

Effect of three growth promoters- Orgavit aqua, Aqua boost, and Megavit aqua on growth of Pangus (*Pangasianodon hypophthalmus*)

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Abstract. A study was conducted to compare the efficacy and growth performance of Orgavit aqua from “Organic Pharmaceuticals” on the growth of Pangus (*Pangasianodon hypophthalmus*) with other two commonly used growth promoters Aqua boost and Megavit aqua from “Novartis Company”. The experiment was done in the wet lab of Fisheries Technology Department, Bangladesh Agricultural University, Mymensingh. A total 12 newly constructed aquarium and 200 fish were used for this study. The three growth promoters were: used in separate nine (9) aquarium at recommended dose, lower dose, higher dose, respectively. Three aquarium were used for the control (diet without any promoter). Pellet feed were used with 10% body weight for each aquaria except control. Doses of, Orgavit-aqua were given as 1 mg, 3 mg and 5 mg/3 g feed/day, doses of Aqua-Boost were given as 1.0 mg, 1.7 mg, 2.0 mg/3.5 g feed/day and doses of Megavit aqua were given as 1 mg, 3 mg, 5 mg/3 g feed/day. Water was exchanged regularly and artificial air supplies were done continuously by aerator throughout the experimental period. The feeding trial period was conducted for 21days. Among the three growth promoters Orgavit aqua from “Organic Pharmaceuticals” showed better result at its recommended dose. On the other hand, Aqua-boost and Megavit aqua from “Novartis Company” showed better result at their higher doses.

Keywords: Growth promoters; *Pangasianodon hypophthalmus*

Introduction

Aquaculture is one of the most important sector which plays a significant role in the economy of Bangladesh in terms of feed, nutrition, income, employment and foreign exchange earnings. Among different species of fishes extensively cultured, pangus is the most popular one. In Bangladesh aquaculture is rapidly spreading in recent year, but cannot fulfill the target production for many constraining factors. Poor growth and weak production is one of the important alarming factor. Fish disease is also another important matter need to be taken in consideration. In pangus culture also some problems are associated, In pangus fish culture and aquaculture of other species, one of the external inputs required for successful fish production is growth promoters as well as aqua medicine. They are essential components in pond construction, health management, soil and water management, enhancement of natural aquatic productivity, transportation of live organism, feed formulation, manipulation and enhancement of reproduction, growth promotion and processing value enhancement of final product (Alderman *et al.* 1994, Gesamp 1997). Subasinghe *et. al.* (1996) also reported that- aqua medicines are indeed essential ingredients for successful aquaculture, which has been used in various forms for centuries. Therefore, if the dose and dosage of these growth promoters as well as aqua medicines is not in perfect concentration than it may hamper the production of fishes. Forty pharmaceutical companies have been registered to market their products. Most of the products have been imported from different countries like USA, Thailand, Malaysia, Belgium

and China (Islam 2010). Mechanism of action of these growth promoters as well as aqua medicine differ from each other. Because of the fact that growth promoters have different mechanisms of action, it is necessary to test the groups individually and need to be reported for the aqua culturists. Considering the above facts, here a comparative study of the efficacy of various growth promoters from some pharmaceutical companies, such as Orgavit aqua from Organic pharmaceuticals, Aqua-boost and Megavit aqua from Novartis company were investigated. Here, the recommended dose and method of application of particular growth promoter was justified.

Materials and Methods

Survey on price and quality of the growth promoters. It has been demonstrated that- in the growth and survival of fish, different growth promoters have different impacts. Therefore, before setting experiment on the effect of certain growth promoters, it was necessary to collect relevant information on them. Keeping this point in consideration, a survey was conducted to justify the price and the quality of the growth promoters by visiting several markets, BFRI (Bangladesh Fisheries Research Institute) and Hatcheries. The information obtained are given in Table I and Table II.

