

UNIVERSITI TEKNOLOGI MARA

**HEAVY METAL CONCENTRATION OF
FRESHWATER FISH ON AQUACULTURE
ACTIVITY AT PAHANG RIVER AND ITS
POTENTIAL HEALTH RISK**

SYAHIDAH BINTI MAHAUDIN

Project submitted in fulfillment of the requirements for
the degree of
Bachelor in Environmental Health and Safety
(Hons.)

Faculty of Health Sciences

July 2018

DECLARATION BY STUDENT

Project entitled “Heavy Metal Concentration of Freshwater Fish on Aquaculture Activity at Pahang River and Its Potential Health” is a presentation of my original research work. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due reference to literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Project Supervisor, Mr. Nasaruddin Abd Rahman. It has been submitted to the Faculty of Health Sciences in partial fulfilment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

Student’s signature:

.....

(Syahidah Binti Mahaudin)

2014683646

951220-14-6284

Date:

ACKNOWLEDGEMENT

In the name of Allah, The Most Gracious, The Most Merciful

Assalamualaikum and all praise to Allah S.W.T The Supreme Lord of the Universe, the Most Gracious and Merciful. A peace and blessing to our Nabi Muhammad S.A.W., all prophets and their families. Alhamdulillah and thank you God for the strength, health and determination to be granted for me in completing my study.

I am deeply grateful and thousands of thanks and love to my parents Mr. Mahaudin Bin Abd Rahman and Mrs. Maheran Binti Mat Noor for their prayer, support as well as being a backbone to encourage me to complete what I have started. My deepest gratitude and appreciation to my dearest supervisor, Mr. Nasaruddin Bin Abd Rahman for his moral support, guidance, ideas and encouragement along the journey from the beginning till the end of this study. Not to forget, I would like to thank all the lecturers in Department of Environmental Health and Safety, Faculty of Health Sciences who always share their thoughts, knowledge and advice throughout my study in UiTM Puncak Alam. Only God can reward all of you with goodness.

My sincere thanks and appreciation goes to all the staff from the department and laboratory who gave their full cooperation and assisted me in many ways throughout my study. A special thanks to my dearest friend, Mr. Zulhelman Bin Zulkifli for his constant encouragement through thick and thin of my study. Million thanks also I wish to my classmate who supported and motivated me and stood beside me while completing my study. May our friendship lasts forever. Lastly, I would like to thank everyone who involved directly and indirectly in this study. Thank You.

TABLE OF CONTENTS

TITLE	
DECLARATION BY STUDENT	ii
INTELLECTUAL PROPERTIES	iii
APPROVAL BY SUPERVISOR	v
ACKNOWLEDGEMENT	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	xi
LIST OF FIGURES	xii
LIST OF EQUATIONS	xiii
LIST OF ABBREVIATIONS	xiv
ABSTRACT	xv
ABSTRAK	xvi
CHAPTER 1: INTRODUCTION	1
1.1 Background information	1
1.2 Problem statement	4
1.3 Research objectives	5
1.3.1 General Objective	5
1.3.2 Specific Objectives	5
1.4 Research Hypothesis	5
1.5 Study Justification	6
1.6 Conceptual Framework	7

ABSTRACT

Heavy metal in fish is one of the concern in food safety especially on aquaculture activity of freshwater fish as it may lead to a lot of adverse health effect to human. *Pangasius hypophthalmus* or Patin fish is a popular fish among people as being trademark for Temerloh District. This study aims to determine the concentration of lead (Pb), cadmium (Cd), zinc (Zn) and copper (Cu) in water and fish and the physicochemical parameters for water sample including pH, temperature, dissolve oxygen (DO) and turbidity were measured. A cross-sectional study was carried out involving thirty samples of fish and nine samples of water were taken at three sampling locations (Cage 1=Kg. Bangau Tanjung, Cage 2=Kg. Tengah and Cage 3=Kg. Lompat). Samples were analyzed by using Graphite Furnace Atomic Absorption Spectrophotometer (GFAAS) and One-way ANOVA test was used to determine the mean difference between fish in three sampling locations. The order of the heavy metal content that was found is $Zn > Pb > Cd > Cu$ in fish while $Pb > Zn > Cu > Cd$ was also observed in water which Kg. Lompat shows the highest concentration of heavy metals for both samples. All fish samples were below the permissible limit by Malaysian Food Act 1983 (Food Regulation 1985) and FAO/WHO while all water samples were below the recommended values by INWQS, 2008 respectively. Mean concentration of heavy metal in fish slightly higher than in water that called bioaccumulation process. The health risk assessment was conducted showed that Target Hazard Quotient (THQ) value for all fish were below 1 indicating no potential adverse health effect and Carcinogenic Risk (CR) for Pb, within the range of 10^{-4} to 10^{-6} as shows no risk of developing cancer to human due to consumption of Patin fish. Hence, the consumption of freshwater fish, *Pangasius hypophthalmus* from Temerloh, Pahang are safe to eat and not pose any serious threat to human.

Keywords: *Aquaculture, Heavy Metals, Pangasius hypophthalmus, Kg. Bangau Tanjung, Kg. Tengah, Kg. Lompat*