

HISTOPATHOLOGICAL STUDY ON THE EFFECT OF
METHANOLIC EXTRACT OF *Melaleuca cajuputi* ON
Lates calcarifer

SHAZANA SHARIR

FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU

2013

LP
38
FMSM
2
2013

9558

1100091354



LP 38 FMSM 2 2013



1100091354

Histopathological study on the effect of methanolic extract of
Melaleuca cajuputi on Lates Calcarifer / Shazana Sharir.

PUSAT PEMBELAJARAN DIGITAL SULTANAH NUR ZAHIRAH
UNIVERSITI MALAYSIA TERENGGANU (UMT)
21030 KUALA TERENGGANU

1100091354		

Lihat Sebelah

HAK MILIK
PUSAT PEMBELAJARAN DIGITAL SULTANAH NUR ZAHIRAH

**HISTOPATHOLOGICAL STUDY ON THE EFFECT OF METHANOLIC
EXTRACT OF *Melaleuca cajuputi* ON *Lates Calcarifer***

By

Shazana Sharir

**Research Report submitted in partial fulfilment 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
2013**

This thesis should be cited as:

Shazana, S. (2013). Histopathological Study on the Effect of Methanolic Extract of *Melaleuca cajuputi* on *Lates calcarifer*. Undergraduate thesis, Bachelor of Science in Marine Biology. Universiti Malaysia Terengganu. Terengganu, Malaysia.32p

No parts of this thesis may be reproduced by any mechanical, photographic, or electronic process, or in the form of phonographic recording, nor may it be stored in retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and the supervisor(s) of the project.

1100091354

UP
35
FISH
2
2013



DEPARTMENT OF MARINE SCIENCE
 FACULTY OF MARITIME STUDIES AND MARINE SCIENCE

DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled:
HISTOPATHOLOGICAL STUDY ON THE EFFECT OF METHANOLIC EXTRACT OF
Melaleuca cajuputi ON Lates calcarifer
 by SHAZANA SHARIR....., Matric No. 0K22619.....
 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.

Verified by:



Principal Supervisor

Name: DR. MARINA BT HASSAN
 Pensyarah
 Jabatan Sains Akuakultur
 Fakulti Perikanan dan Akuat-Industri
 Universiti Malaysia Terengganu
 Official stamp: 21030 Kuala Terengganu

Date: 13/6/2013



Second Supervisor

Name: DR. AHMAD SHAMSUDDIN BIN AHMAD
 Timbalan Pengarah
 Institut Bioteknologi Marin
 Universiti Malaysia Terengganu
 Official stamp: 21030 Kuala Terengganu

Date: 13/6/2013

ACKNOWLEDGEMENT

In the name of Allah, the most gracious, and merciful. I am very thankful to Him to give me the strength and courage to finish what I have just started. I am very blessed to have everyone who has helped me throughout the ups and down of the ongoing journey to obtain the sacred scroll. Special thanks to my dearest supervisor, Dr Marina Hassan that have never failed to give her support academically. I would also like to express my gratitude to all lecturers, friends, laboratories and hatchery helpers for assisting me during the time of need. Not to forget the moral, emotional and financial supports given by my mum and dad, I love you both always. For the person I could rely on, Mohd Shahrul Hafiz and last but not least, my gratitude goes to Nik Nor Aini, for always stayed and supported me. For knowledge and friendship that will last forever.

CONTENTS

ACKNOWLEDGEMENT	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF APPENDICES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER 1	
INTRODUCTION	
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Significant of Study	2
1.4 Objectives of Study	3
CHAPTER 2	
LITERATURE REVIEW	
2.1 <i>Melaleuca cajuputi</i>	4
2.2 Methanolic Extraction of <i>Melaleuca cajuputi</i>	5
2.3 The Potential of <i>Melaleuca</i> sp. as Phytomedicine	6
2.4 Fish Histopathology	7
CHAPTER 3	
METHODOLOGY	
3.1 Plant Material Selection and Preparation of Crude Methanolic Extract	9
3.2 Acclimation of Fish, <i>Lates calcarifer</i>	10
3.3 Range Finding Test	10
3.4 Determination of <i>Melaleuca cajuputi</i> 96h LC ₅₀	10
3.5 Acute Toxicity Test	11
3.6 Histopathological Study	11

