

HEAVY METALS CONTENT IN (*Padina* sp) FROM THE
TERENGGANU COASTLINE

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**HEAVY METALS CONTENT IN (*Padina* sp) FROM THE
TERENGGANU COASTLINE**

BY

NORAZNI BINTI AHMAD

**Research Report submitted in partial fulfillment of
the requirements for the degree of
Bachelor of Science (Marine Science)**

**Department of Marine Science
FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU
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**APPROVAL AND CERTIFICATION FROM
RESEARCH PROJECT I AND II**

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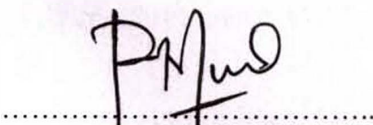


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LIST OF ABBREVIATIONS

APDC	Ammonium pyrrolidinditiocarbamate
As	Arsenic
Cd	Cadmium
Cr	Chromium
Cu	Copper
ECE	Economic Commission for Europe
EDTA	Ethylenediaminetetraacetic acid
FDA	Food and Drug Administration
GPS	Global Positioning System
HCl	Hydrochloric Acid
Hg	Mercury
HNO ₃	Nitric Acid
ICPMS	Inductive Couple Plasma Mass Spectrophotometer
ICPOES	Inductively Couple Plasma Optical Emission Spectroscopy
MIBK	Methyl isobutyl ketone
OECD	Organisation For Economic Co-Operation And Development
Pb	Lead
WHO	World Health Organization
Zn	Zinc

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ABSTRACT

The content of cadmium, lead, chromium, copper and zinc in algal samples from five locations along the east coast of Peninsular Malaysia beach was determined by Inductive Couple Plasma Mass Spectrophotometer. Algal samples of *Padina* sp were collected in the rocky beach area along Terengganu coastline. The content of total cadmium, lead, chromium, copper and zinc in seawater from the collection sites were also determined. In this study, the possibility of using *Padina* sp as a bio absorbent for the removal of heavy metals was examined. Total concentrations ($\mu\text{g metal/g dry weight seaweed}$) of metals in *Padina* sp ranged from 15.439 ($\mu\text{g/g}$) to 53.441 ($\mu\text{g/g}$) for zinc, 0.627 ($\mu\text{g/g}$) to 1.291 ($\mu\text{g/g}$) for cadmium, 3.472 ($\mu\text{g/g}$) to 4.334 ($\mu\text{g/g}$) for copper, 4.993 ($\mu\text{g/g}$) to 11.837 ($\mu\text{g/g}$) for lead and 6.012 ($\mu\text{g/g}$) to 8.886 ($\mu\text{g/g}$) for chromium. The highest heavy metals content in seaweed can be found from Station Pantai Bukit Keluang which showed the high content of zinc, chromium and copper with 53.441 ($\mu\text{g/g}$), 8.886 ($\mu\text{g/g}$) and 4.092 ($\mu\text{g/g}$) respectively. Pantai Kemasik showed the highest content of cadmium 1.291 ($\mu\text{g/g}$) while Pantai Teluk Kalong showed the highest content of lead with 11.837 ($\mu\text{g/g}$). The result showed that the heavy metals content in *Padina* sp in five stations increasing about 4 times from year 1999 to 2007. Heavily industrialized areas, petrochemical areas and the tourism locations can be the factors of increasing heavy metals concentration along Terengganu coastline areas from year 1999 until 2007. As a conclusion, *Padina* sp can be used to monitor metal pollution like zinc, cadmium, copper, lead and chromium.

**Kandungan Logam Berat dalam (*Padina* sp) di sepanjang
Perairan Pantai Terengganu.**

ABSTRAK

Kandungan logam berat cadmium, plumbum, chromium, cooper dan zinc dalam sampel alga (*Padina* sp) dan sampel air laut dari 5 stesen penyampelan di sepanjang perairan berbatu Terengganu diuji menggunakan Inductive Couple Plasma Mass Spectrophotometer. Dalam kertas kerja ini, kebarangkalian kesesuaian *Padina* sp sebagai penyerap logam berat dikaji. Jumlah kepekatan logam berat (μg logam/g berat kering alga) dalam *Padina* sp adalah berjulat antara 15.439 ($\mu\text{g/g}$) sehingga 53.441 ($\mu\text{g/g}$) bagi zinc, 0.627 ($\mu\text{g/g}$) hingga 1.291 ($\mu\text{g/g}$) bagi cadmium, 3.472 ($\mu\text{g/g}$) hingga 4.334 ($\mu\text{g/g}$) bagi copper, 4.993 ($\mu\text{g/g}$) hingga 11.837 ($\mu\text{g/g}$) bagi plumbum dan 6.012 ($\mu\text{g/g}$) hingga 8.886 ($\mu\text{g/g}$) bagi chromium. Kepekatan logam berat tertinggi dapat dilihat di Stesen Pantai Bukit Keluang di mana mencatatkan bacaan tertinggi bagi zinc, chromium dan copper dalam julat 53.441 ($\mu\text{g/g}$), 8.886 ($\mu\text{g/g}$) dan 4.092 ($\mu\text{g/g}$) mengikut logam. Pantai Kemasik menunjukkan kadar penyerapan tertinggi bagi cadmium iaitu 1.291 ($\mu\text{g/g}$) manakala Pantai Teluk Kalong menunjukkan kepekatan tertinggi bagi plumbum dengan bacaan 11.837 ($\mu\text{g/g}$). Berdasarkan keputusan ini, kepekatan logam berat yang terkandung dalam *Padina* sp bagi setiap stesen yang dikaji telah meningkat sebanyak 4 kali ganda dari tahun 1999 sehingga tahun 2007. Kemajuan dalam bidang industri, bidang petrokimia dan pelancongan menjadi faktor utama yang menjurus kepada peningkatan logam berat sepanjang Perairan Terengganu. Sebagai kesimpulannya, dapat dikatakan di sini bahawa *Padina* sp boleh juga digunakan untuk mengawal pencemaran logam-logam berat seperti zinc, cadmium, copper, lead and chromium.