

EFFECTS OF MALATHION  
ON *Sarotherodon mossambicus* (PETERS)  
AND *Trichogaster pectoralis* (REGAN)

ONG SIEW LUI

FACULTY OF FISHERIES AND MARINE SCIENCE  
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EFFECTS OF MALATHION  
ON SAROTHERODON MOSSAMBICUS PETERS  
AND TRICHOGASTER PECTORALIS REGAN

BY

ONG SIEW LUI

A project report submitted to the  
Faculty of Fisheries and Marine Science  
in partial fulfilment of the requirement for the  
degree of Bachelor Science (Fisheries)

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FACULTY OF FISHERIES AND MARINE SCIENCE

The undersigned certify that they have read, and  
recommend to the Faculty of Fisheries and Marine Science,  
for the acceptance, a research project report entitled:

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AND SAROTHERODON MOSSAMBICUS PETERS

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of Bachelor of Science (Fisheries).

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(Dr. A.K. M. Mohsin)  
Supervisor

---

Chairman,  
Research Report Committee

Date: \_\_\_\_\_

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This Project is specially dedicated to  
my beloved Mother,

Brothers and Sisters

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analysis of the residue  
Long Lam of the same branch for helping her in the computer analysis.

The writer appreciates the facilities and assistance given to her by the Faculty of Fisheries and Marine Science in conducting the project.

Not least but not least, she wishes to thank the lecturers and staff of faculty of fisheries and Marine Science in giving her a helping hand in solving problems and doubts encountered during the project undertakings.

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## ABSTRACT

The 96-hour  $LC_{50}$  values of malathion were determined using Trichogaster pectoralis Regan (Sepat siam) and Sarotherodon mossambicus Peters (Tilapia) as test animals. The  $LC_{50}$  96-hr of sepat siam to malathion was 0.98 ppm while that of Tilapia was 0.29 ppm. Tilapia was approximately three times more sensitive to malathion than sepat siam.

This  $LC_{50}$  value of malathion to Tilapia in clear aquaria was compared to the  $LC_{50}$  value of Tilapia in muddy tanks. It was found that the latter has  $LC_{50}$  value of 0.78 ppm which was approximately 2.5 times higher than the former. The malathion residue in mud were detected by gas-liquid chromatograph. The results indicated that when 1.0, 0.75, 0.42 ppm malathion were used, only 0.49, 0.16 and 0.08 ppm respectively were found to settle in the mud after 4 days period.

The poisoning symptoms of both species were observed to be suffering from hyperexcitability initially and movements turned sluggish and lethargic at later stage. Pin point haemorrhages were observed at the base of pectoral and pelvic fins of Tilapia.

The histopathology of livers and gills exposed to malathion at 1.0 ppm for sepat siam and 0.42 ppm for Tilapia were also examined. In both species, enlarged and empty sinusoids were seen. Necrosis and cells with pyknotic nucleus were common. The gills of both species exhibited hyperplasia. In some parts, especially, at the tips of the filaments, severe hyperplasia of cells resulted in secondary lamellae to fuse with the primary filament. Apart from congestion of red blood cell in secondary and primary filaments, detachment of epithelial cells from the primary filaments were also observed.

Tilapia didalam tangki yang mengandung lumpur. Hasil  
didapati bahawa Tilapia didalam tangki berlumpur mempunyai  
nilai 0.78 bsj iaitu 2.5 kali lebih tinggi dari tangki  
yang tidak mengandung lumpur. Pengumpulan malathion  
didalam lumpur dikesan dengan menggunakan kromatografi  
gas-cair. Keputusan menunjukkan apabila 1, 0.75 dan  
0.42 bsj malathion digunakan, hanya 0.49, 0.16 dan 0.08  
bsj mendak dalam lumpur selepas empat hari.

Pada peringkat awal, tanda-tanda keracunan didalam  
kedua-dua jenis ikan ini dapat diperhatikan dengan  
pergerakan hiperuja dan pergerakan ini menjadi lambat  
pada peringkat kemudian. Titik-titik berdarah boleh  
didapati pada pangkal sirip pectoral dan pelvic ikan  
Tilapia.

## ABSTRAK

Penentuan nilai  $LC_{50}$  untuk 96-jam bagi malathion ditentukan dengan menggunakan Trichogaster pectoralis Regan (sepat siam) dan Sarotherodon mossambicus Peters (Tilapia). Nilai  $LC_{50}$  96-jam bagi malathion untuk sepat siam adalah 0.98 bsj dan 0.29 bsj bagi Tilapia. Tilapia didapati tiga kali lebih peka kepada malathion dari sepat siam.

Nilai  $LC_{50}$  bagi malathion untuk Tilapia ditangki bersih telah dibanding dengan nilai yang sama untuk Tilapia didalam tangki yang mengandungi lumpur. Adalah didapati bahawa Tilapia didalam tangki berlumpur mempunyai nilai 0.78 bsj iaitu 2.5 kali lebih tinggi dari tangki yang tidak mengandungi lumpur. Pengumpulan malathion didalam lumpur dikesan dengan menggunakan kromatografi gas-cecair. Keputusan menunjukkan apabila 1, 0.75 dan 0.42 bsj malathion digunakan, hanya 0.49, 0.16 dan 0.08 bsj mendak dalam lumpur selepas empat hari.

Pada peringkat awal, tanda-tanda keracunan didalam kedua-dua jenis ikan ini dapat diperhatikan dengan pergerakan hiperuja dan pergerakan ini menjadi lembab pada peringkat kemudian. Titik-titik berdarah boleh didapati pada pangkal sirip pectoral dan pelvic ikan Tilapia.



Histologi hati dan insang yang terdedah kepada 1 bsj malathion bagi sepat siam dan 0.42 bsj bagi Tilapia juga dikaji. Dalam kedua-dua spesis, pembesaran dan kekosongan sinusoids telah diperhatikan. Nikrosis dan sel bernukleus piknosis biasa dijumpai. Insang daripada kedua-dua spesis membuktikan hiperplasia. Di hujung filamen-filamen, hiperplasia pada sel sangat hebat. Ini menghasilkan lamellae sekunder berpadu dengan filamen primer. Selain daripada sel darah merah terdesak dalam filamen sekunder dan primer, juga diperhatikan penghuraian sel epithelial daripada filamen primer.

*Cichlasoma* (Sulawadani and Lim, 1979) of which sepat siam and Tilapia are among the two most common paddy field fish found in most of the Asian countries (Khan and Tan, 1979).

Paddy field fish culture, apart from providing the animal protein to the rural community, also constitute to their additional source of income. Surveys have been conducted in the paddy fields in Kelantan (Bixon, 1971), Province Wellesley (Salvadurai, 1972) and Malacca (Narkawandi and Salvadurai, 1966) and it was found that farmers depending on rice for their sole income are poorer than farmers rearing paddy field fish as their side income. Income from paddy field fish constituted one-quarter of the total income of rice (Lim, 1979).

Apart from providing animal protein and side income,