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Studies on Effects of Aquaboost and Megavit on the Growth Performances of Thai Pangus(*Pangasius sutchi*) in Pond Condition

Sonia Sku, Saymuna Tarin Lupa, Md. Nazmul Hossen and Md. Kamal[1]
Bangladesh Fisheries Research Institute, Mymensingh-2201, Bangladesh
1 Department of Fisheries Technology, Faculty of Fisheries, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

Abstract: *The study was carried out in 12 ponds to evaluate effects of two growth promoter aqua drugs, Aquaboost and Megavit on the growth performances of Thai Pangas (Pangasius sutchi) in pond environment. The experiment was conducted for 60 days with six different treatments and two replications in each treatment. Formulated feed with six different doses in per kg feed were used for six different treatments: T_1- Controlled (no dose); T_2- Less than recommended dose (0.66g/kg); T_3- Recommended dose (1g/kg); T_4- More than recommended dose (1.33g/kg); T_5- more than recommended dose (1.40g/kg) and T_6- more than recommended dose (1.50g/ kg). Each pond area was 1 decimal and 50 fishes/ decimal were stocked. Average initial body weight of fish was 50g. Aqua drugs mixing feed were fed two times daily at the rate of 10% body weight of fish. Growth performance of the fish was monitored every 15days interval. The water quality parameters of experimental ponds were recorded and they were within acceptable limit. In case of Aquaboost, the final weight gain in different treatments after 60 days of rearing were: 79±0.85g in control (T_1); 84±0.63g in T_2; 96±1.24g in T_3; 112±1.12g in T_4; 98±1.32g in T_5 and 96±1.33 in T_6. Best growth performances were evident in treatment T_4 which was more than one step of recommended dose (1.33g/kg feed). The recommended dose of 1g/kg feed was used in T_3 and the growth of 96±1.24g was obtained from this treatment. In case of Megavit, the final weight gain in different treatments after 60 days of rearing were: 77±0.55g in control (T_1); 81±0.66g in T_2; 97±1.44g in T_3; 115±1.05g in T_4; 89±2.02g in T_5 and 92±1.22 in T_6. Best growth performances were evident in treatment T_4 which was more than one step of recommended dose (1.33g/kg feed). The recommended dose of 1g/kg feed was used in T_3 and the growth of 97±1.44g was obtained from this treatment. The highest specific growth rate of 0.005% to 0.006% was observed in feed containing the dose 1.33g/kg in both Aquaboost and Megavit and significantly ($p<0.05$) higher than the control and other doses. The moisture, lipid, crude protein and ash content of feed containing either Aquaboost or Megavit were in the range of 12.36% to 16.24%; 7.70% to 8.90%; 23.10% to 24.68% and 12.02% to 13.72%, respectively. Water quality parameters such as temperature was ranged from 27.3±0.6 to29.5±1.5^{0}C, pH ranged between 6.3±0.31 to 7.41±0.1, Alkalinity 140±20.4 to 105±5.5, DO 4.5±0.31 to 5.73±0.7, Hardness150±12 to 300±10, Nitrite0.004±0.001 to 0.10±0.1 and Ammonia 0.001±0.00 to 0.03±0.001 found where optimum range for fish culture according to Boyd (1998) temperature was 25-30^{0}C, pH 6.5-8.5, Alkalinity 20-200 mg/l, DO4-8, Hardness 40-400mg/l, Nitrite<3mg/l and Ammonia 0.2-2mg/l.*

Key words: *Aquaboost, Megavit, pond environment, Specific growth rate, Pangasius sutchi.*

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I. Introduction

In recent years, aquaculture development elsewhere in the world relies largely on feeds and antibiotics, aqua drugs and chemicals. Aquaculture in developing countries does not follow strict regulatory guidelines for use of chemicals and aqua-drugs. Farmers or workers who use chemicals and aqua-drugs in farming system have little or no knowledge about safe and efficient use of these aqua-drugs. Even generic names of many drugs are not known. So, it is important to have safe aqua drugs with safety doses for sustaining aquaculture in Bangladesh. Aqua medicines are indeed essential ingredients for successfully managing the aquaculture. There are several aqua-medicinal products which have been used elsewhere in the world mainly for health management of cultured fish. These are sodium chloride, formalin, malachite green, methylene blue, potassium permanganate, glutaraldehyde and tryfliralin (Plump, 1992; Phillips, 1996;Hasan and Ahmed, 2002; Brown and Brooks, 2002; DOF, 2002).There are also other aqua-medicinal products used in pond construction, health management, soil and water management, enhancement of natural aquatic productivity, transportation of live organism, feed formulation, manipulation and enhancement of production, growth promotion and processing