Table I. Price and quality of various growth promoters on the basis of hatchery visits

Trade Name	Active ingredients	Doses	Sources	Price (Tk.)
Megavit Aqua	Vitamins, Minerals and Amino Acid Supplement	100g/100 kg feed	Novartis Pharmaceuticals Ltd.	300-350/kg
Aqua Boost	Organic acid, β -Glucan	500 g/MT feed	Novartis Pharmaceuticals Ltd.	300/kg
Orgavit Aqua	Vitamins, Minerals and Amino Acid Supplement	100 g/100 kg feed	Organic Pharmaceuticals Ltd	325-350/kg
Aqua Savor	Amino acid premix	2-3 kg /Ton feed	Eon Animal health Products Ltd.	750/kg
Vitamin premix	Multivitamin	100-150 g/kg	Square Pharmaceuticals Ltd.	-
Fibosoel	β -glucan and Mannos polymer	200-300 g/Ton feed	Eon Animal health Products Ltd.	325/200 g
Grow fast	Vitamins, Minerals and Amino Acid Supplement	200-300 ml/100 feed (3-4 every 7 days)	Rals Agro Ltd.	650/L
Fish vita plus	Vitamins, Minerals and Amino Acid Supplement	200-300 ml/100 feed (3-5 every 30 days)	Rals Agro Ltd.	250/kg
AQ Grow-L	Herbal growth factor and binder	1-2 ml/kg feed	ACI Animal Health	230/kg
AQ Grow-P	Herbal growth Promoter premix	1-2 g/kg feed	ACI Animal Health	230/kg

Setting of aquaria, and stocking and feeding of fish: Twelve aquaria each with a size of $2.5 \times 1.5 \times 1.5$ ft³ and water holding capacity of 50 l were used for this experiment. The set up was facilitated with recirculating water supply by a pump and electricity facilities. Air was supplied to the aquaria by air pump (Guangdong Risheng Group Co., Ltd). For three different

growth promoters four aquaria (four for each promoter) were used and in 3 aquaria recommended, higher and lower doses of these promoters were used along with pellet feeds. Among 4 aquaria one aquarium was treated as control in each case. Ten pangus (*Pangasianodon hypophthalmus*) with an average total length of 6.5 cm and average weight of 30-30.5 g were stocked in each aquarium. The fish were fed with a pellet feed (Biswas) at a rate of 10% of body weight. Proximate composition of the feed was estimated following AOAC (1990) standard protocols and shown in Table III.

Table II. Price and quality of various growth promoter on the basis of market survey

Trade Name	Active ingredients	Doses	Sources	Price (Tk.)
AQGrow-G	Herbal growth factor	1-3ml/kg feed	ACI Animal Health	300/kg
AQ-Cell	Ca, P, Vitamins and Herbs.	1-2 g/kg feed	ACI Animal Health	300/kg
Aqamin	Cu,Co,Mg,Fe,Zn,I,C a,P,D, L. Methiolin, L-LysinHCl.	1 g/kg feed	ACI Animal Health	150/kg
ACmix super – Fish	Vitamins and Minerals premix	1-25 kg/1000 kg feed	ACI Animal Health	350/2.5 kg
Machalemen	-	1 kg/Ton feed	Lion Overseas Trading Company	300-350/kg
Acimix Super-Fish	Vit. + Mineral + Antioxidant	1 kg/Ton feed	ACI Animal Health	350/kg
Calfostonic Powder	Vit. + Mineral + Amino acid	1-2 kg/Ton feed	ACI Animal Health	350/kg
Ayumin powder	Minerals + Harbs	5-10 kg/Ton	ACI Animal Health	150/kg
Diginex Aqua	NH ₄ HCO ₃ + NaHCO ₃ Nuxvomica + Herbal digestive	1 g/kg feed	Anex Vet (Pvt.) Ltd	70/50 g
Cevit Vet	Vit.-C	25 mg/kg feed	Square Pharmaceuticals Ltd.	90-100/100g
Diamod Fish Aquumn	Vitamins Premix	2 kg/Ton feed	Tushin Agro Pharma Ltd.	-
	Vitamins Premix	In case of nursery and table size fish 200 g/100 kg feed	Biotic Corporation Ltd.	-
		In case Brood fish 100 g/100 kg feed		

Table III. The proximate compositions of the commercial pellet (Biswas) feed

Name of the major composition	Amount of composition (%)
Moisture	11.50
Ash	10.25
Protein	18.75
Lipid	6.25
Fiber	5.85
Carbohydrates	38.65

The feeds with and without growth promoters were applied in 12 aquaria. Doses of three growth promoters (Orgavit aqua, Aqua boost and Megavit aqua), quantity of feed used and their

effect on growth of pangus (*Pangasianodon hypophthalmus*) are shown in Table IV. Feed without any growth promoter was used as control and applied to the fishes of 3 aquaria. This feeding trial was conducted for 21 days. During the experimental period, the weight of fishes of each aquarium was measured weekly using an electronic balance.

