

Effect of Probiotic Bioplus 2B on Growth and Survivorship of Angelfish (*Pterophyllum scalare*)

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Abstract: Effect of dietary probiotic Bioplus 2B supplementation was investigated on growth and survivorship in angel fish (*Pterophyllum scalare*). Fish (0.57±0.1g) were offered control diet (no probiotic supplementation) or control diet supplemented with 0.15, 0.5 and 1 g/kg Bioplus 2B, over a 60-day period. Fish were fed based on 5% of total biomass at the early and 3% at the late experiment period. Results showed that there was no significant difference in growth performance and survival rate between the different treatments ($P>0.05$).

Key words: Probiotic % Growth % Survival % Fish

INTRODUCTION

The Angel fish (*Pterophyllum scalare schultze*) is a freshwater fish [1]. Many studies have shown that cultured fish are more susceptible to disease compared to their wild counterparts, due to artificial condition and intensive culture [2]. The immune system of aquatic organisms, such as fish, is continuously affected by periodic or unexpected changes of their environment. Adverse environmental situations may acutely or chronically stress the health of fish, altering some of their biochemical parameters and suppressing their innate and adaptive immune responses [3]. Non specific immune response has a crucial role during all infection phases. Fish are more depended to their immune system compared to mammals. Accordingly, in the last decade, an interest has been rising for some material application in order to empower non specific immune system and disease prevention [4]. Antibiotics are a class of these compounds for disease controlling, however, after a while, they caused many problems such as pathogen resistance, environmental impacts and ... etc.

Probiotics have recently been suggested to be an alternative for the previous methods and seem to solve many problems. This method, in fact, is considered as a new environmental-friendly one in the aquaculture activities. Probiotics have been defined as live microbial food supplements which beneficially affect the host by improving the intestinal microbial balance leading to

increase in feed efficiency, food intake and response to disease as well as environmental condition improvement [5].

The word probiotic is constructed from the Latin word pro (for) and the Greek word bios (life) [6].

Probiotics are classified based on various characteristics like as microbial lineage and its function. Probiotics are generally fall into three categories based on their lineage: bacterial, fungal and yeast [7]. The bacterial probiotics are the main classes have been used in the aquaculture, by now.

Application of probiotics containing acid lactic bacteria results in the host survival increment in response to pathogens. The actions are [8]:

- ⊆ Antagonism with pathogens via bactericidal component secretion like as bacteriocins.
- ⊆ Pathogen limitation via binding site limitation or material and energy utilization.
- ⊆ Body defense mechanism reinforcement via immune level improvement.

The freshwater angelfish (*P. scalare*) are South American cichlids that originate from the Guyana and the Orinoco and Amazon River basins. Angelfishes are very popular among aquarists all over the world. It would be of interest to accelerate its growth and shorten the husbandry period [9], thus the present study aimed to investigate the effects of probiotic Bioplus 2B on its growth and survival at the early life stages.

MATERIALS AND METHODS

The experiment was conducted using 12 glass aquaria (60 × 40 × 30 cm) equipped with single central air pump. Water temperature was maintained at 28-30°C using under water heaters. A total of 60 fry angelfish (0.57±0.1g) were randomly distributed into the aquaria. Fish were fed on commercial trout pellet (Biomare, France; 0.5 mm in diameter) over a 10-day period for acclimation. Thereafter, the aquaria assigned as 4 triplicate treatments. One of the treatments received the Biomare diet (control group), whereas the remaining were received Biomare supplemented with 0.15, 0.5 and 1 g/kg probiotic Bioplus 2B containing two bacillus lineage: *Bacillus lecheniformis* and *Bacillus subtilis*. To achieve the probiotic-supplemented diets, Biomare was fine grounded and mixed with certain amount of probiotic and repelleted. The obtained pellets were dried over night. Fish were fed based on 5% of body weight in the early experiment and 3% at the end. Fish were biometry at the trial initiation as well as fortnightly thereafter and the food amount was adjusted accordingly. Dissolved oxygen, total hardness and pH were 5-5.5, 270±0.2 mg/l and 7.5±0.3.

At the end of the trial, growth performance was evaluated by calculating weight gain (WG), weight gain percentage (WG %), food conversion ratio (FCR) and specific growth rate (SGR) as follow:

$$WG = W_t - W_i$$

$$WG(\%) = 100 * \frac{W_t - W_i}{W_i}$$

$$FCR = \frac{CF}{WG}$$

$$SGR = 100 * \frac{\ln W_t - \ln W_i}{T}$$

Where W_t was the final weight, W_i was initial weight, CF was total consumed food and T was the experiment duration.