CHAPTER 4	
RESULT	
4.1 96h LC ₅₀ of <i>Melaleuca cajuputi</i> Extract	12
4.2 Histopathological Observation of <i>Melaleuca cajuputi</i> extract on Gills	13
CHAPTER 5	
DISCUSSION	
5.1 96h LC ₅₀	17
5.2 Gill Histopathology	19
CHAPTER 6	
CONCLUSION AND RECOMMENDATION	22
REFERENCES	23
APPENDICES	33
Appendix A	33
Appendix B	34
Appendix C	35
CURRICULUM VITAE	36

LIST OF TABLES

TABLES		PAGE
4.1	Survival Rate of <i>Lates calcarifer</i> in determining the 96h LC50 of <i>Melaleuca cajuputi</i>	12

LIST OF FIGURES

FIGURES		PAGE
4.1	Figure of control group of <i>Lates calcarifer</i>	14
4.2	Figure of <i>Lates calcarifer</i> gill treated with 40mg/L <i>Melaleuca cajuputi</i> concentrations at 96 hours.	14
4.3	Figure of <i>Lates calcarifer</i> gill treated with 60mg/L <i>Melaleuca cajuputi</i> at 24 hours.	15
4.4	Figure of <i>Lates calcarifer</i> gill treated with 60mg/L of <i>Melaleuca cajuputi</i> at 48 hours.	15
4.5	Figure of <i>Lates calcarifer</i> gill treated with 20mg/L of <i>Melaleuca cajuputi</i> at 24 hours.	16
4.6	Figure of <i>Lates calcarifer</i> gill treated with 40mg/L of <i>Melaleuca cajuputi</i> at 24 hours.	16

LIST OF APPENDICES

APPENDICES		PAGE
A	Tissue Processing Protocol	33
B	Hematoxyline and Eosin Staining Protocol	34
C	Result of LC ₅₀ from Multi Factor Probit Analysis	35

LIST OF ABBREVIATIONS

°C	- Degree Celcius
%	- Percent
rpm	- Rotation per minute
kPa	- kilo Pascal
96h LC ₅₀	- 96 hours 50% Lethal Concentration
mg/L	- milligram per Litre
mm	- millimetre
µm	- micron metre
H&E	- Haematoxylin and Eosin
DO	- Dissolved oxygen
h	- Hour
x	- times

ABSTRACT

Melaleuca cajuputi has been long used traditionally to treat ailments and its medicinal properties are the important ingredient in producing Cajaput oil. It has been tested to have anti-inflammatory and anti fungi properties and are vary potential in treating aquatic organism. Aquaculturists have been switching to use herbal piscicides instead of the synthetic piscicide which could pose hazard towards the cultured animal and also human. Thus, in order to determine the toxicity of *Melaleuca cajuputi*, acute toxicity of *Melaleuca cajuputi* were done towards *Lates calcarifer*. The 96h LC50 obtained was 102.06mg/L. Fishes has been exposed to lower dosage of LC50 (20mg/l, 40mg/L and 60mg/L) for 96 hour. Minor oedema, hypertrophy and haemorrhage at concentration 60mg/L were observed on the gill. The application of 40mg/L of *Melaleuca cajuputi* is recommended to be used as a treatment to cultured fish.

ABSTRAK

Kajian Histopatologi Keatas Kesan Ekstrak Metanol *Melaleuca cajuputi* Terhadap *Lates Calcarifer*

Penggunaan *Melaleuca cajuputi* untuk merawat penyakit secara tradisional telah lama digunakan oleh masyarakat terdahulu. Kandungan komponen perubatannya adalah ramuan penting dalam menghasilkan minyak cajuput atau minyak putih. Ia telah diuji secara klinikal untuk mengandungi bahan anti-radang dan anti-fungi dan berpotensi untuk merawat organism akuatik. Penternak Akukultur telah berubah daripada menggunakan racun pembunuh sintetik yang membahayakan ternakan serta manusia kepada racun pembunuh berasaskan herba. Oleh itu, untuk menentukan tahap keracunan *Melaleuca cajuputi*, ujian toksisiti akut terhadap *Lates calcarifer* telah dijalankan. Nilai 96h LC50 yang diperolehi adalah 102.06mg/L. Ikan telah didehakan kepada dos yang lebih rendah daripada LC50 ((20mg/l, 40mg/L and 60mg/L) selama 96 jam. Kepekatan *Melaleuca cajuputi* 60mg/L menunjukkan pembengkakan, hypertrophy dan pendarahan pada kepekatan pada insang ikan. Penggunaan *Melaleuca cajuputi* pada kepekatan 40mg/L adalah disarankan untuk rawatan kepada ikan akuakultur.