UNIVERSITI TEKNOLOGI MARA

STUDY OF THE HEAVY METALS CONCENTRATION IN THE TISSUES OF TILAPIA (*OREOCHROMIS MOSSAMBICUS*) AND CATFISH (*CLARIUS GARIEPINUS*) FROM FISH FARMS

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Thesis submitted in fulfillment
of the requirements for the degree of
Master of Science
(Chemistry)

Faculty of Applied Sciences

June 2019

ABSTRACT

Fish is consumed by humans worldwide due to its nutritional benefits. However, fish can accumulate toxic metals in its tissues and consumption of fish contaminated poses a risk to human health. Concentrations of cadmium, copper, cobalt, lead, zinc, manganese and chromium were determined in the liver, gill, muscle and skin of fish available in three different fish farms in Sarawak with different fish farming cage system which includes poly tanks, concrete tanks and earthen ponds. The two freshwater fish species, tilapia fish (*Oreochromis mossambicus*) and catfish (*Clarius gariepinus*) were studied. Fish samples were digested using concentrated HNO_3 and H_2O_2 on the hot plate and subjected to Flame Atomic Absorption Spectrophotometer for fish analysis. There were significantly differences in the concentrations of studied heavy metals between different organs and between different farms. The concentrations of metals in mg/kg were as follows: Cd: 0.058-2.250, Cu: 0.900-50.275, Co: 0.100-3.917, Pb: 0.158-55.650, Zn: 16.067-156.600, Mn 0.542-33.100 and Cr: 0.817-16.800. This study revealed that high metals concentration in both fish species was from earthen pond. Based on food safety guidelines, most of studied metals in muscle of *O. mossambicus* from all fish farms were found below the permissible limit of heavy metals in fish, indicating the tilapia fish was fit for human consumption. It is suggested that the consumption of muscle of *C. gariepinus* from all fish farms should be monitored since some metals such as cobalt and lead, exceeded the permissible food consumption limits. In profiling study of heavy metals, the concentrations pattern of most heavy metals was found high accumulation in the liver, followed by gills, and then bone, skin and lowest found in fish muscle. When both fish species exposed to heavy metals, the growth performances and organosomatic indices (HSI, KSI and SSI) decreased significantly. The histological study in *O. mossambicus* and *C. gariepinus* liver tissues confirmed the strong relationship between accumulation of studied heavy metal in the fish liver and severity of liver tissue damages. In conclusion, high heavy metals content from catfish show that *C. gariepinus* tolerates harsh environmental condition than *O. mossambicus*. Therefore, catfish is prone to heavy metal accumulation.

***Keywords*:** Heavy Metals, Tilapia Fish, Catfish, Fish Farm

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to the Almighty Allah SWT for His infinite mercy and abundant graces.

Special thank is directed to my supervisor, Dr Mohammad Isa Mohamadin for giving me an opportunity to work on this project. I would like to thank him for giving me an excellent guidance and knowledge throughout the making and conducting of this project, whilst allowing me to explore my own ideas. I could not wish for a better supervisor. He is the best supervisor I could ever ask for.

The special thank also goes to my co-supervisor Mr Wan Abdul Rahim Wan Ahmad for the supervision and support that he gave truly help in progression and the smoothness of the completion of this project.

My heartfelt thanks to the staffs of Faculty Applied Sciences, UiTM Sarawak who's willingly help me out with their abilities and for the wise idea throughout the project. My thanks and an appreciation also goes to laboratory staff of Faculty of Plantation and Agrotechnology, UiTM Sarawak for letting me using the microtome for my histological study.

I would like to thank my parents, Mr. Mohamad bin Sait and [redacted] for the unconditional support and their prayers during the whole study period. To my siblings, Muhammad Zaid Haziq Bin Mohamad, Nur E'zzati Binti Mohamad, Muhammad Hazim Bin Mohamad and Muhammad Haziy Bin Mohamad, thank you very much for your prayers and may Allah SWT bless and give us happiness here and after. To my family, thanks for being with me always.

And finally, I would like to express my deepest appreciation to Universiti Teknologi MARA for the RAGS/1/2014/ST01/UITM//1 grant. Special thanks to the Universiti Teknologi MARA Sarawak which was my second home and it will have this value in my heart forever.

Thank you.

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