

**DETERMINATION OF CAFFEINE, CHLOROGENIC ACID AND
NICOTINIC ACID IN COFFEE BEANS BY USING HPLC**

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TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	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	1
1.2 Significance of study	1
1.3 Objectives of study	3
CHAPTER 2 LITERATURE REVIEW	
2.1 Coffee	4
2.2 Roasting	4
2.3 Chemical effects	5
2.3.1 Caffeine	6
2.3.2 Chlorogenic acid	7
2.3.3 Nicotinic acid	8
2.4 Method development	9
2.4.1 Sample preparation	10
2.4.2 HPLC analysis	10
CHAPTER 3 METHODOLOGY	
3.1 Chemicals	11
3.2 Coffee samples	11
3.3 Sample preparation	11
3.3.1 Standard	11
3.3.2 Roasted coffee beans	11
3.3.3 Brewed coffee beans	12
3.4 HPLC analysis	12
CHAPTER 4 RESULTS AND DISCUSSION	
4.1 Effect of roast time in coffee samples	14
4.2 Different amount of chlorogenic acid in roasted and brewed coffee samples	16

ABSTRACT

DETERMINATION OF CAFFEINE, CHLOROGENIC ACID AND NICOTINIC ACID IN COFFEE BEANS BY USING HPLC

Coffee usually comes in two types of coffee beans. They are coffee *arabica* and coffee *robusta*. These coffees contain many chemicals that are affected during the roasting process. The coffee contains caffeine, chlorogenic acid and nicotinic acid which give a variety of the effect that is both beneficial and harmful to human. This research will determine the amount of compound such as caffeine, chlorogenic acid and nicotinic acid present in coffee after roasting. The coffee beans were roasted in an oven and grounded coffee was brewed in freezer. The sample preparation was quite simple involving only heating water extraction and filtration. Analytical HPLC unit consists of Water 717 plus Autosampler and Water 600 Controller, Water 2487 Dual λ Absorbance detector, a 150 x 4.6 mm i.d. Merck Superspher 100 Reversed Phase (RP), C-18 column with 5 μ m particle sizes. The analysis is uses reversed phase (RP) column with gradient elution of 10 mM citric acid (A) and methanol (B). *Robusta* coffee beans contained the highest amount of caffeine compared with *arabica* were, 36.0290 mg/ml and 35.2950 mg/ml respectively. The amount nicotinic acid in roasted coffee *arabica* for five minute was 0.5859 mg/ml and roasted coffee *robusta* was 0.7000 mg/ml. The amount of chlorogenic acid in brewed coffee samples is smaller than roasted coffee sample. In roasted coffee sample, the amount of CGA in *arabica* and *robusta* were 10.8936 mg/ml and 15.1398 mg/ml respectively.

CHAPTER 1

INTRODUCTION

1.1 Background and problem statement.

Coffee is one of the world's most popular beverages. It also produces pleasant taste and aroma. Coffee usually comes in two types of coffee beans. They are Coffee *Arabica* and Coffee *Robusta*. These coffees contain many chemicals that are affecting during the roasting process. The roasting process is a process that is time and temperature dependent whereby chemical changes are induced in the coffee beans. There are several analytical methods available for determination of these components in coffee. High Performance Liquid Chromatography (HPLC) is usually used by researchers to study the presence of biochemical changes in coffee beans. Determination of caffeine, chlorogenic acid and trigonelline in coffee was developed by using different reverse phase (RP) High Performance Liquid Chromatography (HPLC) methods (Trugo *et al.*, 1983) and chlorogenic acid analysis (Duijn and van der Stegen, 1980; Macrae and Trugo, 1984) but not for the simultaneous analysis of all three compounds. These chemicals in coffee give the side effect to human drinking it in large amounts.

1.2 Significance of study

Like many other foods we eat and drink, the composition of coffee is very complex. It depends on the species and variety of plant, the way they are grow