

HEAVY METALS ANALYSES OF GREEN TURTLE
(*Chelonia mydas*) EGGS IN TERENGGANU, MALAYSIA

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UNIVERSITI MALAYSIA TERENGGANU

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IN TERENGGANU, MALAYSIA**

By

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Research Report submitted in partial fulfilment of

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SCHOOL OF MARINE SCIENCE AND ENVIRONMENT
UNIVERSITI MALAYSIA TERENGGANU

DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT

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LIST OF ABBREVIATIONS

µg	-	microgram
g	-	gram
Ar	-	arsenic
Ca	-	calcium
Cd	-	cadmium
Co	-	cobalt
Cr	-	chromium
Cu	-	copper
Fe	-	iron/ ferum
Hg	-	mercury
Mg	-	magnesium
Mn	-	manganese
Ni	-	nickel
Pb	-	lead/plumbum
Sn	-	tin
Zn	-	zinc

ABSTRACT

Heavy metals have been reported in sea turtles at various stages of their life cycle including sea turtle eggs. This contaminant can disrupt embryonic development and growth of wildlife. Furthermore, in areas such as Terengganu where the human consumption of sea turtle eggs are still common and the egg contamination may have implications to the public health. In the present study, the purpose was to determine the concentration of heavy metals in green turtle eggs (*Chelonia mydas*) as well as to compared the concentration of heavy metals between green turtle eggs sold at Pasar Payang and freshly laid eggs from Chagar Hutang, Redang Island. Each egg was divided into three compartments (egg shell, albumen and egg yolk) and were analyzed for heavy metals of Mn, Cu, Zn, Cd and Pb. Overall, based on the different compartments, the highest concentration detected in the egg shell and albumen was Cu. On the other hand, Zn was found higher ($127.04 \mu\text{g g}^{-1}$) in egg yolk compared to the other compartments. Between sampling sites, Cu and Zn were detected higher in egg shell from Chagar Hutang compared to Pasar Payang. Cd and Pb were detected higher in egg shell from Pasar Payang compared to Chagar Hutang. In albumen, Mn and Cu were detected high in Chagar Hutang while Zn, Cd and Pb were detected high in Pasar Payang. All heavy metals detected in egg yolk were high in eggs collected from Chagar Hutang compared to Pasar Payang. Concentration of all metals detected in green turtle eggs were below than permissible limits of Malaysian Food Regulation (1985) except for Zn. However, non-essential metals (Cd and Pb) were detected higher in the albumen and egg yolk compared to egg shell. Presence of these toxic metals in green turtle eggs could be danger to consumers. Thus, community need to be warned as excessive consumption of green turtle eggs could put their health in risk.

**KAJIAN LOGAM BERAT DI DALAM TELUR PENYU AGAR
(*Chelonia mydas*) DI TERENGGANU, MALAYSIA**

ABSTRAK

Terdapat sumber yang melaporkan bahawa setiap fasa kitaran hidup penyu termasuk telur penyu mengandungi logam berat. Bahan pencemaran ini didapati boleh mengganggu perkembangan embrio dan pertumbuhan hidupan liar. Selain daripada itu, pemakanan telur penyu sudah menjadi kebiasaan di negeri seperti Terengganu dan dikhuatiri bahawa pencemaran telur penyu ini boleh memberi kesan kepada kesihatan orang awam. Tujuan kajian ini dijalankan adalah untuk menentukan kepekatan logam berat di dalam telur penyu agar (*Chelonia mydas*) dan juga membuat perbandingan antara kepekatan logam berat di dalam telur penyu agar yang di jual di Pasar Payang dan juga telur segar dari Chagar Hutang. Setiap biji telur penyu dibahagikan kepada tiga bahagian iaitu kulit telur, putih telur dan kuning telur, seterusnya dianalisa untuk logam berat Mn, Cu, Zn, Cd dan Pb. Secara keseluruhannya, mengikut bahagian telur, kepekatan Cu didapati tinggi di kulit telur dan putih telur. Sebaliknya, Zn didapati lebih tinggi ($127.04 \mu\text{g g}^{-1}$) dalam kuning telur berbanding dengan bahagian lain. Mengikut perbandingan antara kawasan, Cu dan Zn dikesan tinggi dalam kulit telur dari Chagar Hutang berbanding dengan Pasar Payang. Cd dan Pb dikesan tinggi dalam kulit telur dari Pasar Payang berbanding Chagar Hutang. Dalam albumen, Mn dan Cu dikesan tinggi di Chagar Hutang manakala Zn, Cd dan Pb dikesan tinggi di Pasar Payang. Semua logam berat dikesan tinggi dalam kuning telur dari Chagar Hutang berbanding dengan Pasar Payang. Kepekatan bagi semua logam didapati rendah dari tahap yang dibenarkan oleh Peraturan Makanan Malaysia (1985). Walau

bagaimanapun, logam bukan penting (Cd dan Pb) dikesan lebih tinggi dalam kandungan telur (putih telur dan kuning telur) berbanding dengan kulit telur. Kehadiran logam yg merbahaya didalam telur penyu agar ini dikhuatiri dapat memberi kesan kepada kesihatan pemakan. Oleh itu, masyarakat perlu diberi amaran terhadap pemakanan telur penyu agar yang boleh memberi risiko keatas kesihatan mereka.