LP 16 FMSM 1 2007 LP 16 FMSM 1 2007



1100054047
Fecal contamination in mengabang waters, Kuala Terengganu, Terengganu / Indra Farid Idris.



#### PERPUSTAKAAN SULTANAH NUR ZAHIRAH UNIVERSITI MALAYSIA TERENGGANU (UMT) 21030 KUALA TERENGGANU

 1030 KUALA TERENGGAI	NU .
1000540	47

l ihat ophalah

KIAM RALUK Perpustakaan Sultanah Nur Zahirah Unt

## FECAL CONTAMINATION IN MENGABANG WATERS, KUALA TERENGGANU, TERENGGANU

By

**Indra Farid Idris** 

Research Report submitted in partial fulfillment of the requirements for the degree of Bachelor of Science (Marine Biology)

Department of Marine Science
Faculty of Maritime Studies and Marine Science
UNIVERSITI MALAYSIA TERENGGANU
2007



### JABATAN SAINS MARIN FAKULTI PENGAJIAN MARITIM DAN SAINS MARIN UNIVERSITI MALAYSIA TERENGGANU

### PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk 'Fecal Contamination in Mengabang Waters, Kuala Terengganu, Terengganu' oleh Indra Farid Bin Idris No. Matrik UK10230 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukan kepada Jabatan Sains Marin sebagai memenuhi sebahagian daripada keperluan memperolehi ijazah Sarjana Muda Sains Biologi Marin, Fakulti Pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

Disahkan oleh:

Penyelia utama

Nama: Tengku Fara Kamilia Bt. Tengku Mohd Kamil.

Cop rasmi:

Tarikh: 9/5/2007

YM TENGKU FARA KAMILIA TG MOHD KAMIL

Pensyarah Jabatan Sains Marin Fakulti Pengajian Maritim dan Sains Marin Universiti Malaysia Terengganu (UMT)

#### **ACKNOWLEDGEMENTS**

I would like to congratulate myself upon completing this research paper. It has been a long journey since I first started this project, gone through harsh times too. Thanks to Universiti Malaysia Terengganu which has funding this project, all goes well in the end. Not forgetting my conscious project supervisor, Tengku Fara Kamilia Tengku Mohd. Kamil that always support me back in progressing further and further till this paper complete and Professor Law Ah Theem for his guidance.

This paper shows my appreciation those who had been a helping hand during the sampling times, especially Mohd. Khairul Azwan and Mohd. Nazri Nahar. This paper carries the symbol of my gratefulness to Miss Mardiah Hayati Yahya our science officer, Mr. Che Mohd Zan our lab assistant, Mr. Rusli our SCUBA lab assistant, Mr. Sainol our science officer, FASM's lab assistant Miss Zarinawati and those names that did not mention here. Best of all, I would acknowledge Miss Aziana that always been there for me when I need her the most and my parents that I love so much. Thanks for all.

# TABLE OF CONTENTS

Contents	Page
ACKNOWLEDGEMENTS	
TABLE OF CONTENTS	
LIST OF FIGURES	v
LIST OF TABLES	vi
LIST OF APPENDIX	vii
ABBREVIATION	x
ABSTRACT	xi
ABSTRAK	
CHAPTER 1 INTRODUCTION	1
1.1 Objectives	3
CHAPTER 2 LITERATURE REVIEW	4
2.1 Sewage Contamination	4
2.2 Microorganisms in Sewer Waste	
2.3 Detection of Fecal Contamination	
2.4 Sewage Treatment	
2.5 Water Quality and Bacterial Standards	
2.6 Sewage Waste and Human	
2.7 Threats to Mengabang Estuary	

CHAPTER 3	METHODOLOGY	18
3.1 Sampling location		18
3.2 Medium preparations		20
3.3 Field procedures		21
3.4 Sample analysis		21
3.5 Bacteria sterilizat	ions	22
CHAPTER 4	RESULTS	23
4.1 Data Analysis		23
4.2 Fecal coliform M	PN/ 100ml	26
CHAPTER 5	DISCUSSION	28
5.1 Water Monitoring	g Activities in Malaysia	28
5.2 Factors influencing coliform count in Mengabang		29
5.3 The Mengabang v	water class	32
CHAPTER 6	CONCLUSION	33
REFERENCES		34
APPENDIX		40
CUDDICH IM VITAE		40

# LIST OF FIGURES

FIGU	JRES	PAGE
3.1	Sampling Map taken using Google Earth system (2005)	18
4.1	Fecal coliform MPN/ 100ml of all stations	27

## LIST OF TABLES

TABLES		PAGE
2.1	Interim National Water Quality Standards for Malaysia	13
4.1	Raw data according to sampling stations	24
4.2	One-way ANOVA results according to sampling stations	24
4.3	Raw data according to sampling weeks	25
4.4	One-way ANOVA results according to sampling weeks	25
4.5	Fecal coliform MPN/ 100ml of all stations according to week	27

# LIST OF APPENDIX

APPE	NDIX	PAGE
1	Water parameters and fecal coliform MPN/ 100ml data obtained during sampling	g 40
2	Most Probable Number Table (in MPN/100 mL) taken from Law (unpublished).	41
3	Sampling Location at Mengabang Telipot estuary.	42
4	GPS location data on a GPS system.	41
5	Left test tube has negative reaction and right test tube has positive reaction.	41
6	Four positive reactions and one negative reaction in one concentration.	42
7	Water parameter data taken from a sampling station with YSI meter model 556 MPS.	42
8	An uncontaminated test tube filled with EC medium, capped with cotton and wrapped with aluminum foil ready for sample analysis.	43
9	All 75 test tube with LT medium filled with water sample arranged in a uniquely design rack ready for incubation in water bath.	43
10	An inverted vial with no trapped air in a test tube filled with EC medium.	44

11	All 150 prepared test tube filled with respective medium ready to be autoclaved.	44
12	One of the sampling stations.	45
13	Among mangrove community found in Mengabang Telipot estuary.	45
14	Near the end of Mengabang Telipot estuary.	46
15	One of rack used for incubation in sample analysis.	46
16	One of autoclave machines used to sterilize prepared test tube with medium.	47
17	One of the ovens used for incubating samples filled in EC medium.	47
18	Inverted vials during drying.	48
19	Recommended sampling frequency for drinking water taken from	48

### LIST OF ABBREVIATIONS

MPN : Most Probable Number

G : gram

mg/L : milligram per Liter

ppt (‰) : parts per thousand

°C : degree Celsius

% : percentage

pH : antilog [Hydrogen concentratio

#### **ABSTRACT**

Mengabang is an estuary that is surrounded with infrastructural development may have microbial pollution in its water. Fecal coliform detection was done in Mengabang estuary to know the total coliform and *Escherichia coli* Most Probable Number (MPN) in 100ml of Mengabang waters. 5 sampling station were set up in Mengabang estuary throughout fecal coliform monitoring. Multiple Tube Fermentation standard method (APHA, 1988) was used to estimate the number of bacteria present in 100ml of water. How so ever, water parameters such as pH, dissolved Oxygen, temperature and salinity taken during sampling show no limitation. Sedimentation from nearby infrastructural developments is believed the root cause of the high coliform presence. Results show that Mengabang estuary had high fecal coliform ranged around 400 to 5000 MPN / 100ml. This suggests Mengabang water belongs to Water Class III for recreational water use with human body contact. However health concern risk still present in its waters.