

TOXICITY OF 2-PHENOXYETHANOL AND PROPISCIN AS A NEW ANESTHETIC FOR LARVAL SEA BASS *DICENTRARCHUS LABRAX*, L.

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Abstract

Toxicity of two anesthetics, 2- phenoxyethanol and Propiscin, was examined on the larval sea bass (*Dicentrarchus labrax*, L.). Both anesthetics showed low toxicity, Propiscin exhibited much lower LT_{50} than 2-phenoxyethanol. Mortalities after 96 h were induced with Propiscin at lower concentrations than for 2-phenoxyethanol. It can be concluded that 2-phenoxyethanol is a better choice for anesthesia of larval sea bass.

Keywords: larval sea bass, 2-phenoxyethanol, Propiscin, toxicity

Introduction

The studies of anesthetic efficacy have been conducted mostly on juvenile and adult freshwater fish, and little is known about the toxicity concentrations for earlier life stages of fish, especially marine ones (1). The goal of this study was to establish the toxicity concentration of 2-phenoxyethanol and Propiscin when used for anesthesia on larval sea bass, *Dicentrarchus labrax*.

Materials and Methods

Groups of 10 sea bass larvae were randomly put in glass aquarium and the rest of 30 larvae were put in the control tank with aeration and photoperiod of 12 h. Temperature, pH and salinity were measured daily. A short-term bioassay was performed according to (2, 3). The median survival time (LT_{50}) was determined for each concentration of test substance according (2,3). Differences between mean survival time (LT_{50}) at the same concentrations were tested by ANOVA.

Larvae were exposed to 7 different concentrations (two replicates per concentration) of Propiscin (0.2% stabilized solution of etomidate) on logarithmic scale: 0.032, 0.056, 0.1, 0.18, 0.32, 0.56 and 1.00 ml/l, and to 5 different concentrations (two replicates per concentration) of 2- phenoxyethanol on logarithmic scale: 0.18, 0.24, 0.28, 0.32, 0.56 and 1.00 ml/l.

Results

The average temperature, salinity and pH in vessels with 2-phenoxyethanol was 18.5°C, 36.6‰ and 8.12. Fish weighted 0.39 ± 0.10 g. No mortalities were observed in both control tanks. At 0.032 and 0.056 mg/l concentrations no mortality was observed up to 96 h. At 0.1 mg/l, 10% mortality occurred after 48 h, being zero for longer time periods. At 0.18 mg/l, mortality started after 36 h. At concentrations higher than 0.32 mg/l, the mortality was 100% in the first hour of the experiment. Because of the evident difference between the mortalities related to the 0.18 and 0.32 mg/l concentrations, two additional concentrations were tested, 0.24 and 0.28 mg/l (Fig. 1). The latter lead to 80% mortality in 96 h.

In tanks with Propiscin, the average temperature, salinity and pH were 18.42 °C, 37,08 ‰ and 8.10. Fish weighted 0.33 ± 0.09 g.

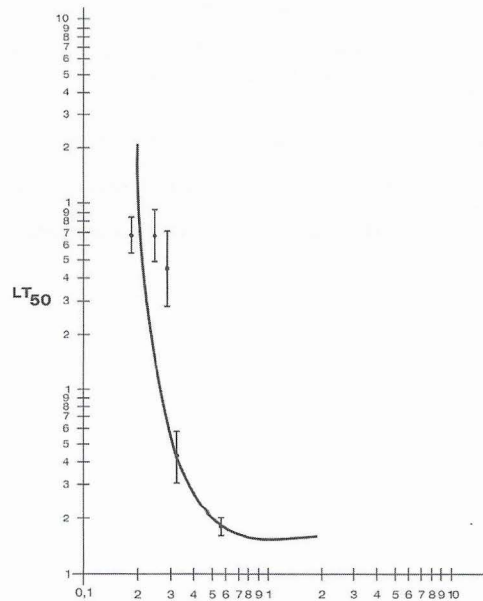


Fig. 1. Median survival time (LT_{50}) at different concentration (ml/l) of 2-phenoxyethanol on larval sea bass.

Propiscin induced mortalities at all concentrations. In first 1 h, mortalities were observed for 1 and 0.56 ml/l. After 12 h, all fish died at 0.32 ml/l (Fig. 2). In all cases, mortality was observed at times < 96 h.

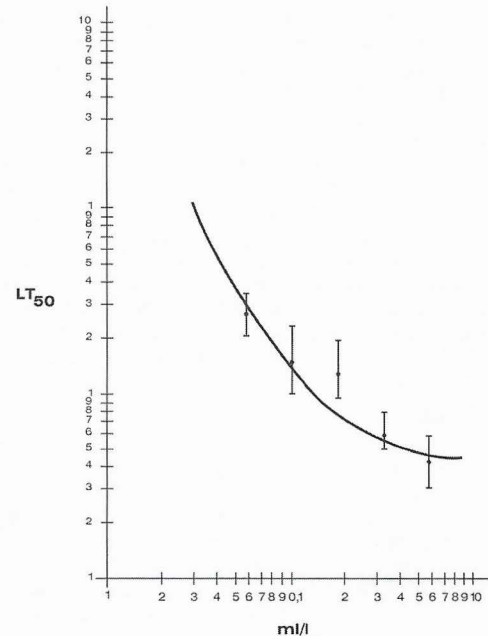


Fig. 2. Median survival time (LT_{50}) at different concentration (ml/l) of Propiscin on larval sea bass.

Discussion

Propiscin induced mortalities after 96 h at concentrations that were non-toxic when fish were treated with 2-phenoxyethanol. The median survival time at same concentrations of both anesthetics also differed ($F=0.775$, $d.f.1$, $P=0.389$) with Propiscin having much lower LT_{50} than 2-phenoxyethanol pointing to its elevated toxicity for larval sea bass.

Evaluated concentrations of etomidate for four different freshwater fish show almost the same concentration range suitable for anesthesia (4). For safe fish anesthesia, 2-phenoxyethanol is mainly used at concentrations of 0.3-0.4 ml/l (5). Our results showed that the concentration most suitable for anesthesia was 0.56 ml/l for Propiscin and the most safe concentration of 2-phenoxyethanol was 0.32 ml/l. The results showed that 2-phenoxyethanol was more suitable as an anesthetic for larval sea bass than Propiscin.

References

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