Results

Effect of Orgavit aqua on the growth of fishes: In this case, the initial average weight of fishes was 30g. While fishes were treated with recommended dose (3mg/3g feed/day), weight of fishes increased to 31.90g, 32.80g, 34.10g after 7, 14 and 21 days of feeding trial, respectively (Table IV). With higher dose (5 mg/3g feed/day) of this promoter, the weight increment of the fishes were- 31.20g, 32.25g and 33.75g on 7, 14 and 21st days of the trial, respectively whereas weight increments of 30.75g, 31.15g and 32.70g were obtained for 7, 14 and 21 days, respectively with the lower dose (1 mg/3g feed/day). In control trial (without growth promoter), initial weight of fishes increased to 30.25 g, 30.75 g and 31.25 g on 7, 14 and 21st days respectively indicating the positive effect of growth promoter on the weight increment of fishes.

Effects of Aqua boost on the growth of fishes: In the case of Aqua boost, 35 g was the initial average weight of experimental fishes (Table IV). Here, while fishes were treated with recommended dose (1.7 mg/3.5 g feed/day) weight of fishes increased to 37.6g, 38.9g, 40.2g after 7, 14 and 21 days of feeding trial, respectively. On the other hand, with the higher dose (2.0 mg/3.5 g feed/day) of Aqua boost, the weight increment of the fishes were- 37.8g, 39.2g and 41.85g on 7, 14 and 21st days of the trial, respectively whereas these values were found to be 36.2g, 38.5g and 39.9g for 7, 14 and 21 days, respectively with the lower dose (1.0 mg/3.5 g feed/day). For the control trial, initial weight of experimental fishes increased to 36.5g, 37.2g and 38.5g on 7, 14 and 21st days of trial.

Effects of Megavit aqua on the growth of fishes: The initial average weight of the experimental fishes was 30g, in the case of Megavit aqua. Here also, while the fishes were treated with recommended dose (3mg/3g feed/day) the body weight of the fishes increased to 31.40g, 33.45g, 35.60g after 7, 14 and 21 days of feeding trial, respectively (Table IV). The weight increment of the fishes were- 32.75g, 34.5g and 36.25g on 7, 14 and 21st days of the trial, respectively with the higher dose (5 mg/3g feed/day) of this promoter, whereas these values were observed 30.75g, 32.25g and 33.70g for 7, 14 and 21 days, respectively with the lower dose (1 mg/3g feed/day). On the other hand, the initial weight of fishes increased to 30.25 g, 30.75 g and 31.25 g on 7, 14 and 21st days of trial, respectively in control trial.

Specific growth rate of fishes using the diet with different growth promoter: Average specific growth rates of fishes after 21 days of trial using the diet with growth promoter Orgavit aqua are shown in Table IV. Here, fishes treated with feed along with several doses of Orgavit aqua like- recommended, higher dose, lower dose and in control aquarium the specific growth rates were 0.0022, 0.0032, 0.0015 and 0.0012, respectively on 21st days. In the case of Aqua boost the specific growth rates were found 0.0023, 0.0027, 0.0015 and 0.0013, respectively with the recommended, higher, lower doses and in control aquarium after 21 days of trial. On the other hand these values were obtained 0.0025, 0.0032, 0.0018 and 0.0015, respectively with the recommended, higher, lower doses and in control aquarium with the growth promoter Megavit aqua.

