

TOXICITY OF COPPER (Cu) AND CADMIUM (Cd) IN *Chironomus* sp. FROM  
ARTIFICIALLY CONTAMINATED SEDIMENT

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from artificially contaminated sediment / Nik Hidayatul  
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TOXICITY OF COPPER (Cu) AND CADMIUM (Cd) IN *Chironomus* sp. FROM  
ARTIFICIALLY CONTAMINATED SEDIMENT

By

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**JABATAN SAINS MARIN  
FAKULTI PENGAJIAN MARITIM DAN SAINS MARIN  
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PROJEK PENYELIDIKAN I DAN II**

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: **Toxicity of Copper and Cadmium in *Chironomus* sp. from Artificially Contaminated Sediment** oleh **Nik Hidayatul Nursaadah Binti Husin**, no. Matrik: **UK12216** telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Marin sebagai memenuhi sebahagian daripada keperluan memperolehi **Ijazah Sarjana Muda Sains (Biologi Marin)**, Fakulti Pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

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## TABLE OF CONTENTS

	<b>Page</b>
<b>ACKNOWLEDGEMENTS</b>	ii
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	vii
<b>LIST OF FORMULA</b>	viii
<b>LIST OF APPENDICES</b>	ix
<b>LIST OF ABBREVIATIONS</b>	x
<b>ABSTRACT</b>	xi
<b>ABSTRAK</b>	xii
<b>CHAPTER 1: INTRODUCTION</b>	1
1.1 Introduction	1
1.2 Objectives	3
<b>CHAPTER 2: LITERATURE REVIEW</b>	4
2.1 The Chironomid	4
2.2 Sediment	5
2.3 Heavy Metals	6
2.4 Bioassay Test For Bioaccumulation Estimating	8
<b>CHAPTER 3: METHODOLOGY</b>	10
3.1 Apparatus, Chemicals and Glassware	10

3.2	Water Quality Analysis	10
3.3	Media Preparation	10
3.3.1	Cadmium and Copper Stock Solution Preparation	10
3.3.2	Sediment Preparation	11
3.4	Test Organism	14
3.5	Bioassay Test	15
3.5.1	Sediment Toxicity Test	15
3.6	Metal Determination	16
3.7	Data Analysis	17
<b>CHAPTER 4: RESULTS</b>		<b>18</b>
4.1	Sedimentology	18
4.1.1	Soil Texture Determination	18
4.2	Water and Sediment Quality	18
4.3	Monitoring of Metal Concentration and Uptake by Chironomid	23
4.4	Median Lethal Toxicity Test	25
<b>CHAPTER 5: DISCUSSION</b>		<b>27</b>
5.1	96hLC <sub>50</sub>	27
5.2	Bioaccumulation of Metals	28
<b>CHAPTER 6: CONCLUSION</b>		<b>31</b>

<b>REFERENCES</b>	<b>32</b>
<b>APPENDICES</b>	<b>37</b>
<b>CURICULUM VITAE</b>	<b>50</b>



## LIST OF TABLES

<b>Table</b>		<b>Page</b>
4.1	Percentage of sand, silt and clay with soil class obtained.	18
4.2	The concentration of Cadmium and Copper (ppm) in different types of media (after experiment).	23
4.3	The concentration of Cadmium (ppm) and Copper in chironomid larva according to lowest to highest sediment concentration (at end of experiment).	23
4.4	The value of LC <sub>50</sub> for different types of media.	25
5.1	Bioconcentration factor (BCF) of chironomid in sediment, pore water and water column.	30

## LIST OF FIGURES

<b>Figure</b>		<b>Page</b>
3.1	USDA textural triangle	13
4.1 (a-d)	Water Quality Parameters in the sediment toxicity tests.	20
4.2 (a-d)	Water Quality Parameters in the sediment toxicity tests	21
4.3 (a-d)	Sediment Quality Parameters in the sediment toxicity tests	22
4.4 (a-b)	Concentration of cadmium and copper in Sediment, Water Column and Pore Water in the sediment toxicity test.	24
4.5 (a-b)	Mortality of Chironomid larvae in different concentrations of copper and cadmium.	26
5.1 (a-b)	Rate of Cu-bioaccumulation. (b) Rate of Cd-bioaccumulation in the sediment toxicity tests.	29

## LIST OF FORMULA

<b>Formula</b>		<b>Page</b>
3.1	Formula for weighing metal salt to obtain 1000ppm.	11
3.2	Correction formula for corrected hydrometer reading.	12
3.3	Formula for calculating the percentage of sand, silt and clay calculation.	12
3.4	Formula for calculating the actual concentration of metals.	17

