

EFFECT OF CONSUMING RAW FISH EXPOSED TO
HEAVY METAL CADMIUM (Cd) POLLUTION IN
WHITE RATS

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FAKULTI SAINS DAN TEKNOLOGI
UNIVERSITI MALAYSIA TERENGGANU
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EFFECT OF CONSUMING RAW FISH EXPOSED TO HEAVY METAL,
CADMIUM (Cd) POLLUTION IN WHITE RATS

By

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TABLE OF CONTENTS

TITLE	PAGE
ACKNOWLEDGEMENTS	ii
LIST OF FIGURES	v
LIST OF ABBREVIATIONS	viii
LIST OF APPENDICES	ix
ABSTRACT	x
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1
1.2 Objectives of the study	2
CHAPTER 2 LITERATURE REVIEW	
2.1 Heavy metal	3
2.2 Cadmium	3
2.2.1 Cadmium toxicological study	4
2.3 Red Tilapia (<i>Oreochromis niloticus</i>)	5
2.4 White rats (<i>Sprague dawley</i>)	6
2.5 Inductively Coupled Plasma Spectrometry (ICPMS)	7
2.6 Histological study	7
CHAPTER 3 METHODOLOGY	
3.1 Methodology	9
3.1.1 Materials for heavy metal study	9
3.1.2 Materials for histological study	9
3.2 Study site	10
3.3 Experimental design	10
3.3.1 Acute toxicity of heavy metal (Cd) for fish	10
3.3.2 Short-term Cd exposure to fish	11
3.3.3 Treatment of Animals	11
3.4 Assay	12
3.4.1 Metal detection and samples preparation	12
3.4.2 Histological analysis	12

TITLE	PAGE
CHAPTER 4 RESULT	
4.1 Histology analysis	14
4.2 ICPMS analysis	24
CHAPTER 5 DISCUSSION	26
CHAPTER 6 CONCLUSION AND RECOMMENDATION	30
REFERENCES	31
APPENDICES	38
CURRICULUM VITAE	49

LIST OF FIGURES

FIGURES	PAGE
4.1.1 Group control – Normal glomerulus and tubular structure. (H&E, 400x)	14
4.1.2 Group 1 (Day 1) – Lesion in kidney. Cells started to have mild inflammation and swell. (H&E, 400x)	14
4.1.3 Group 1 (Day 4) – Lesion in kidney. Loose and lining cells, accumulation of fibrous material. Changes in tubular structure. Glomerulus lost function. (H&E, 400x)	15
4.1.4 Group 1 (Day 7) – Lesion in kidney. Fission of glomerulus with tubules. Tubules hardly be identified and badly swollen. (H&E, 400x)	15
4.1.5 Group 2 (Day 1) – Lesion in kidney. Loose and lining cells, inflammation and congestion of tubule. Changes in tubular structure. (H&E, 400x)	16
4.1.6 Group 2 (Day 4) – Offensive lesion in kidney. Tubules and glomerulus swollen, fission of tubules and glomerulus. Hard to identify and differentiate tubules. (H&E, 400x)	16
4.1.7 Group 2 (Day 7) Severe lesion in kidney. Fission of tubules and glomerulus. Hard to discriminate between tubule and glomerulus. Severe inflammation in tubular cells and nucleus enlargement in some cells. (H&E, 400x)	17
4.1.8 Group 3 (Day 1) – Mild lesion in kidney. Inflammation and congestion of tubule. Formation of mild fibrous material and cell started to swell. (H&E, 400x)	17
4.1.9 Group 3 (Day 4) – Moderate lesion in kidney. Formation of fibrous material, and fission of tubules and glomerulus. Inflammation and congestion of tubule. Nucleus enlargement in some cells. (H&E, 400x)	18
4.1.10 Group 3 (Day 7) – Severe lesion in kidney. Most cells had nucleus enlargement. Lining cells and severe inflammation in tubule. Formation of fibrous material. (H&E, 400x)	18
4.1.11 Group control – Normal hepatocytes. (H&E, 400x)	19
4.1.12 Group 1 (Day 1) –Hepatocytes started to swell. Lesion in liver. Mild congestion and fibrin in vein. (H&E, 400x)	19

