

**DETERMINATION OF CHLOROPHYRIFOS, LAMBDA-
CYHALOTHRIN AND CYPERMETHRIN IN PEDU LAKE**

by

HERMAWATI BINTI TAMBENG

Under the supervision of

Prof.Madya Lee Kok Kheng

Submitted in partial fulfillment of the requirement for
the Bachelor of Science(Hons.) in Applied Chemistry.

Faculty of Applied Sciences

Universiti Teknologi MARA

Shah Alam

October 2000

ACKNOWLEDGEMENT

In the name of Allah, the Most Beneficent, the most Merciful.

I would like to express my sincere gratitude to my supervisor, Profesor. Madya Lee Kok Kheng, and to my co-supervisor, Dr.Cheah Uan Boh and Pn Zarila for their guidance and patience in supervising this project.

I would also like to extend my thanks to the research officer of Pesticide department, MARDI, Lim Teck Poi, Lim Kim Pheng, Pn Siti, Ma, Ngan and Pn. Jamiah and all the staffs of the department for their professional assistance and concern in this project.

Last but not least, a special thanks to my parents, my best friend; Lin, Lailah, Hanis, Murshu and also my classmates for their support and encouragement during of my studies. May Allah bless us and lead us to a better way of life.

ABSTRACT

DETERMINATION OF CHLOROPHYRIFOS, LAMBDA-CYHALOTHRIN AND CYPERMETHRIN IN PEDU LAKE

By:

HERMAWATI BT.TAMBENG

October 2000

This project is carried out to determine the concentrations of chlorophyrifos, lambda-cyhalothrin and cypermethrin in the water of Pedu Lake, Kedah and also to recommend the correct dosage of pesticide for the golf course. All the pesticides were analyzed by gas chromatography. The results obtained indicate a good recovery with percentages of 109-110 %, 45-88 % and 101-103 % for chlorophyrifos, lambda cyhalothrin and cypermethrin respectively. The detection limits of the methods were calculated to be 0.002 ng/ml for chlorophyrifos, 0.172 ng/ml for lambda-cyhalothrin and 0.068 ng/ml for cypermethrin. It can be concluded that the insecticides did not contaminate the water of Pedu Lake since their concentrations were found to be below the detection limit and the MRL (Maximum Residue Limit) of 0.1 ng/ml as recommended by European Union.

TABLE OF CONTENT

	PAGE
ACKNOWLEDGEMENT	i
ABSTRACT	ii
TABLE OF CONTENTS	iii
LIST OF FIGURE	vi
LIST OF TABLE	vii
CHAPTER 1 :INTRODUCTION	1
CHAPTER 2 : LITERATURE REVIEW	4
2.1 Pathway of pesticide in the environment	4
2.2 Source of pesticide in water	4
2.3 Pollution of water by pesticide	5
2.3.1 Effect of pesticide on aquatic fauna	5
2.3.2 Effect of pesticide on human	5
2.4 Pesticide in the body	6
2.4.1 Oral exposure	6
2.4.2 Dermal exposure	6
2.4.3 Inhalation exposure	7
2.5 Toxicity	8
2.5.1 Acute Toxicity	9
2.5.2 Acute Toxicity Measure	10
2.5.3 Chronic Toxicity	11
2.5.4 Chronic Toxicity Measure	11
2.5.5 Carcinogenesis (ocogenesis)	12
2.5.6 Tetratogenesis	12
2.5.7 Mutagenesis	12
2.5.8 Reproductive Toxicity	13
2.5.9 Chronic Toxicity Testing	13
2.5.10 Label Identification of Acute and Chronic Toxicity	13

2.6	Safety factor	14
2.7	Dose response	15
2.8	Properties of pesticide	16
2.8.1	Persistence	16
2.8.2	Volatility	16
2.8.3	Solubility	17
2.9	Chlorophyrifos	17
2.9.1	Characteristic of chlorophyrifos	17
2.9.2	Properties	18
2.9.3	Uses	18
2.9.4	Toxicology	18
2.10	Cypermethrin	19
2.10.1	Characteristic of cypermethrin	19
2.10.2	Properties	20
2.10.3	Uses	20
2.10.4	Toxicology	21
2.11	Lambda-cyhalothrin	21
2.11.1	Characteristic of lambda-cyhalothrin	22
2.11.2	Properties	22
2.11.3	Uses	22
2.11.4	Toxicology	23
2.12	Pesticide treatment technology	23
2.12.1	Action of chlorine, chlorine peroxide and permanganate	23
2.12.2	Action of activated carbon	24
CHAPTER 3 : METHODOLOGY		25
3.1	Apparatus	25
3.2	Reagent	25
3.3	Sampling	26
3.4	Analytical method	26
3.4.1	Analysis of chlorophyrifos	26
3.4.2	Analysis of lambda-cyhalothrin and cypermethrin	27