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## OPTIMIZATION OF DOSES OF MEGAVIT AND AQUABOOST ON THE GROWTH PERFORMANCE OF THAI PANGAS (*Pangasius sutchi*) IN AQUARIUM CONDITIONS

Sonia Sku, Md. Golam Sajed Riar\*, Sumit Kumer Paul<sup>1</sup>, Nur-A-Raushon and Md. Kamal<sup>1</sup>

Freshwater Station, Bangladesh Fisheries Research Institute, Mymensingh-2201, Bangladesh; <sup>1</sup>Department of Fisheries Technology, Faculty of Fisheries, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

\*Corresponding author: Md. Golam Sajed Riar; E-mail: riarsajed@yahoo.com

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### ABSTRACT

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The present study was conducted to optimize doses of Megavit and Aquaboost on the growth performance of Thai pangas (*Pangasius sutchi*) in aquarium conditions. Six treatment with three replications were used (i) control; (ii) with less than recommended dose (LD) of aqua drugs (0.66 g/kg of the feed); (iii) recommended dose (RD) of aqua drugs (1 g/kg of the feed) and (iv), (v) and (vi) more than recommended doses (MRD) of aqua drugs (1.33g/ kg, 1.40 g/kg and 1.50g/kg of the feed) for 28 days in aquarium condition. In each aquarium 10 fingerlings of average initial weight 9.35 g were stocked. Feed containing either Aquaboost or Megavit, fed at 10% body weight of fish two times daily. The body weight was determined with time interval. Mortality rate also recorded. In case control feed, body weight increased slightly from initial 9.35 to 10.75g in 28 days but a positive trend in growth performance of pangas was observed after feeding different doses of aquaboost medicated diets. The highest increased body weight of 13.28±0.08g was observed in the treatment (iv) containing 1.33g/kg aquaboost in the diet of more than recommended doses where in recommended dose (iii) of 1 g/kg, the body weight of pangas increased to 11.52±0.09g. However, with the more recommended doses (MRD), (iv), (v) and (vi) in the diets, growth performance was declined. Similar results were also observed when feeding Megavit to pangas in 28 days in aquarium.

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## INTRODUCTION

Aquaculture in Bangladesh is an important economic activity to the farmers and entrepreneurs. Now a day, pangas is an important fish species grown widely in our aquaculture system. Depending on the availability of fry the pangas has widely been spread throughout the country and become one of the most popular cultivable species due to its high yield and low production cost. It is now widely believed that various types of aqua-medicinal products are indeed essential ingredients for successful aquaculture which has been used in various forms for centuries (Subasinghe et al., 1996). Aquaculture chemicals are widely used for health management of aquatic animal, pond construction, soil and water quality management, improving natural aquatic productivity, transportation of live fish, feed formulation, manipulation of reproduction, growth promotion, processing and value addition of the final product (GESAMP, 1997 ; Subasinghe et al., 1996). It is clearly evident that intensification of aquaculture brings about the use of more chemicals and antibiotics in this sector.

Commonly used chemicals in Bangladesh aquaculture are lime, rotenone, various forms of inorganic and organic fertilizers, phostoxin, salt, dipterex, antimicrobials, potassium permanganate, copper sulphate, formalin, sumithion, melathion, etc. (Plumb, 1992; Alderman, 1992; Phillips, 1996; Hasan and Ahmed, 2002; Brown and Brooks, 2002; DoF, 2002 ; Faruk et al., 2004.)

Different types of aqua medicinal products are widely used in our aquaculture system. There is a little work done in the past to evaluate their efficacy and safe doses for the production of cultivable fish species. It is also fact that aqua medicinal products manufacturing companies are usually marketed these products in Bangladesh but farmers didn't follow the standard rules which is given by the researcher and the company. It is important to evaluate the performances of the aqua drugs through field testing and optimize their doses. The work has been undertaken to see the effects of two aqua drugs, Aquaboost and Megavit on the growth performance of pangas (*Pangasius sutchi*) initially in aquarium conditions.

