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Effect of a Saponin Fraction Extracted from *Trigonella foenum-graecum* L. and two Commercially available Saponins on Sex Ratio and Gonad Histology of Nile Tilapia (*Oreochromis niloticus*, L.) Fry

TIMO STADTLANDER¹, BERTA LEVAVI-SIVAN², H. DWEIK³, MUTAZ QUTOB³, SALEH ABU-LAFI³, ZOHAR KEREM⁴, GEORGE FRANCIS¹, ULFERT FOCKEN^{5,1}, KLAUS BECKER¹

¹University of Hohenheim, Department of Animal Production in the Tropics and Subtropics, Germany

²The Hebrew University, Department of Animal Sciences, Israel

³Al-Quds University, Faculty of Science and Technology, Israel

⁴The Hebrew University, Institute of Biochemistry, Food Science and Nutrition, Israel

⁵Johann Heinrich von Thuenen-Institut (vTI), Institute for Fisheries Ecology, Ahrensburg Branch, Germany

Abstract

Besides cyprinids, Nile tilapia (*Oreochromis niloticus* L.) are the most abundantly produced freshwater fish. Several production systems exist but for high gross profit margins only male monosex production is of interest. This is usually achieved by adding androgens to the diet of first feeding tilapia. The most abundant androgen used is 17 α -methyltestosterone (MT), which is prohibited for use as feed additive in the EU. Furthermore, MT is carcinogenic for humans and MT-rich effluents can cause environmental problems. In our previous experiment, saponins extracted from *Quillaja saponaria* (M.) inhibited aromatase activity *in vitro*. It has been shown that aromatase inhibition leads to masculinisation in fishes. We report the results of an experiment in which three different saponins were tested for their effect on sex ratio and gonad histology of Nile tilapia.

A saponin fraction extracted from *Trigonella foenum-graecum*, and commercially available saponins (*Quillaja* saponin and Diosgenin) were added in different concentrations (150–1000 ppm) to the diets. A total of 1080 Nile tilapia fry were divided into nine groups and stocked at 40 fish per tank in 27 tanks in a flow-through system. Starting six days after hatching, tilapia larvae were fed a control diet and eight different experimental diets (150 and 300 ppm *Trigonella* saponins, 150, 300 and 1000 ppm each for *Quillaja* saponins and Diosgenin) for 28 days. There were three replicates for each treatment. At the end of the experimental feeding, fish were transferred into a recirculation system and fed for 10 more weeks with a commercial tilapia diet. Thereafter they were killed, sexed and random gonad samples taken for histology. Sex ratios in some treatments ranged from 28 % to 67 % males. No treatment group was, however, statistically different ($p > 0.05$) from control and the other treatments. There were no obvious differences in the histology of the gonads. The results of this study are different from those obtained in a previous study in which *Trigonella foenum-graecum* saponins showed a masculinisation effect in Nile tilapia. We conclude that the tested saponins in the applied concentrations are not suitable to be considered as an alternative to MT.

Keywords: Aromatase, masculinisation, methyltestosterone, Nile tilapia, saponins

Contact Address: Ulfert Focken, Johann Heinrich von Thuenen-Institut (vTI), Institute for Fisheries Ecology, Ahrensburg Branch, Wulfsdorfer Weg 204, 22926 Ahrensburg, Germany, e-mail: ulfert.focken@vti.bund.de