

**DETERMINATION OF ANTIOXIDANT ACTIVITY IN SUGARED
AND MILKED TEA BY USING FERRIC REDUCING ANTIOXIDANT
POWER (FRAP) ASSAY**

SHARIFAH NOR HAFIZAI BINTI SYED JAYA

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

JULY 2013

TABLE OF CONTENT

	Page
ACKNOWLEDGMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER 1 INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	4
1.3 Significance of Study	4
1.4 Objective of Study	5
CHAPTER 2 LITERATURE REVIEW	
2.1 Antioxidants	6
2.2 Antioxidant in Tea	7
2.3 Various Determination Methods of Antioxidant Activity	10
2.4 Determination of Antioxidant Activity in Tea Using FRAP Assay	12
CHAPTER 3 METHODOLOGY	
3.1 Apparatus	14
3.2 Chemicals	15
3.3 Experiments	16
3.3.1 Extraction of Antioxidants by Reflux Apparatus	16
3.3.2 Characterization of Antioxidant by Attenuated Total Reflectance -Fourier Transform Infrared (ATR-FTIR) Spectroscopy	17
3.3.3 Estimation Of Antioxidant Capacity By FRAP Assay	17
3.4 Analysing Sample	18
3.4.1 Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR-FTIR) Techniques	18
3.4.2 The UV-Vis Spectroscopy Spectrophotometer	19
CHAPTER 4 RESULTS AND DISCUSSION	
4.1 The extraction by using reflux	21
4.2 Characterization by using ATR-FTIR	21
4.3 Determination of Antioxidant Activity by UV-Vis Spectrophotometer	26

LIST OF TABLES

Table	Caption	Page
2.1	Effect of extraction methods and solvents system on the extract yield (g/100g) from peanut hulls on dry basis	6
3.1	List of Apparatus Used in the Experiment	14
3.3	List of Chemicals Used	15
3.3	Relationship between observed colour and the absorbed colour in UV-Vis Spectrophotometer	20
4.1	The Antioxidants Activity in Tea Samples	26

LIST OF FIGURES

Figure	Caption	Page
4.1	Infrared spectrum for black tea (B), black tea with milk (BM) and black tea with milk and sugar (BMS)	24
4.2	The structures of various theaflavins in tea	25
4.3	The Antioxidant Activity in Tea Samples	29

ABSTRACT

DETERMINATION OF ANTIOXIDANT ACTIVITY IN SUGARED AND MILKED TEA BY USING FERRIC REDUCING ANTIOXIDANT POWER (FRAP) ASSAY

The research presents the antioxidant activity contained in the black tea (B), black tea with milk (BM) and black tea with milk and sugar (BMS). The functional groups of antioxidant also have been characterized. Flavonoids and different polyphenols contained in tea powder have antioxidative properties owing to the presence of various numbers of hydroxyl groups in several arrangements. The investigation was done by using Attenuated Total Reflectance- Fourier Transform Infrared (ATR-FTIR) to identify the antioxidants structure contained in tea and Ultraviolet Visible (UV-VIS) Spectroscopy was used to determine the highest samples containing antioxidant activity. The estimation of antioxidant activity was done by using Ferric Reducing Antioxidant Power (FRAP) Assay and the UV-VIS spectra show that BMS contained the highest antioxidant activity which is 0.467 $\mu\text{g/L}$ compared with two other samples. It is proved that the addition of milk and sugar do not alter the antioxidant activity in tea samples.