and light in compared with synthetic color.

1.2 Research Background

Food coloring is a type of food additives that use to maintain and improve safety, freshness, nutritional value, taste, texture and appearance. It is a form of pigment or dye which can be found in the form of powder, liquid and gel that change the color when it is added into food. In addition, it helps to prevent the color loss of food due to exposure of light, air, temperature, moisture and storage condition. In Malaysia's industry, it is commonly used a synthetic food color compare to natural food color due to lower cost. Roselle rich in anthocyanin and could be used as good source for producing red colorant to many products. Dragon fruit is a good natural source which has some of phytonutrients that rich in antioxidants, vitamin C, polyunsaturated (good) fatty acids, and several B vitamins for carbohydrate metabolism. Food colorant is a measure of quality and nutrient content of food. It is being used to improve color and increase our appetite to food. Color must follow the flavor itself which helps to attract or influenced a person to buy or eat the food. It can attract in a first sight or act as first impression of person to try that food.