Table IV. Doses of three growth promoters (Orgavit aqua, Aqua boost and Megavit aqua), and their effect on growth of Pangus (*Pangasianodon hypophthalmus*)

Name of the growth promoters	Selected dose	Initial weight of fish (g)	Weight of fish after 7 days (g)	Weight of fish after 14 days (g)	Weight of fish after 21 days (g)	Specific growth rate
Orgavit aqua	Recommended dose (3mg/3g feed/day)	30	31.90±0.78	32.80±0.63	34.10±0.42	0.0022±0.25
	Higher dose (5 mg/3g feed/day)	30	31.20±0.62	32.25±0.56	33.75±0.49	0.0032±0.19
	Lower dose (1 mg/3g feed/day)	30	30.75±0.71	31.15±0.72	32.70±0.55	0.0015±0.21
	Control (without growth promoter)	30	30.25±0.75	30.75±0.59	31.25±0.61	0.0012±0.19
Aqua boost	Recommended dose (1.7 mg/3.5 g feed/day)	35	37.6±0.36	38.90±0.63	40.20±0.51	0.0023±0.31
	Higher dose (2.0 mg/3.5 g feed/day)	35	37.8±0.45	39.02±0.56	41.85±0.39	0.0027±0.29
	Lower dose (1.0 mg/3.5 g feed/day)	35	36.2±0.29	38.5±0.41	39.9±0.42	0.0015±0.35
	Control (without growth promoter)	35	36.5±0.31	37.2±0.61	38.5±0.35	0.0013±0.38
Megavit aqua	Recommended dose (3 mg/3g feed/day)	30	31.40±0.49	33.45±0.35	35.60±0.69	0.0025±0.21
	Higher dose (5 mg/3g feed/day)	30	32.75±0.54	34.50±0.42	36.25±0.58	0.0032±0.20
	Lower dose (1 mg/3g feed/day)	30	30.75±0.75	32.25±0.63	33.70±0.72	0.0018±0.25
	Control (without growth promoter)	30	30.75±0.71	31.75±0.65	32.25±0.63	0.0015±0.29

*mean value ± standard deviation of 3 individual measurement

Survival rate of fishes after 21 days of trial using the diet with different growth promoters

In case of “Orgavit aqua” the survival rate of fishes decreased gradually for all the doses used in the study. With recommended dose of this promoter the percent survival rates were 80, 70 and 68, respectively on 7th, 14th and 21st days of trial. For almost all doses a sharp decrease in survival rate was observed on 14th day of trial which improved a little on later days of trial (Table V). While Aqua boost was used with diet of fishes, the highest survival rate (90%) was observed at its recommended dose which decreased to 72% on 14th day of trial then again increased to 77% on 21st day. This similar trend was observed for its other doses too. For Megavit aqua the percent survival rates of fishes were found 90, 62 and 82, respectively on 7th, 14th and 21st days of trial, whereas the values 80, 70 and 87 with its higher dose (Table-7). More or less in all cases comparatively lower percent survival rates were observed for the fishes reared in control condition (diet without any growth promoters) indicating the positive effect of growth promoters on the survival rate of fishes.

COMPARATIVE OF ORGAVIT AQUA WITH THE EFFICIENCY OF AQUA BOOST AND MEGAVIT AQUA

Table V. Survival rates of fish during the 21 days experimental period fed on diets with three different growth promoters

Selected dose	Survival rate (%) after 7 days	Survival rate (%) after 14 days	Survival rate (%) after 21 days
Orgavit aqua			
Recommended dose (3 mg/ 3g feed/day)	80±0.65	70±0.52	68±0.55
Higher dose (5 mg/ 3g feed/day)	90±0.52	65±0.45	77±0.75
Lower dose (1 mg/3 g feed/day)	90±0.41	75±0.55	85±0.49
Control (only 3g feed/day)	75±0.61	68±0.42	70±0.82
Aqua boost			
Recommended dose (1.7 mg/3.5 g feed/day)	90±0.59	72±0.82	77±0.65
Higher doses (2.0 mg/3.5g/day)	80±0.52	62±0.79	85±0.82
Lower dose (1.0 mg/3.5 g feed/day)	70±0.69	75±0.56	68±0.52
Control (only 3g feed/day)	65±0.35	68±0.62	75±0.79
Megavit aqua			
Recommended dose (3 mg/3 g feed/day)	90±0.51	62±0.71	82±0.65
Higher doses (5 mg/3 g feed/day)	80±0.49	70±0.69	87±0.72
Lower dose (1 mg/3 g feed/day)	70±0.62	68±.55	72±0.57
Control (only 3g feed/day)	68±0.61	72±0.72	75±0.82

