

MASTER'S THESIS

Toxicokinetics of pentachlorophenol, 2,3,4,6-tetrachlorophenol and 2,4,6-trichlorophenol in the golden apple snail (*pomacea lineata wagner*)

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Toxicokinetics of Pentachlorophenol, 2,3,4,6-Tetrachlorophenol
and 2,4,6-Trichlorophenol in the Golden Apple Snail
(*Pomacea lineata* Wagner)

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Abstract

The uptake and depuration of three chlorophenols: pentachlorophenol (PCP), 2,3,4,6-tetrachlorophenol (2,3,4,6-TTCP) and 2,4,6-trichlorophenol (2,4,6-TCP) were studied in a freshwater snail, the golden apple snail (*Pomacea lineata* Wagner). The snails were exposed to continuously flowing chlorophenol solution until the apparent steady state was reached, the body burdens were found to be 25.79 $\mu\text{g/g}$, 6.59 $\mu\text{g/g}$ and 10.69 $\mu\text{g/g}$ for PCP, 2,3,4,6-TTCP and 2,4,6-TCP respectively, and with the corresponding bioconcentration factors (BCFs) of 5157.7, 1317.4 and 2138.7. The BCF of PCP was significantly greater than the BCFs of 2,3,4,6-TTCP and 2,4,6-TCP ($\alpha = 0.05$).

During the depuration phase, the snails were exposed to clean water until the body burden dropped below to 10 % to that at the apparent steady state. Chlorophenols were eliminated rapidly from the snails, and among which 2,4,6-TCP was the most rapidly eliminated chlorophenol, with the elimination rate constant (k_{el}) of 0.1078 h^{-1} and the biological half-life ($T_{1/2}$) of 6.4 h, followed by PCP (k_{el} : 0.0622 h^{-1} , $T_{1/2}$: 11.1 h) and 2,3,4,6-TTCP was the most slowly eliminated chlorophenol (k_{el} : 0.553 h^{-1} , $T_{1/2}$: 12.5 h). Depuration of chlorophenols in the golden apple snails followed a single compartment, first order kinetic manner, linear regression models were successfully constructed to describe the correlation between the body burden of chlorophenols and time.

In the present study, it was also found that the BCF, k_{el} and $T_{1/2}$ measured in the golden apple snail were comparable to those obtained from fish and mussel, the similarity in bioaccumulation potential between these animals make the golden apple snail even much preferable to be a biological indicator because of its limited mobility and easy collection.

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