## MATERIALS AND METHODS

### Study area

The study was carried out in aquariums of Fisheries Technology Laboratory, Bangladesh Agricultural University (BAU) campus, Mymensingh. Two aqua drugs; Aquaboost and Megavit were used as growth promoter and its effect on the growth performance of pangas. The total duration of the experiment continued for 28 days in aquarium conditions. The details of the experimental conditions are given below:

### Experimental conditions in aquarium:

Megavit and Aquaboost, both chemicals produced by Novartis were used to evaluate the effective doses for the growth performance of pangas (*Pangasius sutchi*). Six treatments with three replicates were used in aquarium condition. Ten fingerlings (9.35g average body weight) were stocked and fed at 10% body weight two times daily in each aquarium. Total water holding capacity of individual aquarium was 50 litres. All the aquaria were covered by a bamboo made net and aeration was provided with aerator. Water quality parameters such as pH, Temperature, alkalinity, hardness, NO<sub>3</sub>, ammonia and DO were examined properly.

### Feed Formulation

Pelleted feed containing either Aquaboost or Megavit were prepared with rice husks (58.33%), maize flour (6.67%), mustard oilcake (15%), meat bone (15%) and dry fish meal (5%). These feeds were divided into six groups: (i) control (feed was prepared without Aquaboost or Megavit), (ii) 0.66g/kg of feed (less than recommended dose) (iii) 1g/kg feed (recommended dose) (iv) 1.33g/kg (more than recommended dose), (v) 1.40g/kg (more than recommended dose) and (vi) 1.50g/kg (more than recommended dose), respectively. Feeds were dried and stored in refrigerated temperature 4°C. Feeds were prepared in Tora agro farm located Dhanikola of Trisal upazilla, Mymensingh. The proximate composition of applied feed was determined according to standard procedure.

### Analysis of proximate composition of feeds

Proximate composition such as Moisture, Ash, Crude Protein, Crude Lipid and Crude Fibre of prepared feed was determined according to the standard methods given in AOAC (1980).

### Specific Growth Rate (SGR)

The specific growth rate (SGR) was determined by using following formula:

$$\text{SGR (\% day)} = [\log W_2 - \log W_1] / T_2 - T_1$$

Here,

W<sub>2</sub> = Mean final weight (g), W<sub>1</sub> = Mean initial weight (g),

T<sub>2</sub> = Time at end of the experiment, T<sub>1</sub> = Time at initial of the experiment.

### Statistical analysis

The data obtained in the experiment were analyzed by using 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).

## RESULTS

### Proximate composition of feed

The result shows that moisture content in different medicated feeds and control feeds were more or less similar with little variation. The moisture content was in the range of 12.36 to 16.24%. The lipid content in the feed was in the range 7.70 to 8.90%, crude protein in the range of 23.10 to 24.68% and ash content in the range of 12.02 to 13.72%. There is little or no variation in crude fibre content which is within 7%. Carbohydrate was in the range of 32 to 37%. The composition of feeds in the present study is little lower than the acceptable limit for catfish where protein requirement is 25–50% (Robinson *et al* 2011).

Growth performance of pangas (*Pangasius sutchi*) after feeding different doses of Aquaboost tread feed has been presented in Table 2. After feeding control and medicated diets, the growth performance in different treatments were evaluated with time interval by taking sample weight from each treatment. In case control feed, body weight increased finally from 9.35g to 10.75g and a positive trend in growth performance was observed in other treatments after feeding different doses of medicated diets. The highest body weight increased from 9.35 g to 13.28±0.08g was observed in the treatment (iv) containing 1.33g/kg. The body weight increase in treatment (iii) containing recommended dose of 1 g/kg was 11.52±0.09g. The body weight declined considerably in case of more than recommended doses in the treatment (v) and (vi) (1.40g/kg and 1.50g/kg) over 1.33g/kg. The results indicate that 1.33g/kg Aquaboost in the diet might be safe dose for the pangas culture.