value enhancement of final product (Alderman *et al.*, 1994; GESAMP, 1997). Most of the farmers in Bangladesh have very little knowledge about appropriate dosage and methods of application of aqua-medicinal products. In a previous study, the efficacy of Aquaboost and Megavit in different doses mixing with feed was tried for growth performance of Thai Pangas in aquarium condition (Sku *et al.*, 2017). The results were positive only in the case of Aquaboost and Megavit used more than recommended doses. The present study was conducted to evaluate the growth performance of Pangas using different doses of Aquaboost and Megavit in Pangas feed in pond conditions.

II. Materials And Methods

Experimental site

The research was conducted in research ponds of the Department of Fisheries Technology, Bangladesh Agricultural University campus, Mymensingh for 60 days. Different doses of Aquaboost and Megavit were used to evaluate their efficacy on growth performance of Thai Pangas in pond environment.

Pond preparation

A total of 12 ponds, each 1 decimal, square in size and depth 3.5-4 feet each were used in this experiment in 6 treatments with 2 replicates in each treatment. Ponds area was free from aquatic vegetation and well exposed to sunlight. The embankment was well protected and covered with grass. Before starting the experiment, the ponds were renovated, dried and cleaned of aquatic vegetation manually. Deep tube-well water was used in the ponds and 50 Pangas fingerlings each average body weight of 50 g was stocked in each pond. Experimental fish fingerlings were fed with different doses of Aquaboost and Megavit mixing with feed at 10% body weight two times daily. Different ponds were used for different treatments. The growth performance of the experimental fishes was monitored closely and regularly by taking samples with time interval.

Feed preparation

Rice husks (58.33%), maize flour (6.67%), mustard oilcake (15%), meat bone (15%) and dry fish meal (5%) were mixed with either Aquaboost and Megavit to prepare the feed. Prepared feed was divided into six treatments: (i) T_1 for control where no growth promoter was used in feed; (ii) T_2 for 0.66g/kg feed which was less than recommended dose; (iii) T_3 for designated for 1g/kg feed used as recommended dose; (iv) T_4 for 1.33g/kg feed; (v) T_5 for 1.40g/kg feed and (vi) T_6 for 1.50g/kg feed were used. Feed immediately after preparation was stored at 4^0C temperature until used for the experiment.

Proximate composition measurement

Proximate composition of prepared feed was determined according to the standard methods given in AOAC (2000).

Specific Growth Rate (SGR)

For the experiment, specific growth rate (SGR) was important to determine. SGR was measured by using following formula:

SGR (% day) = [log W_2- log W_1] /T_2- T_1.

Here, W_2= Mean final weight (g), W_1 = Mean initial weight (g), T_2 = Time at end of the experiment, T_1 = Time at initial of the experiment.

Water quality parameter measurement

Water quality is the most important limiting factor of fish production pond. Water quality parameters such as Ammonia (mg/l), nitrite (mg/l), dissolved oxygen (mg/l), pH, hardness (mg/l) and alkalinity (mg/l) were measured by using different testing kit were monitored with a certain time interval during feeding trial. Samples, water and fish were usually collected in between 7.00 to 10.00 am.

Statistical analysis

The data obtained from this study were analyzed for ANOVA. The mean values compared using Duncan's Multiple Ranged Test (DMRT) to identify the level of significance of variance among the treatments as post-hoc test using SPSS (Statistical Package for Social Science, version 11.5) statistical software (SPSS mc; Chicago. USA). Significant differences were determined among treatments at the 5 % level ($P < 0.05$).