Discussion

Some variation was found between the information on the leaflet and packets. Neither the sellers or nor the farmers and extension workers had clear ideas about the ingredients of pharmaceutical companies and they were using those drugs without any hesitations. In the experiment Aqua boost and Megavit aqua showed good results at their higher doses. But Orgavit aqua showed good results at its recommended doses. In a similar type of study Skuet. *al.* (2017) observed a positive trend in growth performance while fishes were fed different medicated diets. The body weight increased from 9.35 g to 13.28±0.08g diet containing 1.33g/kg Aqua boost and this value was highest. The body weight increased to 11.52±0.09g in the treatment containing recommended dose of Aqua boost 1 g/kg. The body weight declined considerably in case of more than recommended doses in treatments while Aqua boost used 1.40g/kg and 1.50g/kg indicating that- recommended dose (1.33g/kg) of Aquaboost in the diet might be safe dose for the pangas culture. In the same study they also observed that- the body weight of fishes increase to 10.80g in control feed in 28 days. Here also a positive trend of growth performances was 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 containing 1.33g/kg Megavit aqua in feed. Increase in body weight was found 11.95±0.15g for recommended dose of Megavit aqua.. The growth performance declined in treatment containing Megavit aqua over 1.33g/kg in feed. In their study they observed 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. 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. All the findings mentioned above are quite similar to the finds of the present study.

The study showed that- growth increment of fishes in aquaculture can be a great value when the growth promoters are used properly but improper application can cause grate loss of aquatic ecosystem and production. Therefore, it is important to apply proper growth promoters and best application method for aqua-production management. Pharmaceutical companies should conduct more and more research for reducing the harmful impact of aqua-medicine in aquaculture of country like Bangladesh. On the basis of obtained results the study could be concluded that- growth promoters have positive impact on the growth and survival of fishes but before use the aqua medicines should be checked to avoid loss in ecosystem and aquaculture production. Like Aqua boost and Megavit aqua Orgavit aqua also has positive impact on the growth, survival and production of pangus fish and showed better result at its recommended dose.

Literature Cited

- Alderman, D.J., H. Rosenthal, P. Smith, J. Stewart and D. Weston, 1994. Chemicals used in mariculture. *ICES Coop. Res. Rep.* 202: 100 p.
- AOAC. 1990. "Official Methods of Analysis." 15th ed. Association of Official Analytical Chemists, Washington, DC, USA.
- GESAMP (Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection). 1997. Towards safe and effective use of chemicals in coastal aquaculture. Rep. Stud. (IMO/ FAO/ UNESCO/ IOC//WMO/ WHO/ IAEA/ UN/ UNEP), 65:40pp.
- Islam M.A., A.S.M.S. Mandal, M.S. Reza, M. Alamgir, M.K. Rahman, M. Kamal and S.C. Chakraborty, 2014. Safety dose of three commercially used growth promoters: nuricellaqua, hepaprotect-aqua and rapid grow on growth and survival of Thai pangas (*Pangasianodon hypophthalmus*). *J. Coastal Life Medicine*, 2: 925-930
- Islam, T.M. 2010. Present status of aqua-medicines used in aqua health management. MS Thesis. Department of Aquaculture, BAU, Mymensingh. 35 p.
- Sku S., M.G.S. Riar, S.K. Paul, N.A. Raushon and M. Kamal, 2017. Optimization of doses of Megavitand Aquaboost on the growth performance of Thai pangas (*Pangasiussutchi*) in aquarium conditions. *Res. Agric. Livest., Fish.*, 4 (2): 117-122.
- Subasinghe, R.P., U. Barg and A. Tacon, 1996. Chemicals in Asian aquaculture: need, usage, issues and challenges. In: *Use of Chemicals in Aquaculture in Asia*. Arthur, J.R., C.R. Lavilla-pitogo, R. P Subasinghe (eds). Southeast Asian Fisheries Development Center, Aquaculture Department Tigbauan, Iloilo, Philippines, 1-6.

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