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## Effects of *Quillaja* saponin supplementation on the growth performance and reproductive activity of saline tolerant tilapia *Oreochromis niloticus*

### Introduction

The early maturation and frequent spawning attributes of tilapia *Oreochromis niloticus*, resulting in its production at unmarketable size, has prompted several workers to find ways of controlling reproduction in order to produce good-sized fish. The technique of using hormones to sexually inverse tilapia to an all male stock has become practice in farm production, however it prompts apprehension among fish consumers due to its possible negative effect on human health and it is even prohibited in some countries. Saponin, a glycoside linked to hydrophobic aglycone (sapogenin) that may be a steroid in nature, can be an alternative to androgenic hormones used for tilapia sex inversion and sterility. Studies on the effect of saponin on the reproductive activity of tilapia recently showed possible infertility in females and a sex inversion to an all male population when reared under laboratory conditions. These positive results of saponin in aquaria experiments however required testing under pond production conditions to ascertain its benefit to commercial aquaculture.

### Materials and methods

A commercially available tilapia feed, supplemented with 0, 300 and 700 mg/kg *Quillaja* saponin was fed to saline tolerant 22-25 day old tilapia reared in brackish water ponds (pond size 500 m<sup>2</sup>, 1 fish per m<sup>2</sup>) with three replicates in a randomised complete block design (RCBD) over a period of 120 days. Growth parameters (length, weight, specific growth rate) as well as reproductive parameters of tilapia (number of mature breeders, sex ratio, egg development stages and egg diameter) were determined.



Fig. 1: Tilapia *Oreochromis niloticus*

### Results and conclusions

Final weight and survival of saline tolerant tilapia did not differ after 120 days of pond culture. However, there was a significantly higher number of mouth breeders in the negative control ( $p < 0.05$ ) and furthermore a tendency ( $p < 0.1$ ) for a higher number of males in one saponin treated group (300 mg/kg). Higher numbers of eggs in the vitellogenic stage were observed in the negative control group compared to both saponin treatments, but without statistical significance.

These results confirm the potential of *Quillaja* saponin as a substitute to hormones in the control of reproduction to produce good-sized fish and sex inversion of tilapia. The non-detection of significant effects on egg development may have been due to too small sample sizes. It is therefore suggested to repeat trials with saponin application in more than just one growth period.

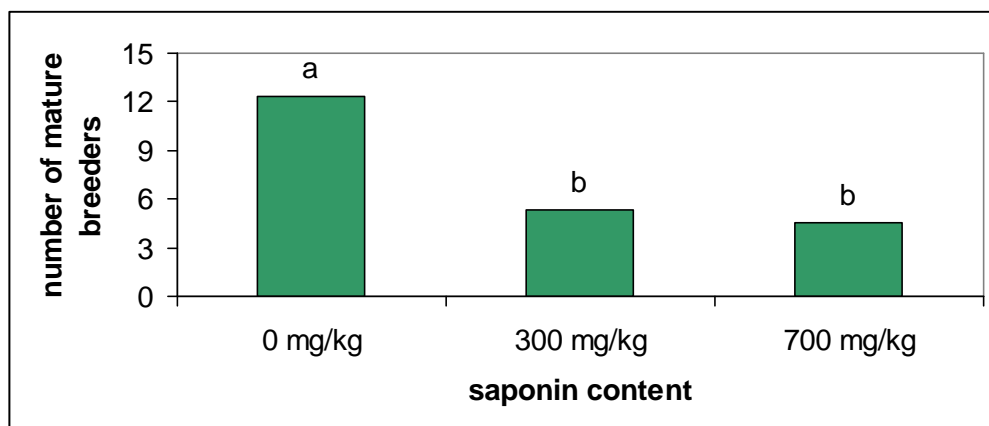


Fig. 2: Number of mature tilapia breeders after 120 days earthen pond culture