III. Result

Growth performance of Aquaboost on Thai Pangas

The results on growth performances of Thai Pangas feeding with different doses of Aquaboost in different treatments were presented in Fig 1. The result shows that there was a positive trend of growth in

experimental fishes in all treatments during 60 days of experiments. The initial average weight of the fingerlings stocked in the pond was 50g. The final weight gain in different treatments after 60 days of rearing were: 79±0.85g in control (T_1); 84±0.63g in T_2; 96±1.24g in T_3; 112±1.12g in T_4; 98±1.32g in T_5 and 96±1.33 in T_6. The results also showed that there was increasing trend in growth performances of the Pangas fish feeding with increasing dose of Aquaboost until one step more than recommended doses and then the growth performance decreased with the further increases of Aquaboost in the diet. Best growth performances were evident in treatment T_4 which was more than one step of recommended dose (1.33g/kg feed). The recommended dose of 1g/kg feed was used in T_3 and the growth of 96±1.24g was obtained from this treatment.

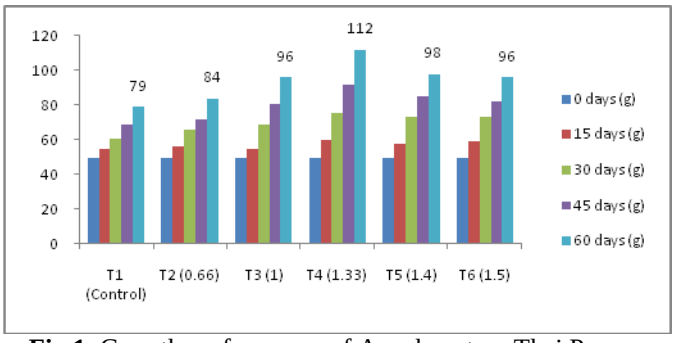

Fig 1: Growth performance of Aquaboost on Thai Pangas

Growth performance of Megavit on Thai Pangas

The results on growth performances of Thai Pangas feeding with different doses of Megavit in different treatments were presented in Fig 2. The result shows that the trend of growth performance of Pangas fish fingerlings feeding with different doses of Megavit was more less similar with growth performance observed in feeding trials of Aquaboost for Pangas. The initial average weight of the fingerlings stocked in the pond was 50g. The final weight gain in different treatments after 60 days of rearing were: 77±0.55g in control (T_1); 81±0.66g in T_2; 97±1.44g in T_3; 115±1.05g in T_4; 89±2.02g in T_5 and 92±1.22 in T_6. The results also showed that there was increasing trend in growth performances of the Pangas fish feeding with increasing dose of Megavit until one step more than recommended doses and then the growth performance decreased with the further increases of Megavit in the diet. Best growth performances were evident in treatment T_4 which was more than one step of recommended dose (1.33g/kg feed). The recommended dose of 1g/kg feed was used in T_3 and the growth of 97±1.44g was obtained from this treatment.

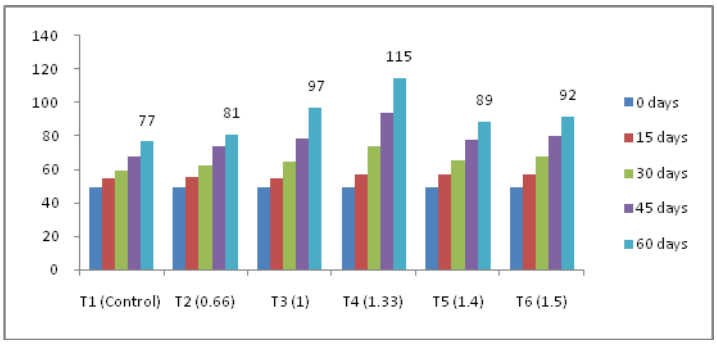

Fig 2: Growth performance of Megaviton Thai Pangas

Proximate composition of feed

Analysis of proximate composition of feeds showed that moisture content in feed prepared by mixing with different doses of Aquaboost and Megavit were more or less similar with little or no variation in moisture content. The moisture, lipid, crude protein and ash content were in the range of 12.36% to 16.24%; 7.70% to 8.90%; 23.10% to 24.68% and 12.02% to 13.72%, respectively. The crude fiber content was 7% and Carbohydrate 32% to 37%. The protein content of the feed used in the present experiment is little lesser than the suitable limit generally used for catfish where protein requirement is 25–50% (Robinson *et al.*, 2001).

