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1995

Toxicity test: Sponge toxin on tilapia fry

Aquaculture Department, Southeast Asian Fisheries Development Center

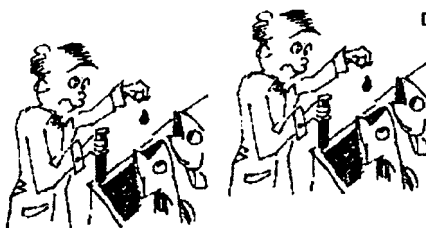
Southeast Asian Fisheries Development Center, Aquaculture Department (1995). Toxicity test: Sponge toxin on tilapia fry. Aqua Farm News, 13(5), 8.

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Toxicity test: sponge toxin on tilapia fry

STEP 2
SCREENING
AND
DISCOVERIES
Unique or
potentially
useful
biological
activity
is found



The toxicity of extracts from five species of marine sponges was tested on tilapia *Oreochromis niloticus* fry. Two kilograms of each sponge were collected by skin diving off Sebaste, Guimaras in west central Philippines. The species were chosen arbitrarily, harvesting whatever was plentiful at the time of diving. The depth from where sponges are collected ranged 3-7 meters. Sponges were collected at different habitats — reef top, sandy shore, deep sandy substratum, and deep rock.

In the laboratory, sponge toxins were extracted using water or methanol. Each sponge sample was minced, homogenized with water, sieved, then centrifuged. The resulting liquid suspension was deep frozen then freeze-dried until used. This was the water extract. The remaining solid (after centrifugation) was oven-dried, milled, mixed in methanol, shaken and agitated, then allowed to settle. The resulting liquid was centrifuged then concentrated in a rotary evaporator. The concentrate was oven-dried until it was reduced to paste or gum. This is the methanol extract.

The toxin extracts (water and methanol) were tested on tilapia fry. For the range-finding tests, toxin concentrations used were 0.01, 0.1, 1.0, 10, 100 and 200 ppm. For the definitive tests, the range was from 0.06 to 512 ppm.

The test tilapia fry were about 10.9 mm and 17.6 mg. About 20 fry were placed in each 3-liter test tank. Water temperature, salinity, pH and dissolved oxygen were monitored. Fish behavior and mortality were monitored every 15 minutes during the first hour, every hour for the next five hours, and every two hours for the rest of the 98 hours. Before dying, the fish either:

- gulped air at the surface
- convulsed or swam spasmodically
- swam in circles or whirled sometimes with head on the tank bottom
- swam with the body sideways or upside down
- floated at or below the surface, sometimes upside down
- rested motionless at the bottom, upright or on its side
- did not respond when touched
- swam to the surface vertically
- crawled on its side
- changed color (to darker shade)

The concentrations of the sponge toxins and the time it took to kill 50% of the tilapia fry — termed LC₅₀ — are tabulated:

Sponge species	LC50 (ppm)	Hours
<i>Dysidea herbacea</i> (methanol extract)	2.5	36
<i>Dysidea herbacea</i> (water extract)	39.2	60
<i>Gelloides callista</i> (water extract)	95.3	24
<i>Sigmatocia symbiotica</i> (water extract)	59.5	60
<i>Spirastrella vagabunda</i> (methanol extract)	125.5	60
<i>Callyspongia exigua</i> (water extract)	398.0	36

The most potent appears to be the methanol extract of *Dysidea herbacea*; it kills with the least toxin and at the shortest time.

Reference: GT Tayo. 1989. *Toxicity of some Philippine sponges*. *Kinaalam* 2 (2): 83-86. *Kinaalam* (the local term for knowledge or wisdom) is a publication of the Graduate School, University of the Philippines in the Visayas, Miagao, Iloilo 5023, Philippines.

