

HEAVY METAL IN CULTURED SHRIMP (*L. vannamei* and
P. monodon) AND IN SHRIMP FARMS IN SEDILI,
JOHOR AND MARANG AND SETIU, TERENGGANU

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**HEAVY METAL IN CULTURED SHRIMP (*L. vannamei* and *P. monodon*)
AND IN SHRIMP FARMS IN SEDILI, JOHOR AND MARANG AND SETIU,
TERENGGANU**

By

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DEPARTMENT OF MARINE SCIENCE
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**DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled:

**HEAVY METAL IN CULTURED SHRIMP (*L. vannamei* and *P. monodon*)
AND IN SHRIMP FARMS IN SEDILI, JOHOR AND MARANG & SETIU,
TERENGGANU** by **ASNIEZA BINTI JUSOH** Matric No. **UK18046** have been
examined and all errors identified have been corrected. This report is submitted to the
Department of Marine Science and as partial fulfillment toward obtaining the Degree
of Science (Marine Biology), Faculty of Maritime Study and Marine Science,
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ABBREVIATIONS

AAS	(Flame) Atomic Absorption Spectrophotometer
APDC	Ammonium pyrrodithiocarbamate
Cd	Cadmium
Cr	Chromium
Cu	Copper
H ₂ O ₂	Hydrogen Peroxide
HCl	Hydrochloric Acid
HF	Hydrofluoric Acid
HNO ₃	Nitric Acid
Mn	Manganese
Ni	Nickle
Pb	Lead
ppm	part per million
Zn	Zinc
μg.L ⁻¹	Micro gram per litre
μg.g ⁻¹	Micro gram per gram

ABSTRACT

The concentration of heavy metal; Chromium, Copper, Manganese, Nickel, Cadmium, Lead and Zinc were determined in the samples of shrimps, sediment, food pellet and water. *Penaeus monodon* farms were analyzed sampled from Marang, Terengganu while *Litopenaeus vannamei* were analyzed sampled from Sedili, Johor and Setiu, Terengganu. Sediment was sampled using Van veen grab. Water was preserved with 60% Nitric Acid and put into ice chest with shrimp sample. The most notable record of heavy metal concentration in shrimp was shown within Setiu with the order; Zn > Cr > Cu > Ni > Mn > Pb > Cd. Sedili showed high load of Zn > Pb > Cu > Cr > Ni > Mn > Cd and the least of heavy metal concentration was recorded in Marang with the order; Zn > Cu > Cr > Pb > Ni > Mn > Cd. The highest and least concentrated heavy metal in Setiu was $6.819\mu\text{g}\cdot\text{g}^{-1}$ for Cr while the least of $3.025\mu\text{g}\cdot\text{g}^{-1}$ for Cd. *L. vannamei* showed higher accumulation of Cr, Mn, Ni and Pb than *P. monodon*. Setiu had highest heavy metal concentration within food for Cu, Cr, Mn, Pb, Ni and Cd. However, it was an exception for Zn in Marang which it showed far higher amount compared to Setiu and Sedili. Marang had the highest load of heavy metal in sediment for all elements except Cu and Zn which found highest in Sedili. Water showed the least load of heavy metal for each element compared to other samples with Setiu showed highest load among all for all elements followed by Sedili. On paired t-test, Cd was the only element showed not significantly difference in shrimp and food. Meanwhile, Correlation of shrimps with sediment showed strongly correlated for Cr and Mn.

Logam Berat di dalam Udang Kultur (*L. vannamei* dan *P. monodon*) dan di dalam Kolam Udang di Sedili, Johor and Marang & Setiu, Terengganu

ABSTRAK

Kepekatan logam Kromium, Kuprum, Mangan, Nikel, Kadmium, Plumbum dan Zink telah ditentukan di dalam udang, tanah, makanan dan air. *Penaeus monodon* telah disampel di Marang manakala *Litopenaeus vannamei* telah diambil dari Setiu dan Sedili. Tanah disampel menggunakan Van veen dan air diawet dengan 60% asid nitik dan disejukkubekukan bersama udang. Kandungan logam paling banyak di dalam udang adalah di Setiu dengan susunan; Zn > Cr > Cu > Ni > Mn > Pb > Cd manakala Sedili menunjukkan Zn > Pb > Cu > Cr > Ni > Mn > Cd dan Zn > Cu > Cr > Pb > Ni > Mn > Cd bagi Marang. Setiu mempunyai $3.025\mu\text{g.g}^{-1}$ Cd sehingga $6.819\mu\text{g.g}^{-1}$ Cr. *L. vannamei* mempunyai Cr, Mn, Ni dan Pb lebih banyak daripada *P. monodon*. Kandungan logam paling tinggi adalah di dalam makanan dengan Setiu tertinggi untuk semua elemen kecuali Zn dengan tertinggi di Marang. Marang mempunyai kandungan logam tertinggi untuk semua elemen kecuali Cu dan Zn yang merekod kandungan tertinggi di Sedili. Air menunjukkan kandungan paling rendah di antara semua sampel. Setiu menunjukkan kandungan logam paling tinggi di dalam air berbanding Sedili dan Marang. Berdasarkan ujian t-berpasangan, Cd bagi udang dan makanan adalah satu-satunya logam yang tidak mempunyai perbezaan signifikan. Bagi korelasi pula, udang dan tanah mempunyai perkaitan kukuh antara keduanya.