

**SPECTROPHOTOMETRIC STUDIES OF NATURAL PIGMENT IN
BETA VULGARIS AND CURCUMA LONGA AND APPLICATION ON
SILK FABRIC AS A NATURAL DYE**

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**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Chemistry
in the Faculty of Applied Sciences
Universiti Teknologi MARA**

NOVEMBER 2007

ACKNOWLEDGEMENT

First and foremost, praise to Allah SWT for his blesses and mercy giving me the strength and endurance to complete this final year project on time. On top of my list, I would like to thank Puan Kamariah Muda, my supervisor of this final year project for giving me guidance and supervision in order to complete this particular project entitled “Spectrophotometric Studies of Natural Pigments in *Beta vulgaris* and *Curcuma longa* and Application on Silk Fabric as a Natural Dye”. All the help and assist you given to me have helped me a lot in writing a good project paper.

I also would like to acknowledge Dr. Ruziyati Tajuddin for her help and assistance in understanding the project overview. Next, I would like to thank the lab assistants in Makmal 301, MK1 and 2, En. Mohd Kadim Sarmean, En Raimi Mohd Noor and En Adnan Ismail that guide me in handling the equipment and instrument in the laboratory.

Special dedication goes to my parents for all the support and encouragement while completing this project paper. Besides that, I would like to express my gratitude to my siblings for all the ideas and information they have given to me on the related subject.

Then, I would like to thank all my friends whom have lend a hand and helped me out in completing this project paper. Last but not least, I would like to thank all the people whom have helped me while I am in the process of completing this project paper.

Shabinah Filza binti Mohd Sharib

ABSTRACT

SPECTROPHOTOMETRIC STUDIES OF NATURAL PIGMENT IN BETA VULGARIS AND CURCUMA LONGA AND APPLICATION ON SILK FABRIC AS A NATURAL DYE

The natural pigment in *Beta vulgaris* and *Curcuma longa* were observed in spectrophotometric studies. These natural pigments were extracted using a conventional method which is boiling with distilled water at four different temperature (40°C, 60°C, 80°C and 100°C). The crude extract was then analyzed by UV-VIS Spectrometer over the range of 400nm to 800nm. The maximum absorbance of *Beta vulgaris* crude extract was observed at 60°C with λ_{\max} of 487.72nm and 534.04nm. While the maximum absorbance of *Curcuma longa* crude extract was observed at 100°C with λ_{\max} of 422nm. The studies show that the natural pigment in *Beta vulgaris* and *Curcuma longa* tend to degrade when exposed to sunlight and high temperature. Maximum percentage degradation of the natural pigment in *Beta vulgaris* and *Curcuma longa* are observed when exposed to sunlight and light respectively. The best condition for both natural pigments is in the dark room that give lowest percentage degradation than other conditions. Silk fabric dyed with natural pigment in absent and presences of mordant were also studied. The initial colour of the silk fabric changes when dyed with natural pigment and mordant. The three mordant used were copper (II) sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$), stannous chloride ($\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$) and potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$) and it is mordanted with the natural pigment using pre-mordanting method to give variation of colour.

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CHAPTER 1

INTRODUCTION

1.1 Background

Pigment is a substance used as colouring in various substances. Natural pigments are pigments that found mainly in the living material such as plants and animals. For example, chlorophyll and melanin are pigments that produce a characteristic colour in plant and animal tissue.

Natural dyes are any class of intensely coloured complex organic compounds that found in the living material such as plants and animals. Natural dyes also a coloured substances that have pigment which imparts more or less permanent colour to other materials. It is commonly used to colour textiles, leather, paper, and other materials during the early days. For example, Chairat et al. (2004) reported that lac dyes which obtain from a Rain tree, *Samanes saman* was used as textile dyes for generations in Thailand.

These natural pigment have various benefit to our life. It is mainly used as colorant and may have other important function such as photosynthesis process in the plants, and protection mechanism as mention in chlorophylls below. In analytical chemistry, the red cabbage dye commonly used as a pH