

**AQUATIC PLANTS AS BIOINDICATOR FOR WATER
POLLUTION**

NUR ATHIRAH BINTI MAZLAN

**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science (Hons.) Biology
In The Faculty of Applied Sciences
Universiti Teknologi MARA**

JANUARY 2017

ABSTRACT

AQUATIC PLANTS AS BIOINDICATOR FOR WATER POLLUTION

Water is one of the important substance that is needed by living organisms. Therefore, water pollution should be prevented. Bioindicator is consider as an animal or plants which accumulate contaminants in their tissue and organs from their surroundings. The objectives of this study were to determine the quality of water sample based on pH, DO and BOD, to investigate the potential of aquatic plants as bioindicator for water pollution and to determine the cytotoxicity effect of selected plants. The water samples were collected from three different rivers nearby Jengka's Town. Both aquatic plants were collected from the pond in UiTM. The DO values were determined first to get the BOD values for water quality determination. The morphology of plants was measured based on qualitative and quantitative parameter. For cytology study, histology technique was used to determine the cytotoxicity effect of selected aquatic plants in polluted water samples. *Limnocahris flava* and *Ipomea aquatica* were aquatic plants used in this study. The result showed water sample from Jengka's River had higher BOD value which was 2.156 mg/L. For the pH, Jengka's River also got higher value which indicate less acidity. The morphology of *Limnocharis flava* and *Ipomea aquatica* does showed some changes in term of stem and root diameter, leaves counting and colour of leaves and roots, and of. The number of chromosome for *Limnocharis flava* for treatment A was $2(n) = 12$ and treatment C was $2(n) = 20$. For *Ipomea aquatica*, treatment B and C, the number of chromosome were $2(n) = 38$ and $2(n) = 14$ respectively. The number of chromosome differ to theory due to the composition in the water treatment. As conclusion, *Limnocharis flava* showed excellent potential compared to *Ipomea aquatica* as a bioindicator for water pollution.

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	viii
ABSTRACT	x
ABSTRAK	ix
CHAPTER 1: INTRODUCTION	
1.1 Background Study	1
1.2 Problem Statement	2
1.3 Significance of the Study	3
1.4 Objectives of the Study	3
CHAPTER 2: LITERATURE REVIEW	
2.1 Introduction to Water	4
2.2 Bioindicator	7
2.2.1 <i>Ipomea aquatica</i>	9
2.2.2 <i>Limnocharis flava</i>	10
2.3 Histological Study	12
2.3.1 Sample and treatment	12
2.3.2 Cytogenetic study	13
CHAPTER 3: METHODOLOGY	
3.1 Materials	17
3.1.1 Raw materials	17
3.1.2 Chemicals	17
3.1.3 Apparatus	18
3.2 Methods	18
3.2.1 Water collection	18
3.2.2 Dissolved oxygen (DO)	19
3.2.3 Biochemical Oxygen Demand (BOD)	20
3.2.4 pH	21
3.2.5 Plant collection	22
3.2.6 Growing plants in water sample	22
3.2.7 Histological study	23
3.2.8 Chromosome identification	24

CHAPTER 4: RESULT AND DISCUSSION	
4.1 Water testing	25
4.2 Morphology of aquatic plants	27
4.2.1 <i>Limnocharis flava</i>	27
4.2.2 <i>Ipomea aquatica</i>	34
4.3 Chromosome determination of aquatic plants	40
4.3.1 <i>Limnocharis flava</i>	40
4.3.2 <i>Ipomea aquatica</i>	44
4.4 Experimental problem	47
CHAPTER 5: CONCLUSION AND RECOMMENDATIONS	49
CITED REFERENCES	51
APPENDICES	55
CURRICULUM VITAE	57

LIST OF TABLES

TABLE	TITLE	PAGE
2.1	Water index quality	5
2.2	Normal composition of untreated domestic wastewater	5
2.3	Odorous compound associated with untreated wastewater	6
4.1	pH of water sample from three differences river	25
4.2	DO and BOD reading from three difference water sample	26
4.3	Leaves counting of <i>Limnocharis flava</i> with different water samples	28
4.4	Colour changes of leaves <i>Limnocharis flava</i> with different water samples	29
4.5	Stems diameter of <i>Limnocharis flava</i> with different water samples	30
4.6	Growth performance of <i>Limnocharis flava</i> with different water samples	31
4.7	Colour changes of roots <i>Limnocharis flava</i> with different water samples	31
4.8	Roots texture of <i>Limnocharis flava</i> with different water samples	33
4.9	Leaves counting of <i>Ipomea aquatica</i> with different water samples	35
4.10	Colour changes of leaves <i>Ipomea aquatica</i> with different water samples	35
4.11	Stems diameter of <i>Ipomea aquatica</i> with different water samples	36
4.12	Growth performance of <i>Ipomea aquatica</i> with different water samples	37