



Tropentag, September 19-21, 2012, Göttingen -
Kassel/Witzenhausen

“Resilience of agricultural systems against crises”

Nonsteroidal Anti-inflammatory Drugs (NSADS) for Reproduction Control in Nile Tilapia

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Abstract

Several studies have been conducted to detect the direct effect of inhibiting the aromatase activity, the rate limiting enzyme that converts androgens to estrogens needed for ovarian differentiation in fish to overcome the immediate need for a more environmentally friendly substitute of methyl testosterone. Cyclooxygenase (COX)-inhibitors are potent and irreversible inhibitors of the COX pathway. Since studies on human breast cancer cells showed that COX-inhibitors decreased aromatase messenger ribonucleic acid (mRNA) expression at the transcriptional level we tested the hypothesis of possible aromatase inhibition by the non-selective COX-inhibitors in fry fish tilapia during the crucial period of sexual differentiation. The effects of supplementation of COX1-inhibitors (diclofenac and ibuprofen) and COX2-inhibitors (etodolac and etoricoxib) in the diets of tilapia on growth rate, mortality and sexual differentiation were studied. Furthermore, determination of etoricoxib in fish feces using reversed-phase high performance liquid chromatography (RF-HPLC) with evaporative light scattering and photo diode array detector (ELSD-PDA system) was carried out. Three group experiments were run for 7 months at the Aquaculture Research Laboratory, Al-Quds University, Jerusalem. In experiment 1, 20 genetically females (XX) larvae were stocked in triplicates in a closed system and were given control diet (C group) and a diet supplemented with 10 mg kg⁻¹ diclofenac (1 % diclofenac group), 5 mg kg⁻¹ ibuprofen (0.5 % ibuprofen group) and 5 mg kg⁻¹ diclofenac (0.5 % diclofenac group), respectively, for 4 weeks. After the 4th week all diets were changed to control diet. Results showed that COX-inhibitors could increase growth and alter reproduction in Nile tilapia but subsequent field investigations are needed to confirm these results using different classes of COX-inhibitors at different concentrations. They were well tolerated by fish except for diclofenac that showed high mortality.

Keywords: Aquaculture, nonsteroidal drugs, reproduction control, Tilapia