



**ASSESSMENT OF HEAVY METAL ACCUMULATION IN
DIFFERENT ORGANS OF CULTURED PANGUS (THAI) AND
TILAPIA ALONG WITH OBSERVATION OF THE ENZYMATIC
ACTIVITIES IN THOSE ORGANS**

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Roll No. : 0118/07

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Session: 2018-2019

**A thesis submitted in the partial fulfillment of the requirements for the degree of
Master of Science in Fisheries Resource Management**

**Department of Fisheries Resource Management
Faculty of Fisheries
Chattogram Veterinary and Animal Sciences University
Chattogram-4225, Bangladesh**

December 2019

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**This is to certify that we have examined the above Master's thesis and have
found that is complete and satisfactory in all respects, and that all revisions
required by the thesis examination committee have been made**

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ACKNOWLEDGEMENTS

All the praises and thanks to Allah, the Almighty, most gracious, most merciful, most benign who has enabled me to pursue my study in fisheries science successfully as well as to submit the thesis for the degree of Master of Science (MS) in Fisheries Resource Management and also pay gratitude to the Almighty for enabling and giving me enough strengths to complete my research work as well as thesis within due course of time.

I express my gratitude and indebtedness to honorable Vice-Chancellor, **Professor Dr. Goutam Buddha Das**, Professor **Dr. Mohammed Nurul Absar Khan**, Dean, Faculty of Fisheries, CVASU from the bottom of my heart for their immense administrative support to complete my research work.

I express my great appreciation to **Dr. Sk Ahmad Al Nahid**, Head and Assistant Professor, Department of Fisheries Resource Management, Chattogram Veterinary and Animal Sciences University, for his valuable and constructive suggestions during the writing of research proposal. His willingness to give his time to teach on write up scientific research proposal so generously has been very much appreciated.

I also sincerely express my thanks to my research supervisor **Sk. Istiaque Ahmed** Assistant Professor, Department of Fisheries Resource Management, Chattogram Veterinary and Animal Sciences University, Chattogram for his valuable guidance, intellectual suggestions, knowledge, patience, and time. It would never have been possible for me to complete this work without his strong support and encouragement.

I express my cordial thanks to **Mr Fahad Bin Quader**, Head and Assistant Professor, Department of Applied Chemistry and Chemical Technology, Chattogram Veterinary and Animal Sciences University, Chattogram for his unfailing support, authoritative guidance, constructive criticism, advice and continuous motivation.

I am extremely glad to take opportunity to express my heartfelt thanks and gratitude to all other respected teachers of the Faculty of Fisheries, Chattogram Veterinary and Animal Sciences University, Chattogram for their valuable teaching and continuous encouragement during the study period in fisheries.

I also expresses my thanks to lab technician Supria Biswas, Eden Dutta, Bokhtiar and also cordially thanks to all the staff members of the Aquatic Ecology laboratory for their cooperation during laboratory analysis.

It's my fortune to gratefully acknowledge the support of my friend Tania Sharmin and Zannatun Nur Popy for their support and generous care throughout the research tenure.

Finally I also expresses my heartfelt gratitude to my beloved parents Nasir Uddin and Farzana Sultana for selfless love, blessings, care, dedicated efforts, valuable prayers, continuous support during the academic life. I also expresses my thanks to my sister and brother for their support and valuable prayers during research work.

The Author

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LIST OF ABBREVIATIONS

HMs	Heavy Metals
DoF	Department of Fisheries
As, Pb, Cr	Arsenic, Lead, Chromium
ATPase	Adenosine triphosphates
ALP	Alkaline phosphatase
AAS	Atomic Absorption Spectrometry
BFRI	Bangladesh Fisheries Research Institute
NFI	National Fisheries Institute
FAO	Food and Agriculture Organization
WHO	World Health Organization
FY	Fiscal Year
SD	Standard Deviation

ABSTRACT

Heavy metal pollution in aquatic environment has emerged as a worldwide concern in recent times. The aquaculture commodities in Bangladesh are serving exclusively to supplement the country's animal protein demand. Therefore, to evaluate the safety issues in terms of heavy metal accumulation, two important aquaculture species of the country (Tilapia and Thai Pangus) were examined in this study. The concentration of heavy metals were determined by traditional tissue processing through dissection, drying and acid digestion followed by Atomic Absorption Spectrometry (AAS) analysis. In terms of organs of the investigated fishes, the heavy metals were mostly concentrated in the kidney tissues but the concentration in muscles were found to be the lowest which is indeed a positive finding as humans consume the muscles widely even though the concentration of Arsenic in muscles were recorded higher than the safety values recommended by FAO/WHO for both the cases. It has been revealed that the values recorded for Arsenic exceeded the limits in every case because the water itself used for culture may contain Arsenic particularly as the study site was a coastal basin like Chattogram along with indiscriminate use of Arsenic pesticides, large-scale industrial activities, mining operations and so-on. Fortunately, the values of other two investigated heavy metals- Lead and Chromium remained within the safety levels. The study was also intended to observe the enzymatic activities of different organs of these two fishes by following the standard procedures described in previous literatures. The ATPase activity was recorded the highest in the kidney tissues followed by the livers and gills while the lowest was observed in muscle tissues for both fishes. In case of ALP, the highest value was recorded in the livers for Pangus and in kidneys for Tilapia respectively. Likewise the ATPase activity, the lowest values for ALP activity were recorded for muscle tissues in both investigated fishes. This was mainly because the mitochondria of kidney and liver tissues are better catalyzer of enzymes than the mitochondria of muscle tissues. In conclusion, the study suggests that the source of water used for culturing these highly growing aquaculture species should be free from heavy metal pollution for ensuring public safety even though the enzymatic activities recorded in different organs are considerably aligned with the normal range.

Key words: *Heavy metals; Cultured Thai pangus & Tilapia; Investigated Organs, Alkaline phosphatase (ALP Activity) and ATPase*