

**ZOOPLANKTON COMPOSITION ANDA WATER QUALITY
ASSESSMENT OF INANAM-LIKAS RIVER BASIN (ILRB),
KOTA KINABALU, SABAH**

MARYSIA THECLA DENISIUS

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

JULY 2018

ACKNOWLEDGEMENTS

First of all, I am grateful to God Almighty for making me strong and patient throughout the completion of this project. Next, I am also grateful to both my parents and each of my family members for their unending supports in terms of moral and financial supports. These supports have made me possible to complete this project.

In the other hand, I would like to convey my heartiest gratitude towards my respected supervisor, Mr Ajimi Jawan for his sincere guidance, advices and help for completing this project. Besides that, I am deeply indebted to my other respected lecturers and coursemates for their invaluable help in preparing this thesis. Their encouragement were a great help throughout the completion of this research work.

Last but not least, I am very thankful to the laboratory assistants, Mr. Hanafi, Mr. Mohammad Sufri and Mr. Amzah Jaafar for their constant help in preparing and lending apparatus and materials I needed for my sample collecting sessions and especially during my entire time in doing my lab work.

Once again, Thank You!

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	ix
ABSTRACT	x
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.2 Problem statement	3
1.3 Significance of study	4
1.3.1 Academics	4
1.3.2 Socials	4
1.3.3 Economies	5
1.4 Objectives of study	5
1.5 Scope of study	6
CHAPTER 2 LITERATURE REVIEW	
2.1 River basin	7
2.1.1 River basins in Sabah and Malaysia	7
2.1.1.1 Management strategy of river basin	8
2.1.2 Issues in River Basins	9
2.1.2.1 Anthropogenic activity in river basins	10
2.2 Important of physico-chemical water parameters assessment in river basin	11
2.2.1 pH	13
2.2.2 Dissolved Oxygen (DO) (mg/L)	13
2.2.3 Water temperature (°C)	14
2.2.4 Nitrate (mg/L)	15
2.2.5 Phosphate (mg/L)	15
2.3 Zooplankton as bioindicator in river basin	16
2.3.1 Zooplankton diversity in river basin	17
2.3.2 Main indicator species	18
2.3.3 Zooplankton's taxa group and characteristics	19
2.3.3.1 Rotifera	20
2.3.3.2 Copepoda	21
2.3.3.3 Cladocera	23

CHAPTER 3 METHODOLOGY	
3.1 Materials and Apparatus	25
3.1.1 Raw materials	25
3.1.2 Chemicals	25
3.1.3 Apparatus	26
3.2 Methods	28
3.2.1 Study area	28
3.2.2 Water quality	32
3.2.2.1 Sampling	32
3.2.2.2 Samples preservation and analysis	34
3.2.2.3 Data analysis	36
CHAPTER 4 RESULTS AND DISCUSSIONS	
4.1 Determination of the physical and chemical water parameter in Inanam-Likas River Basin (ILRB)	38
4.1.1 pH	40
4.1.2 Dissolved Oxygen (DO) and Water temperature	42
4.1.3 Nitrate and Phosphate	44
4.2 Zooplankton species identification in waterbody of Inanam-Likas River Basin (ILRB)	47
4.2.1 Identified species	47
4.2.2 Species Diversity	61
4.3 Evaluation of water quality status by zooplankton species	62
4.3.1 Comparison of water quality assessment of ILRB using water quality pysico-chemical parameters and zooplankton species	66
CHAPTER 5 CONCLUSION AND RECOMMENDATION	66
CITED REFERENCES	70
APPENDICES	76
CURRICULUM VITAE	83

ABSTRACT

ZOOPLANKTON COMPOSITION & A WATER QUALITY ASSESSMENT OF INANAM-LIKAS RIVER BASIN (ILRB), KOTA KINABALU, SABAH

ILRB is an urban and industrial area, where rapid development occurs. These situations make it vulnerable to pollution and affect the water quality there. So, few parameters and zooplankton species were determined to indicate the river's water condition. The study was carried out to determine the water quality status of Inanam-Likas River Basin (ILRB) by using physico-chemical parameters and zooplankton as bio-indicators. Sampling activities were done between the months of January to March 2018. Water samples collected from five stations along ILRB with each station consist of three replicates. The five stations were namely Mari-mari Cultural Village, Kg. Kobuni, Kg. Ulu Kionsom, Kolombong and Kg. Bangka-bangka, Likas. For the determination of physico-chemical level, methods involved were on-site analysis using portable pH meter and Dissolved Oxygen meter and laboratory analysis using DR2800 spectrophotometer. For zooplankton sampling, a 53 μm zooplankton net was used to filter river's water to get the organisms and preserved with Lugol's iodine solution. From this study, the results shown physico-chemical parameters that namely pH (7.23 - 8.15), dissolved oxygen (6.96 - 8.89) mg/L, water temperature (25.07 - 29.63) °C were within the standard parameters range except nitrate (0.04 - 0.77) mg/L and phosphate (0.08 - 1.08) mg/L. In the other hand, there are 14 species of zooplankton identified in the ILRB. The species were found from two main taxa group of zooplankton such as phylum Rotifera and subphylum crustacea. Meanwhile, the Shannon-Wiener Diversity Index (H') shows that Kg. Bangka-bangka, Likas have the highest H' which was 1.4952 while the lowest was at Mari-mari Cultural Village with $H' = 0.9986$. A zooplankton diversity value should increase in a less polluted and decrease in a polluted environment. However, the value calculated for zooplankton species diversity is high in a polluted station which was station 5 which is more polluted rather than in station 1. This maybe due to growth of species that have high tolerance towards a harsh change in the environment. Lastly, from the analysis of species indicators, there were more pollutant indicators than non-pollutant indicators found. This may due to area such as the industrial sites at Kolombong which triggered the growth of the species. The results indicated that ILRB has poor water quality.