

**EFFECT OF DIET COMPOSITION ON NILE
TILAPIA GROWTH PERFORMANCE AND
MICROBIAL COMMUNITY STRUCTURE OF
GUT AND REARING WATER**

By

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AHMED**

B.Sc. Agric. Sci. (Biotechnology), Fac. Agric., Cairo Univ., 2011

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ABSTRACT

Two experiments were performed at the Fish Nutrition Laboratory (FNL), Department of Animal Production, Faculty of Agriculture, Cairo University, Egypt. Each experiment lasted one month using circular plastic tanks (85 L used to 55 L capacity). The first experiment aimed to evaluate the effects of four carbon sources of gradual complexity; glucose, starch, molasses and cellulose on the integrity of biofloc system. Twelve circular plastic tanks were stocked with 10 tilapia fingerlings stocked each with average body weight 9.14 ± 0.06 g. All water quality parameters were within normal limits for tilapia culture. Cellulose treatment showed the highest significant average final body weight and the best FCR. Cellulose recorded the lowest zooplankton count with no significant differences among treatments. Rotifers (*Philodina* and *Lucane bulla* sp.) dominated the zooplanktons. In conclusion, cellulose could be an efficient carbon source under BFT system conditions. The second experiment was designed to study the effects of soybean meal protein substitution by sesame meal protein with percentages (0 (control), 25 and 50 %) on the microbial community of Nile tilapia gut and rearing water under biofloc system conditions. Nine circular plastic tanks were used as experimental units for different treatments in triplicate. Each tank was stocked with 10 tilapia fingerlings with average body weight of 18.27 ± 0.1 g. Water quality parameters were within normal limits for tilapia culture and there were no significant differences except for TAN value of fish group fed diet (SM_{50%}) which was significantly the lowest among other treatments. No significant differences were noticed on different rearing water samples regarding microbial count. However, *Bacillus* and *Lactobacillus* count decreased non-significantly as a result of increasing sesame meal inclusion in the diet. While *Staphylococcus* count increased non-significantly in both water and gut samples. The total zooplankton count decreased as the sesame inclusion increased in fish diet. It could be concluded that the sesame addition to diet in high percentage is not recommended in biofloc system. BFT depends on bacterial activity like *Bacillus*, 25 % of soybean meal protein substitution with sesame meal protein could be less detrimental for BFT system and maintaining the health and immunological benefits for fish.

Keywords: Tilapia, Carbon sources, Molasses, Cellulose, Starch, Glucose, Sesame, Microbiota.

DEDICATION

Thank God Almighty The beneficent and Merciful for the completion of this achievement.

I dedicate this work to my parents, dear Mother, Father and Sister.

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LIST OF ABBREVIATIONS

APHA	American Public Health Association
BFT	Biofloc technology
C: N	Carbon /nitrogen ratio
Ca.	Calculated
DHA	Docosahexaenoic , 22:6n-3
EPA	Eicosapentaenoic , 20:5n-3
FA	Fatty acid
HUFA	Highly unsaturated fatty acid
LC-PUFA	Long chain poly unsaturated fatty acid
MC-PUFA	Medium-chain poly unsaturated fatty acid
Mg/L	Milligram /liter
Mt	Metric tons
MUFA	Mono unsaturated fatty acid
OA	Oleic acid , 18:1n-9
Rpm	Revolutions per minute
PPM	Part per million
PPT	Part per thousand
PUFA	Poly unsaturated fatty acid
SBM	Soybean meal
SFA	Saturated fatty acid
SM_{25%}	25 % sesame meal protein replacement of soybean meal protein
SM_{50%}	50 % sesame meal protein replacement of soybean meal protein
TSS	Total suspended solids

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