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RESEARCH REPORTS

SUSTAINABLE AQUACULTURE FOR A SECURE FUTURE

Title: Acute and sublethal growth effects of un-ionized ammonia to Nile tilapia *Oreochromis niloticus*

Author(s): Abdelmoez A. F. Abdalla
Department of Fisheries and Wildlife
Michigan State University
East Lansing, Michigan 48823

Clarence D McNabb
Department of Fisheries and Wildlife
Michigan State University
East Lansing, Michigan 48823

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Abstract: This study investigated the acute effects of un-ionized ammonia (NH₃-N) on 11 g fingerlings of Nile tilapia *Oreochromis niloticus* at two temperatures (23 and 33°C); and at 28°C with two sizes of fish, 3 and 45 g. In addition, sublethal effects of un-ionized ammonia on growth of Nile tilapia at 28°C were evaluated. All tests were conducted in flow-through bioassay system.

In acute toxicity tests at 23 and 33°C, the 96-h LC50's (±SD) were 2.25 ± 0.07 and 2.51 ± 0.16 mg/L NH₃-N, respectively. There was not a significant effect between the two temperatures on acute toxicity of NH₃-N in these tests (*P* 0.05). Estimates of the 96-h LC50's (± SD) at 28°C were 1.36 ± 0.45 mg/L NH₃-N for the small fish and 2.65 ± 0.09 mg/L NH₃-N for the large fish. In these tests, there was a significant difference between the two sizes of fish tested (*P* 0.05). In 35-day study of the effects of sublethal concentrations of NH₃-N at 28°C, there was a linear decrease in fish weight gain with increasing un-ionized ammonia concentrations (*r*² = 0.90, *P* 0.001). The concentrations of un-ionized ammonia that cause no reduction in growth, 50% reduction in growth, and 100% reduction in growth were 0.06, 0.73, and 1.46 mg/L NH₃-N, respectively. These data suggest that Nile tilapia has tolerance to un-ionized ammonia similar to that of tilapia species, somewhat greater than that of channel catfish, and greater than that of many other warmwater fish and salmonids.

This abstract was excerpted from the original paper, which was published in D. Randall and D. MacKinlay (Editors), Nitrogen Production and Excretion in Fish. International Congress on the Biology of Fish, Symposium Proceedings, July 27-30 1998, pp. 35-44.

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