

DETERMINATION OF THE CONCENTRATION OF SELECTED
METALS IN MUSCLES OF SEAWATER
EUPHONIAEUS SPP. SPECIMENS AND
EUPHONIAEUS TERNIGIUDATUS

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INSTITUTE OF SCIENCE AND TECHNOLOGY
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Determination of the concentration of selected heavy metals in infusions of seahorse, hippocampus spinosissimus and hippocampus trimaculatus.



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HAK MILIK
PERPUSTAKAAN KUSTEM

DETERMINATION OF THE CONCENTRATION OF SELECTED HEAVY
METALS IN INFUSIONS OF SEAHORSE, *HIPPOCAMPUS SPINOSISSIMUS*
AND *HIPPOCAMPUS TRIMACULATUS*

BY

KUMARAN S/O SINNAPPAN

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PENGAUKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

Determination the concentration of selected heavy metals in infusions of seahorse, *Hippocampus spinosissimus* and *Hippocampus trimaculatus* oleh Kumaran a/l Sinnappan, nombor matrik UK7591 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Kimia sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains (Sains Kimia), Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

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LIST OF ABBREVIATIONS AND SYMBOLS

SYMBOL	MEANING
%	Percentage
° C	Degree Celsius
µg/l	Microgram per liter
µm	Micrometer
Cd	Cadmium
cm	Centimeter
Cr	Chromium
Cu	Copper
FAAS	Flame Atomic Absorption Spectrometry
g	Gram
GFAAS	Graphite Furnace Atomic Absorption
Spectrometry	
Hg	Mercury
HNO ₃	Acid Nitric
nm	Nanometer
Pb	Lead
ug/g	Microgram per gram

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ABSTRACT

Sample of seahorse from two species, *Hippocampus spinosissimus* and *Hippocampus trimaculatus* were analysed for Cd, Cr, Cu, Pb and Hg concentrations. The research was done because seahorse has become a popular material used for Chinese traditional medicine (TCM). The objective was to find out whether these seahorses are safe for human consumption. The dried samples were digested using the nitric acid digestion method. Then, the samples were analysed for the metal concentration using the Inductively Coupled Plasma – Optical Emission Spectrometry. In the male seahorse samples of *Hippocampus spinosissimus*, the concentration of copper decreases as follows, $Cu > Pb > Cr > Cd > Hg$. Meanwhile for the female samples, the concentration decreases as $Cu > Cr > Pb > Hg > Cd$. In the male seahorse samples of *Hippocampus trimaculatus*, the concentrations of heavy metals are as follows, $Cr > Pb > Cu > Cd > Hg$. Meanwhile for the female samples, the concentration decreases as $Cu > Pb > Cr > Cd > Hg$. However, there were no significant differences found in concentration between the species and sex of the seahorse. It is found that the heavy metal content in seahorse was under permissible level for human consumption and safe to be use used as a Chinese traditional medicine.

ABSTRAK

Sampel kuda laut daripada dua spesis, *Hippocampus spinosissimus* dan *Hippocampus trimaculatus* telah dianalisa untuk kepekatan kehadiran Cd, Cr, Cu, Pb and Hg. Kajian ini dijalankan berikutan penggunaan kuda laut yang semakin meluas dalam penghasilan ubat cina tradisional. Objektif kajian ini adalah untuk mengkaji sama ada kuda laut ini sesuai untuk pemakanan manusia. Sampel kering kuda laut telah dihadam dengan teknik penghadaman asid nitrik. Kemudian sampel dianalisa dengan menggunakan Gandingan Aruhan Plasma-Spektrometer Pemancaran Optik (ICP-OES) untuk mendapatkan kepekatan logam. Dalam kuda laut jantan kepekatan berkurangan mengikut $Cu > Pb > Cr > Cd > Hg$. Sementara itu, bagi sampel betina pula kepekatan berkurangan mengikut $Cu > Cr > Pb > Hg > Cd$. Dalam sampel jantan, *Hippocampus trimaculatus*, kepekatan adalah seperti berikut $Cr > Pb > Cu > Cd > Hg$. Manakala bagi betina kepekatan berkurangan mengikut $Cu > Pb > Cr > Cd > Hg$. Bagaimanapun tidak terdapat perbezaan signifikan dalam kepekatan logam di antara spesis dan jantina kuda laut yang dikaji. Oleh itu, kandungan logam berat di dalam kuda laut berada di bawah paras bahaya dan selamat diminum oleh manusia.