FIGURES	PAGE	
4.1.13	Group 1 (Day 4) –Inflammation in hepatocytes. Congestion at vein walls and fibrin in vein. Nucleus enlargement and swollen cells. Cells lining along the vein. (H&E, 400x)	20
4.1.14	Group 1 (Day 7) –Fatty changes in liver. Some dying hepatocytes and loose cells noticed. Severe inflammation occurred. (H&E, 400x)	20
4.1.15	Group 2 (Day 1) –Congestion at vein walls and fibrin in vein. Fatty changes in liver. Some cells started to swell. (H&E, 400x)	21
4.1.16	Group 2 (Day 4) – Hepatocytes became swollen. Fibrin in vein. Some nucleus pushed into spindle shape. Cells lining along the vein. Lesion in progress. (H&E, 400x)	21
4.1.17	Group 2 (Day 7) – Fatty changes. Fibrin in vein. Some ballooning degeneration cells. Severe inflammation in hepatocytes (H&E, 400x)	22
4.1.18	Group 3 (Day 1) –Inflammation in sinusoids and fibrin in vein. Fatty changes and mild congestion in cells. (H&E, 400x)	22
4.1.19	Group 3 (Day 4) –Hepatocytes shown ballooning degeneration, and cells lining along the vein. Inflammation in hepatocytes. (H&E, 400x)	23
4.1.20	Group 3 (Day 7) –Vacuolation between hepatocytes. Severe fatty changes, fibrin in vein and inflammation.(H&E, 400x)	23
4.2.1	Graph above shown the detected values of Cd by ICPMS in both liver and kidney of white rats (Day 1 exposure). Pink bar represent kidney and blue bar represent liver where Y-axis is ICPMS value (ppm) and X-axis is samples grouping. 1 is control negative, 2 is control positive, 3 is group A (1.1721 ppm), 4 is group B (2.3442 ppm) and 5 is group C (4.6883 ppm) Data are mean \pm standard error (n=3).	24
4.2.2	Graph above shown the detected values of Cd by ICPMS in both liver and kidney of white rats (Day 4 exposure). Pink bar represent kidney and blue bar represent liver where Y-axis is ICPMS value (ppm) and X-axis is samples grouping. 1 is control negative, 2 is control positive, 3 is group A (1.1721 ppm), 4 is group B (2.3442 ppm) and 5 is group C (4.6883 ppm) Data are mean \pm standard error (n=3).	24

FIGURES**PAGE**

- 4.2.3 Graph above shown the detected values of Cd by ICPMS in both liver and kidney of white rats (Day 7 exposure). Pink bar represent kidney and no Cd detected in liver where Y-axis is ICPMS value (ppm) and X-axis is samples grouping. 1 is control negative, 2 is control positive, 3 is group A (1.1721 ppm), 4 is group B (2.3442 ppm) and 5 is group C (4.6883 ppm) Data are mean \pm standard error (n=3). 25
- 4.2.4 Figure 4.2.4 Graph above shown detected Cd values by ICPMS in the raw fish after exposed to Cd pollution for 4 days. Y-axis is ICPMS value (ppm) and X-axis is samples grouping. 1 is control, 2 is group A (1.1721 ppm), 3 is group B (2.3442 ppm) and 4 is group C (4.6883 ppm) Data are mean \pm standard error (n=2). 25

LIST OF ABBREVIATIONS

°C	Degree Celcius
µg	Microgram
µl	Microlitre
µm	Micrometer
bw	Body weight
Cd	Cadmium
CdCl ₂	Cadmium Chloride
cm	Centimetre
dDH ₂ O	De-ionised water
Fe	Ferum
g	Gram
HCl	Hydrochloric Acid
HNO ₃	Nitric Acid
H ₂ O	Water
H ₂ O ₂	Hydrogen Peroxide
H&E	Haematoxylin and Eosin
ICPMS	Inductively Coupled Plasma Spectrometry
kg	Kilogram
l	Litre
M	Molar
mg	Miligram
ml	Mililitre
mS	Mili Siemen
Ni	Nickel
ng	Nanogram
pg	Pictogram
ppb	Parts per billion
ppm	Parts per million
V	Volume
96hrLC ₅₀	96 Hours Lethal Concentration

