

IDENTIFICATION OF BACTERIA IN WATERS OF TELUK  
KALONG, KEMAMAN, TERENGGANU

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**IDENTIFICATION OF BACTERIA IN WATERS OF TELUK KALONG,  
KEMAMAN, TERENGGANU**

**By**

**Putri Asma binti Megat Yusop**

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

**Department of Marine Science  
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**DEPARTMENT OF MARINE SCIENCE  
FACULTY OF MARITIME STUDIES AND MARINE SCIENCE  
UNIVERSITI MALAYSIA TERENGGANU**

**DECLARATION AND VERIFICATION REPORT  
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled:

**Identification of Bacteria in Waters of Teluk Kalong, Kemaman, Terengganu** By **Putri Asma binti Megat Yusop** Matric No. **UK 22528** have been examined and all errors identified have been corrected. This report is submitted to the Department of Marine Science as partial fulfillment towards obtaining the Degree **Bachelor of Science (Marine Biology)** Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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## TABLE OF CONTENTS

|   | <b>Page</b> |
|---|-------------|
| <b>ACKNOWLEDGEMENTS</b>   | ii          |
| <b>LIST OF TABLES</b>   | iii         |
| <b>LIST OF FIGURES</b>  | iv          |
| <b>LIST OF ABBREVIATIONS</b>  | v           |
| <b>LIST OF APPENDICES</b>   | vii         |
| <b>ABSTRACT</b>   | viii        |
| <b>ABSTRAK</b>  | ix          |
| <b>CHAPTER 1: INTRODUCTION</b>  |             |
| 1.1 Introduction  | 1           |
| 1.2 Significance of the study   | 5           |
| 1.3 Objectives  | 6           |
| <b>CHAPTER 2: LITERATURE REVIEW</b>   |             |
| 2.1 Microbial Oceanography  | 7           |
| 2.2 Pathogen in the sea   | 8           |
| 2.3 Role of bacteria in the ocean   | 9           |
| 2.4 Media culture and selective medium  | 11          |
| 2.5 16S rRNA (16S ribosomal RNA) cloning via PCR and bacteria<br>identification | 13          |
| 2.6 Marine pollution  | 15          |

2.7 Water discharge at Teluk Kalong 15

2.8 Importance of establishing bacteria diversity at Teluk Kalong 17

### **CHAPTER 3: METHODOLOGY**

3.1 Sampling 18

3.2 Culture media preparation 19

3.2.1 Marine Broth and Marine Agar 20

3.2.2 Thiosulfate Citrate Bile-Salt- Sucrose Agar (TCBS Agar) 20

3.2.3 Membrane Enterococcus Agar (mE Agar) 21

3.2.1 Membrane Faecal Coliform (mFC Agar) 21

3.3 Enumeration of indicator bacteria 21

3.4 Isolation of cultivable bacteria 22

3.4.1 Serial dilution 23

3.4.2 Isolation of bacteria colony 24

3.4.3 Bacteria maintenance 25

3.5 PCR (Polymerase Chain Reaction) method 25

3.6 Gel electrophoresis of PCR product 28

3.7 DNA purification and sequencing 29

3.8 Bacteria identification 30

### **CHAPTER 4 : RESULT**

4.1 Determination of indicator bacteria using selective medium 31

4.2 Isolation of bacteria 34

4.3 Identification of bacteria based on CFU morphology 37

4.4 16S rRNA cloning via PCR 40



|                               |    |
|-------------------------------|----|
| <b>CHAPTER 5 : DISCUSSION</b> | 44 |
| <b>CHAPTER 6 : CONCLUSION</b> | 55 |
| <b>REFERENCES</b>             | 56 |
| <b>APPENDICES</b>             | 62 |
| <b>CURRICULUM VITAE</b>       | 64 |

## LIST OF TABLES

|           |  | <b>PAGE</b> |
|-----------|--|-------------|
| Table 3.1 | PCR Mixture Profile                      | 26          |
| Table 3.2 | Primer Summary                           | 27          |
| Table 3.3 | PCR Program Profile                      | 27          |
| Table 4.1 | Morphology and colour of various isolate | 39          |

## LIST OF FIGURES

|               |  | <b>PAGE</b> |
|---------------|--|-------------|
| Figure 3.1    | Sampling site at Teluk Kalong  | 18          |
| Figure 3.2    | Process of serial dilution   | 23          |
| Figure 3.3    | Process of isolation of bacteria colony  | 24          |
| Figure 4.1    | CFU enumeration for the presence of indicators bacteria in<br>100 mL water samples                                   | 32          |
| Figure 4.2    | The growth of bacteria on selective medium   | 33          |
| Figure 4.3(A) | CFU enumeration after serial dilution  | 35          |
| Figure 4.3(B) | Numbers of colonies with dilution factor in all stations   | 36          |
| Figure 4.4    | Isolation of pure colonies from marine broth onto marine agar<br>represent strains of bacteria before identification | 38          |
| Figure 4.5    | PCR product at 1400 bp   | 41          |
| Figure 4.6    | The 16S rRNA sequence of <i>Halomonas aquamarina</i> isolate<br>UMT-A  | 42          |
| Figure 4.7    | The 16S Partial DNA of <i>Vibrio parahaemolyticus</i> isolate<br>UMT-B   | 43          |

