



**ANALYSIS OF HEAVY METALS IN DIFFERENT
ORGANS (GILL, LIVER, KIDNEY AND MUSCLE)
OF COMMERCIALLY IMPORTANT FISH
SPECIES CAPTURED FROM CHATTOGRAM
COASTAL AREA**

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Roll No: 0118/03

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**The thesis submitted in the partial fulfillment of the requirements for the degree
of Masters of Science in Food Chemistry and Quality Assurance**

**Department of Applied Chemistry and Chemical Technology
Faculty of Food Science and Technology**

**Chattogram Veterinary and Animal Sciences University
Chattogram-4225, Bangladesh**

December 2019

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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
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The Author

DEDICATION

**DEDICATED TO MY BELOVED
PARENTS AND RESPECTED
TEACHERS**

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LIST OF ABBREVIATIONS

%	:	Percentage
SD	:	Standard Deviation
Pb	:	Lead
Cr	:	Chromium
As	:	Arsenic
Mg/Kg	:	Milligram per kilogram
MT	:	Metric Ton
PPM	:	Parts Per Million
WHO	:	World Health Organization
GDP	:	Gross Domestic Product
FAO	:	Food and Agricultural Organization
DoF	:	Department of Fisheries
AAS	:	Atomic Absorption Spectrometer
EDI	:	Estimated Daily Intake
G	:	Gram
UNEP	:	United Nations Environmental Program
µg/l	:	Microgram per liter
µg/g	:	Microgram Per gram
HNO ₃	:	Nitric Acid
p ^H	:	Amount of hydrogen ions available in a solution
NIFES	:	The National Institute of Nutrition and Seafood Research
EAA	:	Essential Amino Acid
DDT	:	Dichloro Diphenyl Trichloroethane
TSP	:	Triple Super Phosphate
IARC	:	International Agency for Research on Cancer
PTWI	:	Provisional Tolerable Weekly Intake
PTDI	:	Provisional Tolerable Daily Intake

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ABSTRACT

Chattogram is the biggest port city and also the coastal city of Bangladesh. Coastal resources provide here the opportunities to use the coast in different ways within the hazard prone environment. Pollution problem is acute here due to the stress caused by industrial and domestic effluent. The present study was carried out to evaluate whether there are any significant toxic effects of the widely exposed heavy metals on different organs of the commercially important marine fishes collected from Bengal marine bay near Chattogram city of Bangladesh. In this study, concentration of three heavy metals namely lead, arsenic and chromium were determined in four organs (gill, liver muscle and kidney) of three abundant fish species (*Herpodon nehereus*, *Pampus chinensis* and *Hilsa ilisha*). All heavy metals were determined and analyzed by Atomic Absorption Spectrophotometer. The obtained result revealed the highest concentrations of all three heavy metals were recorded in *Herpodon nehereus* which were not statistically different from those in *Pampus chinensis* and *Hilsa ilisha*. The organ wise lead concentration was recorded highest concentration in kidneys and gills of examined fishes with significant variation in muscles and liver. The scenario depicted quite differently in case of chromium where concentration in gills was found to be the highest with insignificant accumulation in other three organs. In case of Arsenic, kidneys and livers were the most exposed two organs in comparison to insignificant exposure to muscles and moderate accumulation in gills. Among all the three heavy metals, the accumulation trend of arsenic were the highest followed by lead in different examined fishes where exposure of chromium was found to be the lowest. The obtained values of arsenic accumulation were considered critical for human consumption as it exceeded minimum safe limits given by WHO and FAO but the concentration of lead and chromium were found to be safe for human consumption. The Chattogram coastal water might be highly polluted with arsenic due to effluent discharge from industries located near the sea. The values recorded from lead were increasingly approached to the safety values. Crucial steps should be taken to reduce anthropogenic discharges in the coastal water; high levels of pollution will not only affect aquatic life but will also invite socio-economic disasters.

Keywords: Heavy metals; Bay of Bengal; Fish organs; Bioaccumulation; Atomic absorption spectroscopy.