LIST OF APPENDICES

APPENDIX		PAGE
A	Cadmium preparation	39
B	Lethal Concentration (LC ₅₀)	40
C	Calculation	41
D	Open Acid Digestion	42
E	Recovery Test	43
F	H&E staining process	44
G	The ICPMS readings for livers of rats, average and standard deviation.	45
H	The ICPMS readings for kidneys of rats, average and standard deviation.	46
I	a) The ICPMS readings for raw fish, average and standard deviation.	47
	b) The ICPMS readings for calibration.	
	c) Graph shown the calibration reading of ICPMS towards the Cd detection. Y-axis is the intensity and X-axis is the detected Cd values.	
J	a) Table (a),(b), and (c) shown the correlation of detected Cd value by ICPMS between raw fish and livers from white rats in Day 1, Day 4 and Day 7. (Significant level: $p \leq 0.05$)	48
	b) Table (a),(b), and (c) shown the correlation of detected Cd value by ICPMS between raw fish and kidneys from white rats in Day 1, Day 4 and Day 7. (Significant level: $p \leq 0.05$)	
K	The correlation of detected Cd value by ICPMS between raw fish and livers from white rats (Pair 1 for day 1, Pair 2 for day 4 and Pair 3 for day 7); between raw fish and kidneys from white rats (Pair 4 for day 1, Pair 5 for day 4 and Pair 6 for day 7) Significant level: $p \leq 0.05$	49

ABSTRACT

Cadmium (Cd) is a contaminant that can cause numerous health effects to living organism and an emerging environment pollutant due to its anthropogenic activity. Living organism around the environment can be polluted by Cd toxicity by inhalation, polluted food consumption, skin contact, and many more. The main objectives of this study were to determine the toxicity effect of Cd from fish (*Oreochromis niloticus*) in white rats (*Sprague dawley*) and also the level of Cd pollution in raw fish and white rats' organs sample by Inductively Coupled Plasma Mass Spectrometry (ICPMS). Three groups of designed samples based on 96hrLC₅₀ of Cd exposure calculated by parts per million (ppm); GA-lowest (1.1721 ppm), GB-medium (2.3442 ppm) and GC-highest (4.6883 ppm) while the control groups was remain unexposed to Cd. White rats were euthanized at day one, fourth and seventh and liver and kidney collected for both histological studies and ICPMS readings. There were Cd detection via ICPMS in the exposed fish meat and rats organs, but were rather low. No correlation encounter in the detected ICPMS value between the polluted fish meat and rats' organs. However, the effects of low Cd toxicity in liver and kidney were obvious and shown in histological changes as early as day 1. Cd at low level can affect the health and harmful to the white rats through the consumption of fish polluted with Cd.

KESAN PENGAMBILAN IKAN MENTAH YANG TERCEMAR DENGAN LOGAM BERAT, KADMIUM (Cd) KEPADA TIKUS PUTIH

ABSTRAK

Kadmium (Cd) merupakan satu bahan pencemar yang boleh menyebabkan pelbagai masalah kesihatan kepada organisma hidup dan pencemar alam sekitar yang kian meningkat kerana aktiviti antropogeniknya. Organisma hidup di sekeliling persekitaran yang terdedah boleh dicemari oleh toksisiti melalui penafasan, pengambilan makanan yang tercemar, kulit, dan sebagainya. Objektif utama kajian ini adalah untuk mengenalpasti kesan toksisiti Cd daripada ikan (*Oreochromis niloticus*) kepada tikus putih (*Sprague dawley*) dan juga tahap pencemaran Cd di dalam kedua-dua sampel ikan mentah dan organ tikus putih melalui Inductively Coupled Plasma Mass Spectrometry (ICPMS). Tiga kumpulan yang tahap pencemaran Cd di tentukan melalui 96hrLC₅₀ dengan unit 'parts per million' (ppm); GA (1.1721 ppm), GB (2.3442 ppm) dan GC (4.6883 ppm) sementara kumpulan kawalan tidak di dedahkan kepada pencemaran Cd. Tikus putih di sembelih pada hari pertama, keempat dan pada hari ketujuh. Semua ginjal dan hati tikus dikumpulkan bagi tujuan kajian histologi dan bacaan ICPMS. Terdapat Cd di dalam ikan mentah dan organ tikus melalui pengesanan mesin ICPMS tetapi nilai Cd yang dikesan adalah rendah. Tiada korelasi di antara nilai Cd yang dikesan diantara ikan mentah yang tercemar dan organ tikus putih. Bagaimanapun, terdapat kesan-kesan yang nyata bagi ginjal dan hati tikus putih pada slaid-slaid histologi yang diperiksa seawal hari pertama pendedahan. Cd pada kepekatan rendah berupaya menjejaskan kesihatan dan merbahaya kepada tikus putih melalui pemakanan ikan yang tercemar dengan Cd.