## SYMBOLS AND ABBREVIATIONS

| SYMBOLS AND ABBREVIATIONS                      | FULL NAME                      |
|--|--------------------------------|
| %  | percentage                     |
| °C   | degree celcius                 |
| µm   | micrometer                     |
| µL   | microliter                     |
| 63 F   | primer 63 forward              |
| 1389 R   | primer 1389 reverse            |
| 16S rRNA                                       | 16S ribosomal ribonucleic acid |
| Cd   | cadmium                        |
| CFU  | colony forming unit            |
| DNA  | deoxyribonucleic acid          |
| dNTP   | deoxynucleoside triphosphate   |
| EtBr <sub>2</sub>                              | ethium bromide                 |
| FeC <sub>6</sub> H <sub>5</sub> O <sub>7</sub> | ferric citrate                 |
| Fe(OH) <sub>3</sub>                            | Iron hydroxide                 |
| FIB  | fecal indicator bacteria       |
| g  | gram                           |
| g/L  | gram per liter                 |
| Kb   | kilo base pair                 |
| MA   | marine agar                    |
| mE   | membrane Enterococcus          |

|   |  |
|---|--|
| mFC   | membrane Faecal Coliform               |
| MgCl <sub>2</sub>                             | magnesium chloride                     |
| Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> | sodium thiosulfate                     |
| PCR   | polymerase chain reaction              |
| pmol  | picomol                                |
| rpm   | rotation per minute                    |
| TBE   | Tris-Borate-EDTA buffer                |
| TCBS  | Thiosulfate citrate bile-salt- sucrose |
| UV  | ultra violet                           |

## LIST OF APPENDIX

|   | <b>PAGE</b> |
|---|-------------|
| <b>APPENDIX A</b> Morphology of bacteria colony | 62          |
| <b>APPENDIX B</b> Phenotype of bacteria growth  | 63          |

## ABSTRACT

Water samples were taken along Teluk Kalong in order to study the bacteria found in these water. Industrial discharge at Teluk Kalong was sampled for three sampling site. The objectives of study are to identify bacteria population and to investigate the presence of indicator bacteria along the waste discharge point in waters of Teluk Kalong. Three type of bacteria used as indicator for the study which are *Escherechia coli*, *Vibrio sp.* and *Enterococcus sp.* Colony Forming Unit (CFU) was used to determine the number of bacteria presence at sampling site. The physical characteristic, morphology of bacteria and the number of colonies was observed and recorded. *E. coli* shows the highest number compared to others. All of these bacteria can affect health problem to human and cause public health. However, the water parameter not used as identification factor for this study. Polymerase Chain Reaction method using primer 63 F and 1389 R was used to identify type of bacteria presence in sampling site. The electrophoresis gel was stained with ethium bromide (EtBr<sub>2</sub>) and purified using Bioteke Purification Kit before send to 1<sup>st</sup> Base Sdn. Bhd. for sequencing. The identified bacteria were *Vibrio parahaemolyticus* and *Halomonas aquamarina*. *V. parahaemolyticus* can cause gastrointestinal illness while presence of *H. aquamarina* indicate that the surrounding water may contain high concentration of iron.

## ABSTRAK

Sampel air di Teluk Kalong diambil di tiga stesen untuk pengecaman bacteria di dalam air tersebut. Tujuan kajian ini dijalankan adalah untuk mengenal pasti jenis bacteria dan kehadiran bacteria pengesan di kawasan sisa industri dilepaskan iaitu di Teluk Kalong. Tiga jenis bacteria pengesan yang digunakan dalam kajian ini iaitu *Escherichia coli*, *Vibrio sp.* dan *Enterococcus sp.* Kaedah colony forming unit (CFU) digunakan dalam untuk mengetahui bilangan bacteria yang hadir dalam air di kawasan tersebut. Karakteristik fizikal dan sifat luarannya serta bilangan koloni yang tumbuh dipantau dan dikira bilangannya. *E. coli* mempunyai bilangan koloni yang tinggi (235/ 100 mL) berbanding bacteria lain. Kesemua bacteria pengesan ini boleh membahayakan kesihatan manusia. Walaubagaimanapun, data fizikal parameter tidak digunakan dalam mengenalpasti jenis bacteria ini. Kaedah Polymerase Chain Reaction menggunakan primer 63 F dan 1389 F digunakan untuk mengetahui jenis bacteria yang berada di kawasan itu. Elektroporesis gel dibersihkan dengan menggunakan ethium bromide (EtBr<sub>2</sub>) dan disucikan dengan Bioteke Purification Kit sebelum dihantar ke 1<sup>st</sup> Base Laboratories untuk mendapatkan jujukan. Bacteria yang dikenalpasti hadir adalah *Vibrio parahaemolyticus*, dan *Halomonas aquamarina*. *V. Parahaemolyticus* boleh menyebabkan sakit perut. Manakala, kehadiran *H. aquamarina* menunjukkan persekitaran air mungkin mempunyai kandungan besi yang banyak.