## LIST OF APPENDICES

Appendix		Page
1	Water column and sediment parameter for cadmium (different Concentration) in sediment toxicity test.	37
2	Water column and sediment parameter for copper (different concentration) in sediment toxicity test.	40
3	Mortality and alive data	43
4	Sampling, sieving and oven dry of sediment	44
5	Picture of <i>chironomus</i> sp.	45
6	Life cycle of <i>chironomus tentans</i> .	46
7	Sediment dry sieving	47
8	Open digestion and metal detecting.	48
9	The equipment for water and sediment quality monitoring.	49

## LIST OF ABBREVIATIONS / SYMBOLS

96h LC <sub>50</sub>	-	96 hours Lethal Concentration 50%
ppm	-	part per million
mg/L	-	milligram per liter
mV	-	milivolt
μS/cm	-	microsievert per centimeter
ml	-	mililiter
L	-	liter
mm	-	milimeter
cm	-	centimeter
μm	-	micrometer
Cd	-	cadmium
Cu	-	copper
AAS	-	Atomic Absorption Spectrometer
ICP-MS	-	Inductively Coupled Plasma Mass Spectrometer
r	-	Pearson correlation coefficient
μg g <sup>-1</sup> h <sup>-1</sup>	-	microgram per gram per hour

## ABSTRACT

This study was carried out to determine the 96h LC<sub>50</sub> value of two selected heavy metals (copper and cadmium) in the spiked sediment towards 'blood worm' or *Chironomus* sp. It was also to study the relationship between pore water metal content and toxicity. The concentration of Cd-spiked sediment used in this sediment toxicity test was 1.95ppm, 33.85ppm, 63.80ppm, 99.05ppm and 186.20ppm. For Cu-spiked sediment, the concentration used is 4.65ppm, 157ppm, 365ppm, 486ppm and 669ppm. Replicates were conducted for each concentration of both metals. This study was done in duplicate for each concentration of both metals. 96h LC<sub>50</sub> values obtained for Cu-spiked sediment was 194.142ppm, while for Cd-spiked sediment, the 96h LC<sub>50</sub> values obtained was 85.541ppm. The toxicity effect was much higher in Cd compared to Cu. Pore water metal content in Cd-spiked sediment was higher compared to sediment and water column Cd concentration. The moving of metal from sediment to pore water as well as water column represents the cyclic motion of metals through absorption.

KETOKSIKAN KUPRUM DAN KADMIUM KEPADA *Chironomus* sp. DARIPADA  
MENDAPAN TERCEMAR TIRUAN

**ABSTRAK**

Kajian ini dilakukan untuk menentukan nilai 96hLC<sub>50</sub> bagi dua logam berat yang dipilih iaitu Kuprum (Cu) dan Kadmium (Cd) di dalam mendapan yang dimasukkan dengannya ke atas 'blood worm' atau *Chironomus* sp. Ia juga bagi mengkaji perkaitan antara logam berat yang terdapat dalam air di dalam liang tanah dengan ketoksikan. Kepekatan Cd yang digunakan dalam kajian ini, bagi mendapan yang dimasukkan dengan Cd adalah 1.95ppm, 33.85ppm, 63.80ppm, 99.05ppm dan 186.20ppm setiap satu. Manakala bagi mendapan yang dimasukkan Cu, kepekatan Cu yang digunakan adalah 4.65ppm, 157ppm, 365ppm, 486ppm and 669ppm setiap satu. Dua gandaan kajian dilakukan bagi setiap kepekatan kedua-dua logam tersebut. 96hLC<sub>50</sub> bagi mendapan yang dimasukkan dengan kuprum adalah 194.142ppm, manakala untuk mendapan yang dimasukkan dengan kadmium adalah 85.541ppm. Melalui nilai 96hLC<sub>50</sub> ini, didapati kesan ketoksikan yang tinggi dicatatkan untuk Cd berbanding Cu. Bagi Cd, kepekatan di dalam air di liang adalah tinggi berbanding kepekatan di dalam tanah dan lapisan air diatas 2 cm lapisan tanah. Namun, ia adalah sebaliknya bagi Cu. Ini mungkin disebabkan oleh pergerakan logam dari tanah ke dalam liang tanah kemudian naik ke air di atas lapisan tanah tersebut melalui resapan.