DETERMINATION OF CAFFEINE IN DIFFERENT BRANDS OF COFFEE SAMPLES BY SOLID PHASE MICROEXTRACTION (SPME) AND GAS CHROMATOGRAPHY MASS SPECTROMETRY DETECTOR (GC-MSD)

NUR ELYWATI BINTI KHALID

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

APRIL 2010

DETERMINATION OF CAFFEINE IN DIFFERENT BRANDS OF COFFEE SAMPLES BY SOLID PHASE MICROEXTRACTION (SPME) AND GAS CHROMATOGRAPHY MASS SPECTROMETRY DETECTOR (GC-MSD)

NUR ELYWATI BINTI KHALIB

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

APRIL 2010

ACKNOWLEDGEMENTS

First and foremost, all praise is to ALMIGHTY ALLAH S.W.T, the omnipotent, the omnipresent, the most merciful and the most compassionate who blessed me with tolerant attitude, realistic thinking, family support and supervisor that enable me to complete this research. This research is the result of my effort on my part, along with assistance of many people. Nevertheless, with help from others, this research has finally completed.

My profuse heartfelt thanks and appreciation goes to my supportive supervisor, Assoc. Prof. Zuraidah binti Abdullah Munir for her contribution especially her time and wisdom, firm guiding hand, and encouragement throughout my research when I was floundering in chaos. Not only she provided me with valuable suggestion for my thesis, but also provided instructive comments and evaluation at every stage of the thesis process, allowing me to complete thesis as scheduled.

I am also grateful to Mr. Ahmad Kambali bin Khalil for his technical help and his assistance in using laboratory equipment.

Last but not least, I would like to express my greatest appreciation to my beloved family, classmates, roommate, lab mates, entire friends and other lecturers for their guidance and full support in completing this thesis.

Thank you.

Nur Elywati Khalib

TABLE OF CONTENTS

ABSTRACT

DETERMINATION OF CAFFEINE IN DIFFERENT BRANDS OF COFFEE SAMPLES BY SOLID PHASE MICROEXTRACTION (SPME) AND GAS CHROMATOGRAPHY MASS SPECTROMETRY DETECTOR (GC-MSD)

Caffeine in different brands of coffee samples (L_1, L_2, I_1, and I_2) was determined using extraction by solid phase microextraction (SPME) and then analyzed by gas chromatography coupled with mass spectrometry detector (GC-MSD). The optimizations of SPME were carried out in order to enhance the fiber performance and obtain high amount of caffeine extracted. The optimization conditions were done by extracting 500 ppm of caffeine standard solution. It was found that the optimum SPME conditions were at 85 °C of extraction temperature and 10 minutes of extraction time. The headspace immersion of SPME was applied to extract caffeine from different brands of coffee samples. The result showed that I_2 brand of coffee has the relatively highest amount of caffeine among the four brands analyzed. This was followed by I_1, L_1 and L_2 brands of coffee.