

## Immunotoxicity and hepatic function evaluation in Nile tilapia (*Oreochromis niloticus*) exposed to diazinon

Girón-Pérez Manuel Iván<sup>a,b,\*,1</sup>, Santerre Anne<sup>a,1</sup>, Gonzalez-Jaime Fabiola<sup>c</sup>, Casas-Solis Josefina<sup>a</sup>, Hernández-Coronado Marcela<sup>a,1</sup>, Peregrina-Sandoval Jorge<sup>a,1</sup>, Takemura Akiro<sup>d</sup>, Zaitseva Galina<sup>a,1</sup>

<sup>a</sup> University of Guadalajara, Cellular and Molecular Biology Department, Carretera a Nogales Km 15.5, Las Agujas, Zapopan, 45110 Jalisco, Mexico

<sup>b</sup> Autonomous University of Nayarit, Cd de la Cultura Amado Nervo Blvd, Tepic-Xalisco S/N, Tepic, Nayarit, Mexico

<sup>c</sup> Hospital ISSSTE "Águiles Calles Ramírez", Paseo de la Loma S/N, Tepic, Nayarit, Mexico

<sup>d</sup> University of the Ryukyus, Tropical Biosphere Research Center, Sesoko Station, 3422 Sesoko, Motobu, Okinawa 905-0227, Japan

Received 10 October 2006; revised 26 January 2007; accepted 15 February 2007

Available online 25 February 2007

### Abstract

The LC<sub>50</sub> of the organophosphorus pesticides (OPs) diazinon to Nile tilapia (*Oreochromis niloticus*) was determined, thereafter, hepatic activity, phagocytic index, percentages of active cells, relative spleen weight, total IgM concentration and lymphoproliferation rates were compared between diazinon exposed groups (LC<sub>50</sub> and ½LC<sub>50</sub>) and non-exposed control group.

Experimental data show that diazinon is highly toxic for juvenile Nile tilapia (LC<sub>50</sub> = 7.830 ppm) and presents immunotoxic properties which affect both the innate and cellular adaptive immune responses of this fish, as revealed by the fact that splenocyte proliferation and phagocytic indices were significantly decreased after acute exposure to the pesticide. However, the hepatic biochemical parameters and the total circulating IgM concentrations were not affected in this experimental model.

© 2007 Elsevier Ltd. All rights reserved.

**Keywords:** Diazinon; Acute toxicity; Nile tilapia; Hepatic function; Immune system

### 1. Introduction

The immune system of aquatic organisms, such as fish, is continuously affected by periodic or unexpected changes of their environment. Adverse environmental situations may acutely or chronically stress the health of fish, altering some of their biochemical parameters and suppressing their innate and adaptive immune responses [1].

\* Corresponding author. Autonomous University of Nayarit, Contamination and Toxicology Environmental Laboratory, Cd de la Cultura Amado Nervo Blvd, Tepic-Xalisco S/N, 63000 Tepic, Nayarit, Mexico. Tel./fax: +52 33 37 77 11 91.

E-mail addresses: ivan\_giron@hotmail.com (M.I. Girón-Pérez), asanter@cucba.udg.mx (A. Santerre), fabyglezjaime@hotmail.com (F. Gonzalez-Jaime), jcasas@cucba.udg.mx (J. Casas-Solis), marcebu@gmail.com (M. Hernández-Coronado), psj15969@cucba.udg.mx (J. Peregrina-Sandoval), tilapia@lab.u-ryukyu.ac.jp (A. Takemura), zgalina@cucba.udg.mx (G. Zaitseva).

<sup>1</sup> Tel./fax: +52 33 32 73 83 75.