

**Fe, Mn, Ni, Pb AND Zn POLLUTION OF SURFACE WATER IN
SELECTED AGRICULTURAL AREAS**

NUR HAMIZAH BT AZMAN

**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**

JANUARY 2016

ACKNOWLEDGEMENTS

I would like to deeply thanks to Allah SWT for his help and kindness as He give the strength, health and time to complete my final year project and thesis on time. Without His help, this project might not be able to finish on time. I take this opportunity to express my sincere gratitude to those who has contributed some idea and give a hand in completing this final year project.

First of all I would like to express my sincere gratitude and grateful appreciation to my project supervisor, Dr Haji Mohd Zahari Abdullah @ Rafie who give opportunity and has entrusted me to do the project under his supervision and also for his advice, consistent support and guidance for all stages of this project.

Special thanks to all chemistry lecturers who have kindly assist me with the valuable information and idea regarding this project. Besides my special acknowledgment extended to my parents and family for their moral support to pursue my interest.

Last but not least, I would like to express my gratitude to all my friends and lab assistants in Faculty of Applied Science UiTM Pahang for giving me a very good cooperation during completing my lab work. Without their help, this final year project cannot be success. Thanks again to all who helped me.

Nur Hamizah Binti Azman

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	xi
ABSTRAK	xii
CHAPTER 1 INTRODUCTION	
1.1 Background of the study	1
1.2 Problem statement	4
1.3 Objectives of the study	4
1.4 Significant of the study	5
CHAPTER 2 LITERATURE REVIEW	
2.1 Heavy metals	6
2.2 Compositions in fertilizers	8
2.3 Agricultural activities related to water quality	11
2.4 Impacts fertilizer to the environment	14
CHAPTER 3 METHODOLOGY	
3.1 Materials and chemicals	18
3.1 Sampling area	18
3.3 Sample collection	20
3.4 Sample pre-treatment	20
3.5 Standard solution preparation	20
3.6 Sample analysis	21
3.7 Data analysis	21
CHAPTER 4 RESULTS AND DISCUSSION	
4.1 Calibration curve	23
4.2 Heavy metals concentration	24
4.3 Principal Component Analysis (PCA)	29
4.4 Pollution Load Index (PLI)	31

CHAPTER 5 CONCLUSION AND RECOMMENDATION	34
REFERENCES	36
APPENDICES	40
<i>CURRICULUM VITAE</i>	43

ABSTRACT

Fe, Mn, Ni, Pb AND Zn POLLUTION OF SURFACE WATER IN SELECTED AGRICULTURAL AREAS

Nowadays water pollution has become one of the most important environmental health concerns. Water resources especially surface water need to be monitored for the benefit of the users. This study has been conducted in order to evaluate the quality of two locations of surface water, Sungai Jerik and Lubuk Ujid. Five heavy metals including Fe, Mn, Ni, Pb and Zn have been measured for their concentration in both locations. The water samples were collected using polyethylene bottle and acidified with nitric acid (HNO₃). At the laboratory, the sample were filtered and kept in a fridge. Heavy metals in all samples were determined by the Flame Atomic Absorption Spectroscopy (FAAS) and Inductively Coupled Plasma Mass Spectroscopy (ICP-MS). Result obtained for all the heavy metals was varied and the highest concentration dominated by Ni with the concentration range between 810 – 817 µg/L. Concentration of all heavy metals except Ni were lower than the guidelines recommended by the Ministry of Health (MOH) for raw water. In order to evaluate the possible sources of the metals contaminant in water sample, “multivariate analysis” was applied. The data obtained in this study strongly suggest that the existence of Fe, Zn, Pb and Ni were closely related to the anthropogenic activities. It is expected that agricultural activities is part of the contributors. Heavy metals concentration in surface water should be continuously monitored to prevent the environmental problem become worse. For further analysis, supposed to be increased the number of sampling locations and also varies the type of heavy metals to be detected.