**Table 1.** Proximate composition of feed (\*= The values within parentheses are calculated based on dry weight basis)

Name of item	Moisture (%)	Lipid (%)	Crude protein (%)	Ash (%)	Crude fiber (%)	Carbohydrate (%)
Control feed	12.36	7.70 (8.78)*	23.10 (26.35)*	13.72 (15.65)*	6.56 (7.58)*	36.56 (41.72)*
Aquaboost (0.066 g/kg – 1.50 g/kg)	12.98 - 13.17	8.56 (9.85)* 8.90 (10.22)*	24.50 (28.21)* 24.68 (28.34)*	12.03 (13.85)* 12.02 (14.35)*	6.20 (7.14)* 6.30 (7.23)*	35.54 (40.93)* 35.23 (40.45)*
Megavit (0.066 g/kg – 1.50 g/kg)	16.24 - 15.16	8.60 (10.26)* 8.60 (10.13)*	24.15 (28.83)* 23.98 (28.26)*	12.02 (14.35)* 12.07 (14.22)*	6.80 (8.11)* 6.50 (7.66)*	32.19 (38.43)* 33.69 (39.71)*

\*Chemical composition of feeds treated with different doses of either Aquaboost or Megavit and control feeds used in the experiment

**Table 2.** Growth performance of pangas (*Pangasius sutchi*) feeding different doses of Aquaboost tread farm made feed in Aquarium condition

Aquarium	Weight of fish (g)				
Doses	0 day	7 days	14 days	21 days	28 days
Control	9.63±0.19	7.25±0.19	10.10±0.16	10.25±0.19	10.57±0.12
0.66 g/kg	9.35±0.11	9.64±0.12	10.14±0.13	10.18±0.11	10.40±0.09
1.0 g/kg (RD)	9.54±0.07	9.98±0.09	10.12±0.09	10.22±0.07	11.52±0.09
1.33 g/kg	9.64±0.10	10.23±0.08	10.73±0.11	11.43±0.10	13.28±0.08
1.40 g/kg	9.45±0.13	9.68±0.13	10.24±0.13	10.19±0.12	10.40±0.11
1.50 g/kg	9.55±0.07	9.76±0.11	10.11±0.08	10.12±0.06	11.49±0.13

**Table 3.** Growth performance of pangas (*Pangasius sutchi*) feeding different doses of Megavit tread farm made feed in Aquarium condition

Aquarium	Weight of fish (g)				
Dose	Initial avg. (g)	7 days (g)	14 days (g)	21 days (g)	28 days (g)
Control(g/kg)	9.63±0.19	7.56±0.19	10.10±0.19	10.25±0.16	10.57±0.12
0.66 g/kg	9.49±0.13	8.92±0.16	10.26±0.15	10.53±0.13	10.83±0.16
1.0 g/kg (RD)	9.44±0.13	9.49±0.15	10.18±0.13	10.42±0.13	11.95±0.15
1.33 g/kg	9.345±0.13	7.56±0.09	10.83±0.11	11.66±0.13	12.50±0.09
1.40 g/kg	9.47±0.14	9.92±0.14	10.28±0.17	10.43±0.12	11.28±0.13
1.50 g/kg	9.47±0.11	9.59±0.13	10.17±0.14	10.44±0.15	11.55±0.12

**Table 4.** Water quality parameter of aquarium

Parameter	0 Days	After 7 Days	After 14 Days	After 21 Days	After 28 Days
Temperature(°C)	28.0 ± 0.47	29.7 ± 0.79	30.4 ± 1.30	30.5 ± 0.44	31 ± 0.58
pH	8.50 ± 0.38	8.35 ± 0.13	8.45 ± 0.07	7.6 ± 0.15	7.9 ± 0.12
Alkalinity	120 ± 3.06	100 ± 5.77	150 ± 2.87	120 ± 15	100 ± 4.58
DO	5 ± 0.29	5.5 ± 0.15	6.5 ± 0.09	7 ± 0.06	6 ± 0.06
Hardness	50 ± 2.08	200 ± 6.01	100 ± 5.21	150 ± 4.41	200 ± 2.89
Nitrite	0.03 ± 0	00	0.03 ± 00	00	00
Ammonia	2 ± 0.12	2 ± 0.52	0.2 ± 0.05	0.5 ± 0.09	00

