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CONTAMINATION IN NILE TILAPIA (*Oreochromis niloticus*)
COLLECTED FROM NAIC AND KAWIT, CAVITE

THESIS

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LEAD CONTAMINATION IN NILE TILAPIA (*Oreochromis niloticus*)
COLLECTED FROM NAIC AND KAWIT, CAVITE

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ABSTRACT

DENNIS R. REYES, and MAUREEN L. ENCALLADO, “Lead Contamination in Pondwater, Liver and Gonads of Nile Tilapia (*Oreochromis niloticus*) Collected from Naic and Kawit, Cavite”. Undergraduate Thesis Bachelor of Science in Biology. Cavite State University April 2007. Adviser. Mrs. Rosemarie R. Calma.

This study was done to detect the presence of lead within the coastal municipalities of Naic, and Kawit Cavite. Histopathological examination of the liver and gonads of *O. niloticus* was also done to describe the effects of lead on these tissues. A relationship was drawn between the body parameters and the gonadosomatic index or hepatosomatic index, and between physicochemical parameters and lead level to verify the damage brought about by the presence of lead as contaminants in the selected sampling sites.

A completely randomized design (CRD) scheme with lead level and frequency of sampling in the two lowland towns of Cavite, namely Naic and Kawit, were utilized and tilapia samples were randomly collected from these experimental areas three times at four-week interval.

The pH and DO levels were not significantly different between the two sites except hardness (CaCO_3). The bioavailability of lead is strongly enhanced at decreasing pH these result was observed to be within the recommended pH range of 6.8 to 8.0 suitable for fish growth and may not increase the toxicity of lead for tilapia. A lesser DO level of 5mg/L ppm may not be considered lethal, its growth and reproduction might be adversely affected. Water hardness (CaCO_3) was higher in Kawit than in Naic, indicating that there were more suspended solids as pollutants in Kawit lake making it turbid and

almost basic. Overall results suggested that tilapia would grow better in Kawit than in Naic due to higher pH and availability of nutrients.

Results showed that the lead level concentrations in Naic and Kawit were 0.19 ± 0.08 and 0.09 ± 0.17 respectively and was not significant at $P < 0.05$ level. Body weight of fish was influenced by the change in body width but not the length, similarly, body weight or width were not indicators of liver weight or gonad weight in tilapia and other body parameters in general.

The organosomatic indices were analyzed and results showed that the HSI was highly correlated with mean liver weights of the fish collected from both sites; it was not influenced by a change in its body weight. This indicates that liver weight was a good bioindicator. GSI was useful in determining the reproductive maturity of the fish and not its body weight.

Histopathological evidences revealed that the tilapia samples collected had tumor-like growth in between hepatocytes. Pyknosis and necrosis were also observed in the liver tissues, while the testes showed distorted spermatogonia. The gonadal histopathological examinations remain speculative since distortion may also be attributed to spawning.

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INTRODUCTION

Rapid urbanization, which resulted from the increased number of mismanaged wastes and proliferation of shanties and illegal structures along riverbanks and coastal areas are some of the major drawbacks to aquaculture industry. In addition, the untreated and otherwise improperly treated waste water discharges and garbage from industrial and domestic establishments and the existence of a large number of stationary fish pens in the coastal areas lead to the degradation of sea bed and water quality and posed human health hazards. To resolve this problem, water monitoring activities were conducted in 1993 from river mouths of Manila Bay. Results showed that Cavite had the highest concentration of copper and lead, mercury and zinc in Pampanga and cadmium in Metro Manila (PAMSEA & MBEMP TWG-RRA, 2004). In another situation, the Calumpang River in Batangas City was tested to contain lead and cadmium ten times higher than the DENR standards for natural waters (class C) suggesting a heavily polluted state (Gonzalez and Carandang, 2006). Likewise, Bacoar Bay had lead concentration ten