Specific Growth Rate

The results of the specific growth rate of Pangas feeding with Aquaboost and Megavit are presented in Fig.3. In the present study, the specific growth ratevaries from 0.003% to 0.005% in Pangas feeding with

different doses of Aquaboost, while the values were in the range of 0.004% to 0.006% in Pangas feeding the feed with different doses of Megavit. The highest specific growth rate of 0.005% to 0.006% was observed in feed containing the dose 1.33g/kg in both Aquaboost and Megavit and significantly ($p<0.05$) higher than the control and other doses. In the present study, the highest survival rate of 98-99% was obtained from Treatment (T_4) feeding with either Aquaboost or megavit.

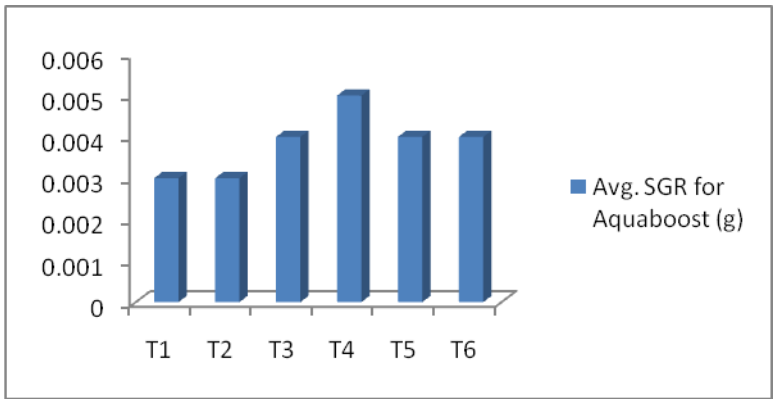

Fig 3: Average SGR of Pangas for Aquaboost.

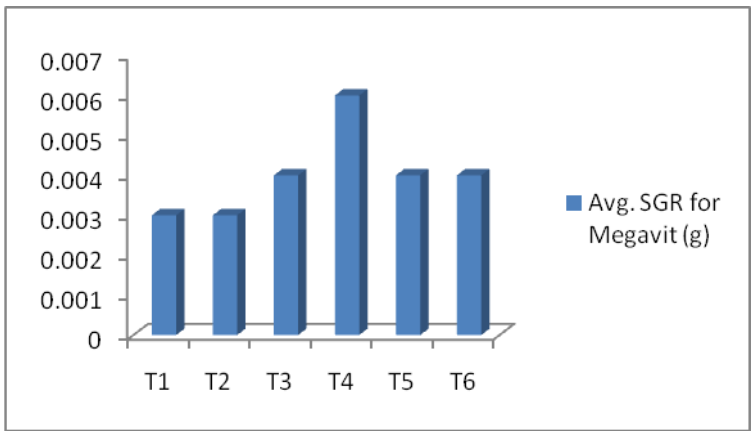

Fig 4: Average SGR of Pangas for Megavit

Water quality parameter

During the experimental period different water quality parameters were measured with testing kit and recorded fortnightly. The results are shown in Fig 5. The temperature was ranged from 27.3±0.6 to29.5±1.5^{0}C, pH ranged between 6.3±0.31 to 7.41±0.1, Alkalinity 140±20.4 to 105±5.5, DO 4.5±0.31 to 5.73±0.7, Hardness150±12 to 300±10, Nitrite0.004±0.001 to 0.10±0.1 and Ammonia0.001±0.00 to 0.03±0.001 found where optimum range for fish culture according to Boyd (1998) temperature was 25-30^{0}C, pH6.5-8.5, Alkalinity20-200 mg/l, DO4-8, Hardness 40-400mg/l, Nitrite<3mg/l and Ammonia 0.2-2mg/l.

