

**DETERMINATION OF TARTRAZINE AND SUNSET YELLOW  
IN DIFFERENT BRANDS OF SOFT DRINKS USING HIGH  
PERFORMANCE LIQUID CHROMATOGRAPHY DIODE  
ARRAY DETECTOR (HPLC-DAD)**

**SITI NOOR AISHAH BINTI MOHD ZULKAPLY**

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

**JULY 2016**

**DETERMINATION OF TARTRAZINE AND SUNSET YELLOW IN  
DIFFERENT BRANDS OF SOFT DRINKS USING  
HIGH PERFORMANCE LIQUID CHROMATOGRAPHY  
DIODE ARRAY DETECTOR (HPLC-DAD)**

**SITI NOOR AISHAH BINTI MOHD ZULKAPLY**

**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**

**JULY 2016**

## ACKNOWLEDGMENTS

First, I would like to thank ALLAH S.W.T for giving me health and strength to accomplish my project. I also would like to thank Dr. Zainiharyati binti Mohd Zain, Project Coordinator of Bachelor of Science (Hons.) Chemistry, for helping me and giving me guidance prior, during and after the project.

I would like to thank my supervisor, Assoc. Prof. Zuraidah Abdullah Munir, for her excellent leadership, supervision and guidance throughout the project and also for providing excellent guidance prior, during and after the project. I would like to express my thanks for all the facilities required to proceed my project.

I am also much indebted to all staffs of the Faculty of Applied Science UiTM Shah Alam for their remarks and suggestions during my project.

Above all, I would like to express my warmest and heartfelt thanks to my parents and siblings for their love and encouragement. I wish to thank them for their endless support and help whenever needed. I thank also my other relatives for support and all friends for being great friends. I would like to give the expression of my sincere gratitude for their support, patience and encouragement during my project.

Siti Noor Aishah binti Mohd Zulkaply

## TABLE OF CONTENTS

	Page
<b>ACKNOWLEDGEMENTS</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	vii
<b>LIST OF ABBREVIATIONS</b>	viii
<b>ABSTRACT</b>	ix
<b>ABSTRAK</b>	x
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background	1
1.2 Problem statement	4
1.3 Significance of study	5
1.4 Objectives of study	5
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Food dye	6
2.2 Natural food dye	6
2.3 Synthetic food dye	7
2.3.1 Tartrazine	9
2.3.2 Sunset yellow	10
2.4 Acceptable daily intake (ADI) of tartrazine and sunset yellow	11
2.5 Maximum level of tartrazine and sunset yellow	12
2.6 Beverages	12
2.6.1 Soft drinks	13
2.7 Determination of synthetic dyes	13
2.7.1 Thin Layer Chromatography (TLC)	14
2.7.2 Traditional Column Chromatography	16
2.7.3 Capillary Electrophoresis (CE)	16
2.7.4 High Performance Liquid Chromatography (HPLC)	18

## ABSTRACT

### DETERMINATION OF TARTRAZINE AND SUNSET YELLOW IN DIFFERENT BRANDS OF SOFT DRINKS USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY DIODE ARRAY DETECTOR (HPLC-DAD)

Synthetic dyes are commonly used by manufacturers of beverages including wine, cordial, fruit juice and soft drinks to give colour and to make the products more tempting. However, many studies had reported that synthetic dyes are harmful to human health especially when taken more than the Acceptable Daily Intake (ADI). Besides that, manufacturers do not state the amount of synthetic dyes added into their products. This study was conducted to determine the amount of food dyes which are tartrazine and sunset yellow in five different brands of local carbonated soft drinks; A, B, C, D, and E by using high performance liquid chromatography diode array detector (HPLC-DAD) and to compare the amount of both food dyes in different brands of local soft drinks. Linearity, limit of detection (LOD) and limit of quantification (LOQ) were studied. Linear calibration curves were obtained for tartrazine and sunset yellow in the range of 1.00 mg/L to 200.00 mg/L. The linear regression equation for standard tartrazine was  $y = 10.953x + 17.03$  while linear regression equation for standard sunset yellow was  $y = 7.934x + 2.94$ . The coefficient of determination ( $R^2$ ) for tartrazine and sunset yellow were 0.9997 and 0.9999, respectively. The LOD for tartrazine and sunset yellow were 0.52 mg/L and 0.41 mg/L, respectively. The LOQ for tartrazine was 1.73 mg/L and for sunset yellow was 1.35 mg/L. Sample B contained the highest amount of the tartrazine which is 19.28 mg/L while the other samples, tartrazine was not detected. Sample D contained the highest amount of sunset yellow which is 57.38 mg/L and sample A contained the lowest amount of sunset yellow which is 30.17 mg/L. This study showed that amount of both food dyes in this study are below the maximum level based on Europe Union (EU) Regulation, thus all the samples in this study are safe to be consumed by consumers.