Studies were also conducted to optimize the growth performance of Megavit treated feed in aquarium conditions (Table 3). Megavit was added to the feed at different doses similarly that of Aquaboost. Samples weight was taken with time interval after feeding the control and Megavit medicated diets. A maximum body weight increase of 10.80g was obtained in control feed in 28 days. A positive trend of growth performances was also observed in all treatments where fish were fed different doses of medicated diet. A maximum growth of 12.50±0.09 g was obtained in treatment (iv) containing 1.33g/kg in feed. A maximum increased body weight in recommended doses was found 11.95±0.15 g. The growth performance declined in other treatments containing Megavit over 1.33g/kg feed.

### Specific Growth Rate (SGR)

The specific growth rate ranged from 0.001 to 0.003 of body weight in feed containing Aquaboost, while the specific growth rate ranged from 0.002 to 0.004 in feed containing Megavit with the given doses. The highest specific growth rate of 0.003 to 0.004 was found 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 experiment, the highest survival rate 86-88% was found in feed containing either Aquaboost or Megavit dose of 1.33g/kg of feed. The growth performance was poor in control feed.

## DISCUSSION

The work has been undertaken to see the effects of two aqua drugs, Aquaboost and megavit on the growth performance of pangas (*Pangasius sutchi*) in aquarium conditions. Water quality parameters of aquarium, growth performance, SGR and survival rate were determined under laboratory condition. It was observed that water temperatures varied from 28.50 to 30.20 °C with average pH ranging from 7.9 to 8.2 and dissolved oxygen values from (3.38±0.140 to 6.50±0.01)mg/L (Table 4).

Aquaboost is a growth promoter having a composition of selected organic acid and their salt,  $\beta$ -glucan, mannon, oligosecharide and essential oil. It is manufactured by Novartis Co. Ltd. According to the manufacturer Aquaboost improve FCR, weigh gain, feed utilization, nutrients absorption, reduce mortality, influence immunity. Vetvicka *et al* (2013) reported that administration of  $\beta$ -glucan through immersion, dietary inclusion or injection has been found to enhance many types of immune responses, resistance to bacterial and viral infections to environmental stress in many fish species. In case of treatment (iv) containing 1.33g/kg (more than recommended dose) growth performance, SGR and survival rate were found to be significantly higher than the other doses. The suitable dose of Aquaboost in Pangas feed will not only ensure proper growth but also enhances the fish production. If proper concentration of doses is not in use, it may hamper the culture system and production.

Megavit composes with Magnesium, Manganese, Copper, Ferrous, Iodine, Lysine and Methionine. It is manufactured by AB/MAURI Company Ltd. and marketed in Bangladesh by Novartis Company Ltd. According to the manufacturer, it can improve self-defense, specific and nonspecific immunity, reduce poisonous reaction and increase the activity of monocyte, increase FCR and control water pH. Study on Megavit at a rate of 1.33g/kg feed twice a day for 28 days feeding trial resulted better growth performance of pangas fingerlings than the other doses. This dose was also higher than that recommended by the manufacturer. Islam *et al*. (2014) reported that Rapid-Grow, Nutricel-Aqua and Hepaprotect-Aqua gave better result in more than recommended dose which is higher than the given doses of the manufacturer company. Similarly, present study of two growth promoter Aquaboost and Megavit can give significantly higher production and thereby promote pangas culture. Since the present study was conducted in aquarium condition, further studies are needed to test the efficacy in pond condition. From this study we can say that growth promoters used with appropriate dose in pangas culture may be fruitful for enhancing targeted growth rates.

Nowadays aquaculture production largely depends on suitable growth promoters. If doses are not in perfect condition it will prevent to get good growth, development, survival as well as feed consumption of fish. Growth promoters and physical condition of fishes are closely related to each other. The doses may hamper the production if the doses are not in perfect amount.

## COMPETING INTERESTS

The authors declare that they have no competing interests.

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