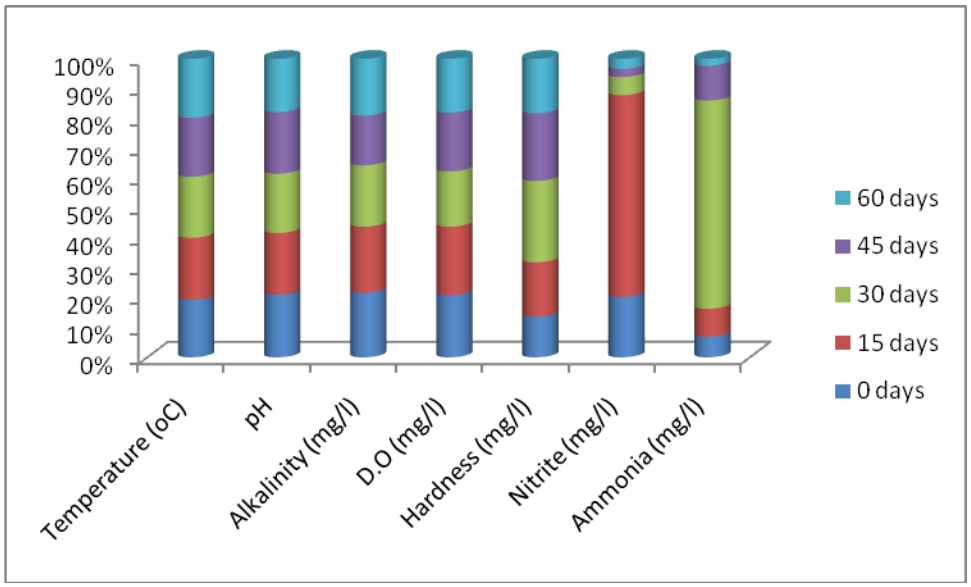

Fig 5: Water quality parameter of experimental pond

IV. Discussion

The results on growth performances of Thai Pangas feeding with different doses of either Aquaboost or Megavit in different treatments showed similar trend of growth performance .There was increasing trend in growth performances of the Pangas fish feeding with increasing dose of either Aquaboost or Megavit until one step more than recommended doses prescribed by the company. Then the growth performance decreased with the further increases of Aquaboost or Megavit in the diet. Best growth performances were evident in treatment T_4 which was more than one step of recommended dose (1.33g/kg feed). The results of growth performance and survivability obtained from the present study revealed that both Aquaboost or Megavit has growth promoting potency but the recommended dose prescribed by the company in the user manuals or indicated in the label of the packet/bottle is not appropriate dose for obtaining desired growth performances as well as survivability of Pangas. Incorporation of either Aquaboost or Megavit level of 1.33g/kg feed might be recommended as safe doge for Pangas fish and the fishermen can adopt it.

The results also indicated that after incorporation of certain level either Aquaboost or Megavit, in feed, the desired growth performances and survivability of Pangas were no achieved. This phenomenon is not clearly understood. This is may be related to some kind toxic effects of these two growth promoters, Aquboost and Megavit due to its over doses. If so it was not elucidated in the present study. Some previous studies on Nutricella Aqua, Rapid grow, Hepaprotect Aqua, Orgavit aqua also showed that one step more than recommended doses prescribed by the company were found for achieving the good growth performance other fishes (Islam, 2012).Available study also showed that the inclusion of the commercial probiotic Rapid Grow at a level of 0.05mg Kg-1 diet at stocking density rate of 250 fish/ decimal of mono-sex Tilapia (*O. niloticus*) is useful to get the best fish performance with friendly effects on the environment (Chandra *et al*., 2013). Marzouk *et al.,* (2008) observed that probiotics (*B. subtillis* and *Saccharomyces cerevisae*) exposed large enhancement in growth parameters of *O. niloticus*. After supplementation of Biogen® growth performance enhanced in Nile tilapia and catfish culture, respectively reported by El-Haroun *et al.,* (2006) and El-Haroun (2007). Shelby *et al.,* (2006) found that the probiotic used with juvenile channel catfish diet had lack effect on specific growth promoting. Also, He *et al.,* (2009) found that supplementation of dietary DVAQUA® reported no impacts on growth performance, feed conversion and survival rate of the hybrid tilapia.

Water is a primary component of all aquaculture ecosystems. Water quality is simply defined as the degree of excellence that given water possesses for the propagation of desirable aquatic organisms to achieve high survival, growth and reduction (Deo, 2006). A complete understanding of the relationship between water quality and aquatic productivity is a pre-requisite for optimum growth and survival (Boyd, 1982). The results obtained from the water quality parameters indicated that all the parameters were within the acceptable limit throughout the study period for the culture of Pangas.

V. Conclusions

Aquaboost and Megavit have growth promoting potency and can be used for the culture of Pangas. The safe levels of inclusion of these two aqua-drugs were 1.33g/kg. Both aqua drugs had no negative impact on water quality.

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