

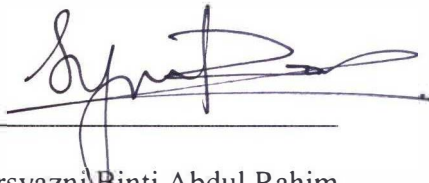
**CONFIRMATION OF *Aeromonas* sp., *Streptococcus* sp.
AND *Vibrio* sp. AS SUSPECTED PATHOGEN
TO *Amphiprioninae* sp. FROM
PUSAT IKAN HIASAN,
PORT DICKSON**

NUR SYAHIRAH BINTI SHAARI

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

JULY 2019

This Final Year Project Report entitled “**Confirmation of *Aeromonas* sp., *Streptococcus* sp. and *Vibrio* sp. as Suspected Pathogen to *Amphiprioninae* sp. From Pusat Ikan Hiasan, Port Dickson**” was submitted by Nur Syahirah Binti Shaari, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Sciences, and was approved by



Nursyazni Binti Abdul Rahim
Supervisor
B. Sc. (Hons.) Biology
Faculty of Applied Sciences
Universiti Teknologi Mara
72000 Kuala Pilah
Negeri Sembilan



Siti Norazura Binti Jamal
Project Coordinator FSG661
B. Sc. (Hons.) Biology
Faculty of Applied Sciences
Universiti Teknologi Mara
72000 Kuala Pilah
Negeri Sembilan



Dr. Aslizah Binti Mohd Aris
Head School of Biology
Faculty of Applied Sciences
Universiti Teknologi Mara
72000 Kuala Pilah
Negeri Sembilan

Date: _____

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER 1: INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	3
1.3 Significance of the Study	4
1.4 Objectives of the Study	4
CHAPTER 2: LITERATURE REVIEW	
2.1 <i>Amphiprioninae</i> sp.	5
2.1.1 Privileges of <i>Amphiprioninae</i> sp. to the ecological community	6
2.2 Waterborne Pathogenic Bacteria	6
2.2.1 <i>Aeromonas</i> sp.	7
2.2.2 <i>Streptococcus</i> sp.	7
2.2.3 <i>Vibrio</i> sp.	8
2.2.4 <i>Klebsiella pneumoniae</i>	9
2.3 Infections by Bacteria	9
2.3.1 Bacterial infections on fish	9
2.3.2 Bacterial infections on humans	12
2.3.3 Controls of bacterial infections	14
CHAPTER 3: METHODOLOGY	
3.1 Materials	16
3.1.1 Raw materials	16
3.1.2 Chemicals	16
3.1.3 Apparatus	17
3.2 Methods	17
3.2.1 Sampling and collection	17
3.2.2 Preparation of media	19
3.2.2.1 MacConkey agar	19
3.2.2.2 Blood agar	20

3.2.2.3	Thiosulfate Citrate Bile Salt Sucrose agar	20
3.2.3	Isolation of bacteria	21
3.2.3.1	Isolation of <i>Aeromonas</i> sp.	21
3.2.3.2	Isolation of <i>Streptococcus</i> sp.	21
3.2.3.3	Isolation of <i>Vibrio</i> sp.	22
3.2.3.4	Plate count	22
3.2.4	Biochemical characterization of the isolates	23
3.2.4.1	Gram staining	23
3.2.4.2	Indole test	24
3.2.4.3	Methyl red test	24
3.2.4.4	Citrate utilization test	25
3.2.4.5	Catalase test	26
3.2.4.6	Oxidase test	26

CHAPTER 4: RESULTS AND DISCUSSION

4.1	Clinical Examinations	27
4.2	Bacteria Isolation	29
4.3	Analysis of Biochemical Characterization of Isolates	33
4.3.1	Gram staining	33
4.3.2	Indole test	36
4.3.3	Methyl red test	38
4.3.4	Citrate utilization test	39
4.3.5	Catalase test	40
4.3.6	Oxidase test	42
4.4	Characterization of Isolates	45

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

CITED REFERENCES	51
APPENDICES	62
CURRICULUM VITAE	65

ABSTRACT

CONFIRMATION OF *Aeromonas* sp., *Streptococcus* sp. AND *Vibrio* sp. AS SUSPECTED PATHOGEN TO *Amphiprioninae* sp. FROM PUSAT IKAN HIASAN, PORT DICKSON

There are many types of bacteria that are present in the universe as it plays crucial roles in the ecosystem. Bacteria are able to infect both humans and animals through variety type of transmission that leads to disease especially to ornamental fish. Ornamental fish are important for maintaining the diversity of the ecosystem while giving benefits to some of the marine creatures. Despite that, the organisms are facing real pathogenic infections such as bacterial, viral, fungal and parasitic infections. *Amphiprioninae* sp. is a type of marine creatures that are highly infected by bacteria that results in high mortality rate. The example of bacteria that are infecting *Amphiprioninae* sp. directly is *Aeromonas* sp., *Streptococcus* sp. and *Vibrio* sp. The purpose of this project is to confirm the types of bacteria that caused infections to the *Amphiprioninae* sp. and characterize them through Gram staining and biochemical tests. The final results of this project shows that *Aeromonas* sp., *Streptococcus* sp. and *Vibrio* sp. are absent in both samples. The samples are not infected by any of the bacteria predicted but are infected by other types of pathogenic bacteria. At the end of this project, the bacteria that were isolated from samples is *Klebsiella pneumoniae* from family Enterobacteriaceae. The biochemical tests are producing similar results to the predicted results of *K. pneumoniae* as it will produce results of positive methyl red, citrate utilization, catalase and negative indole and oxidase test.