DETERMINATION OF SELECTED METALS IN FISH SPECIES IN UNIVERSITI MALAYSIA TERENGGANU (UMT) CREEKS

NOR ASYURAH BINTI KAFI

SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU

2014

Determination of selscted metals in fish species in Universiti Malaysia Terengganu (UMT) creeks / by Nor Asyurah Kafi.

Lihat Sebelah

DETERMINATION OF SELECTED METALS IN FISH SPECIES IN UNIVERSITI MALAYSIA TERENGGANU (UMT) CREEKS

By

Nor Asyurah binti Kafi

Research Report submitted in partial fulfillment of

the requirements for the degree of

Bachelor of Science (Marine Biology)

School of Marine Science and Environment

UNIVERSITI MALAYSIA TERENGGANU

2014

SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU

DECLARATION AND VERIFICATION REPORT

FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled **Determination of Selected Metals in Fish Species in Universiti Malaysia Terengganu (UMT) Creeks** by **Nor Asyurah binti Kafi**, Matric No. **UK25994** have been examined and all errors identified have been corrected. This report is submitted to the School of Marine Science and Environment as partial fulfillment towards obtaining the Degree of **Bachelor of Science (Marine Biology)**, School of Marine Science and Environment, Universiti Malaysia Terengganu.

Verified by:

.....

First Supervisor

Name: DR. ONG MENG CHUAN

Official stamp: Lecturer
School of Marine Science and Environment
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Date: 11-06-2014

.....

Second Supervisor

Name: DR. HASRIZAL BIN SHAARI

Official stamp: Lecturer
School of Marine Science and Environment
Universiti Malaysia Terengganu
21030 Kuala Terengganu

Date: 16-6-2014

*(*Insert if applicable)*

Notes: Retype this Form into your report with the Page Format and full details.

ACKNOWLEDGEMENTS

The author would like to thanks for those who helping, encourage and support this project especially my supervisors; Dr. Ong Meng Chuan and Dr. Hasrizal bin Shaari. Special thanks the author dedicated for author's friends and team members who helping and struggle together to make this project run smooth. The author also would like to thanks the laboratory of Universiti Malaysia Terengganu for their assistance in the field and analysis of samples.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

UMT	-	Universiti Malaysia Terengganu
SRM	-	Standard Reference Material
mm	-	millimeters
$\mu g\ g^{-1}$	-	microgram per gram
g	-	grams
HN	-	*Hemibagrus nemurus*
LC	-	*Lates calcarifer*
LA	-	*Lutjanus argentimaculatus*
CM	-	*Carangoides malabaricus*
MC	-	*Megalops cyprinoides*
CC	-	*Chanos chanos*
CS	-	*Channa striata*
OS	-	*Oreochromis* sp.
TJ	-	*Terapon jarbua*
AT	-	*Anabas testudineus*
GE	-	*Gerres erythrourus*
Cr	-	Chromium
Cu	-	Copper
Zn	-	Zinc
Cd	-	Cadmium
Pb	-	Lead

LIST OF APPENDICES

ABSTRACT

A study was conducted to determine the concentration of selected heavy metals (Cr, Cu, Zn, Cd, Pb) in tissue of living organism in Universiti Malaysia Terengganu (UMT) creeks. Fish is use as biomonitor to access the pollution level in this area. The concentration of selected metals were determined in 11 fish species; *Hemibagrus nemurus*, *Carangoides malabaricus*, *Megalops cyprinoides*, *Gerres erythrourus*, *Channa striata*, *Anabas testudineus*, *Terapon jarbua*, *Oreochromis* sp., *Lates calcarifer*, *Lutjanus argentimaculatus* and *Chanos chanos*. The concentration was measured by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) by using dry sample of fish tissues (muscle, gills, liver, stomach) and the pollution were access by calculating the Pollution Load Index (PLI). Fish muscle has high Cr (20.4 $\mu g\ g^{-1}$) while gills has high Zn (36.4 $\mu g\ g^{-1}$). Zn also high in fish liver (40.80 $\mu g\ g^{-1}$) and fish stomach has high Cr (33.8 $\mu g\ g^{-1}$). *Chanos chanos* has high Pb (2.12 $\mu g\ g^{-1}$) and Cu (26.0 $\mu g\ g^{-1}$) in its stomach and liver respectively. *Oreochromis* sp. has high Cr (33.8 $\mu g\ g^{-1}$) and Zn (36.4 $\mu g\ g^{-1}$) in its stomach and gills respectively. *Anabas testudineus* has high Cd (0.59 $\mu g\ g^{-1}$) in its liver. The metals concentration in fish tissues has weak relationship with fish length. The pollution level of UMT creeks is considered as no pollution load with PLI value less than 0.193. The concentration of selected metals in fish tissues is in decending order Zn > Cr > Cu > Pb > Cd.

PENENTUAN LOGAM BERAT TERPILIH DALAM SPESIS IKAN DALAM ANAK SUNGAI DI UNIVERSITI MALAYSIA TERENGGANU (UMT)

ABSTRAK

Kajian dijalankan untuk menentukan kepekatan logam berat terpilih (Cr, Cu, Zn, Cd, Pb) di dalam tisu benda hidup di anak sungai di Universiti Malaysia Terengganu (UMT). Ikan digunakan sebagai biopemantau untuk mengenalpasti tahap pencemaran di kawasan ini. Kepekatan logam berat yang terpilih ditentukan dalam 11 spesis ikan; *Hemibagrus nemurus*, *Carangoides malabaricus*, *Megalops cyprinoides*, *Gerres erythrourus*, *Channa striata*, *Anabas testudineus*, *Terapon jarbua*, *Oreochromis* sp., *Lates calcarifer*, *Lutjanus argentimaculatus* dan *Chanos chanos*. Kepekatan tersebut disukat menggunakan 'Inductively Coupled Plasma Mass Spectrometry' (ICP-MS) dengan menggunakan sampel kering bagi tisu-tisu ikan (otot, insang, hati, perut) dan tahap pencemaran dikira menggunakan 'Pollution Load Index' (PLI). Otot ikan terdapat tinggi kandungan Cr (20.4 $\mu g\ g^{-1}$) manakala insang mempunyai tinggi kandungan Zn (36.4 $\mu g\ g^{-1}$). Zn juga tinggi dalam hati ikan (40.80 $\mu g\ g^{-1}$) dan perut ikan mempunyai tinggi Cr (33.8 $\mu g\ g^{-1}$). *Chanos chanos* mempunyai tinggi kandungan Pb (2.12 $\mu g\ g^{-1}$) di dalam perut dan Cu (26.0 $\mu g\ g^{-1}$) di dalam hati. *Oreochromis* sp. mempunyai tinggi kandungan Cr (33.8 $\mu g\ g^{-1}$) di dalam perut dan Zn (36.4 $\mu g\ g^{-1}$) di dalam insang. *Anabas testudineus* mempunyai tinggi kandungan Cd (0.59 $\mu g\ g^{-1}$) di dalam hati. Kepekatan logam di dalam tisu ikan mempunyai perkaitan yang lemah dengan panjang ikan. Tahap pencemaran di anak sungai UMT dianggap tiada beban pencemaran dengan nilai PLI kurang daripada 0.193. Kepekatan logam berat terpilih di dalam tisu ikan adalah dalam turutan menurun; Zn > Cr > Cu > Pb > Cd.