DETERMINATION OF METALS IN THREE DIFFERENT *ULAMS* USING ATOMIC ABSORPTION SPECTROSCOPY (AAS)

NUR SYAZWANI BT MOHD YUSOF

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

JULY 2016

This Final Year Project Report entitled **"DETERMINATION OF METALS IN THREE DIFFERENT *ULAMS* USING ATOMIC ABSORPTION SPECTROSCOPY (AAS)"** was submitted by Nur Syazwani Bt Mohd Yusof, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by

_____

Hasratul Nadiah Binti Mohd Rashid
Supervisor
B.Sc. (Hons.) Chemistry
Faculty of Applied Sciences
University Teknologi MARA
72000 Kuala Pilah
Negeri Sembilan

_____	_____
Tn. Sheikh Ahmad Izaddin Sheikh Mohd Ghazali	Mazni Musa
Project Coordinator	Head of Programme
B.Sc. (Hons.) Chemistry	B.Sc.(Hons.) Chemistry
Faculty of Applied Sciences	Faculty of Applied Sciences
University Teknologi MARA	University Teknologi MARA
72000 Kuala Pilah	72000 Kuala Pilah
Negeri Sembilan	Negeri Sembilan

Date: _____

TABLE OF CONTENTS

		Page
ACKNOWLEDGEMENT		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 of study	4
1.3	Significance of study	6
1.4	Objective of study	7
CHAPTER 2 LITERATURE REVIEW		
2.1	Metals	8
2.1.1	Heavy metals	8
2.1.2	Alkaline earth metals	10
2.2	Provisional Tolerable Weekly Intake (PTWI)	11
2.3	*Ulams*	12
2.4	Atomic Absorption Spectroscopy (AAS)	16
2.5	Digestion method	18
CHAPTER 3 METHODOLOGY		
3.1	Materials	20
3.2	Chemicals	20
3.3	Apparatus	20
3.4	Instrumentations	21
3.5	Methods	21
3.5.1	Dry ashing method	21
3.5.2	Preparation of standard solutions	22
CHAPTER 4 RESULTS AND DISCUSSION		
4.1	Analysis of *Ulam* samples	24
4.2	Results	25
4.2.1	Copper (Cu)	25
4.2.2	Iron (Fe)	26
4.2.3	Calcium (Ca)	27

4.3 Limit of Detection (LOD) 29
4.4 Linearity 30

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS
5.1 Conclusion 34
5.2 Recommendations 36

CITED REFERENCES 37
APPENDICES 40
CURRICULUM VITAE 61

ABSTRACT

DETERMINATION OF METALS IN THREE DIFFERENT *ULAMS* USING FLAME ATOMIC ABSORPTION SPECTROSCOPY

Most of countries were exposed to environmental risk and human health which comes from contamination of metals. In this study, the concentration of metals (Cu, Fe and Ca) in three different *ulams* was determined using Flame Atomic Absorption Spectroscopy. Dry ashing method has been selected using 65 % nitric acid and 37 % hydrochloric acid. The results obtained were compared with the Provisional Tolerable Weekly Intake (PTWI) set by Joint Expert Committee on Food Additives (JECFA). The average value of Cu were 0.825 mg/L, 0.406 mg/L and 0.320 in *pucuk paku, ulam pegaga, ulam raja* respectively. For Fe, 0.779 mg/L, 0.446 mg/L and 0.488 mg/L were observed in *pucuk paku*, *ulam pegaga* and *ulam raja.* Different with Ca, high average value were obtained which were 0.753 mg/L, 1.000 mg/L, and 0.905 mg/L in *pucuk paku, ulam pegaga,* and *ulam raja* respectively. The concentration of metals in all samples were below the PTWI value and the correlation coefficient (R^2) over 0.995 were obtained. Therefore, all three samples of *ulam* were fit for human consumption.