Survival rate was also calculated by counting the number of remaining fish divided to the initial fish number multiplied to 100.

Data were analyzed using statistical software SPSS v. 16. Data were subjected to one way ANOVA and Duncan's test to find significant effect of diets on growth and survival. $P < 0.05$ considered to be significantly different. Data are presented as treatments mean ± SD.

RESULTS

Table 1 shows the growth performance and survival of different treatments after 60 day. There was no significant difference in growth performance and survival rate between treatments ($P > 0.05$). Growth pattern of different groups is presented in Figure 1.

DISCUSSION

Probiotics are the useful microorganisms promoting growth performance and protecting the host against pathogens. These microorganisms are included in the diets and have the beneficial effects on host's gut micro flora [10]. On the other hand, probiotics can be considered as a microbe to improve food nutritional value [11]. In the present work, probiotic Bioplus 2B showed no significant effect on growth and survival in angelfish. Previous study on common carp showed suppression in rearing costs as a result of dietary probiotic inclusion [12]. It has also been demonstrated experimentally that probiotics indeed may enhance growth of fish [13, 14]. Probiotic bacteria such as Lactic acid bacteria, *Streptococcus*, *Saccharomyces* showed improved survival, growth and immunity of fish [15]. *Lactobacillus acidophilus* supplemented diets caused better growth performance and health condition in rainbow trout [16].

Faramarzi *et al.* [17] indicated that the common carp fry fed with diets with a probiotics supplement exhibited greater growth than those fed with the control diet.

In shrimp, *Penaeus monodon*, probiotic application improved gut microbial balance and promoted growth performance via nutrient absorption and enzymatic activities improvement [18]. Similarly, artemia naupli encapsulated with *Lactobacillus* led to improved growth and survival in freshwater prawn, *Macrobrachium rosenbergii*.

Bairagi *et al.* [19] showed that *Bacillus circulans* and *Bacillus subtilis* isolated from gut microflora of rohu (*L. rohita*), catla (*C. catla*) and common carp (*C. carpio*), have extra cellular enzymes namely amylase, lipase and protease and its turn are capable to be used in fish diets to increase nutrient absorption and growth performance.

Probiotic bacillus has a good ability to increase growth performance in rainbow trout larvae which will lead to development of practical diets in this species [20]. Other studies have shown that probiotic application led to increase in growth and survival in different species [21- 23]. However, El-Dakar *et al.* [24] showed probiotic application have no significant effect on survival and growth performance in rabbitfish.

Table 1: Effect of dietary probiotic (Bioplus 2B) supplementation on growth performance and survival in angelfish

Probiotic content	WG	WG%	SGR	FCR	Survival%
Control	25.3±3.3 ^a	915.5±45.7 ^a	3.9±0.1 ^a	1.2±0.07 ^a	100±0 ^a
0.15	26.9±3.2 ^a	970.2±94.7 ^a	3.9±0.1 ^a	1.1±0.1 ^a	93.3±11.5 ^a
0.5	28.7±2.6 ^a	988.8±213.9 ^a	3.9±0.3 ^a	1.1±0.2 ^a	100±0 ^a
1	27.7±5.0 ^a	981.8±201.3 ^a	3.9±0.3 ^a	1.1±0.1 ^a	100±0 ^a

-Data are represented as mean±SD

-Means with the same letters are not significantly different (P>0.05)

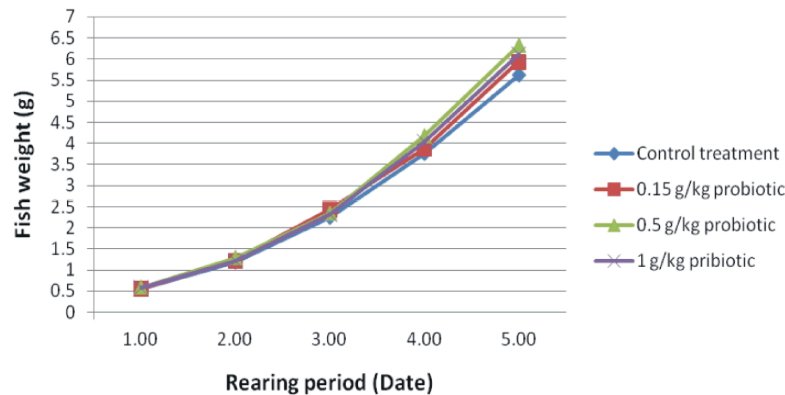


Fig. 1: Growth pattern of different experimental groups

It is concluded that dietary probiotic Bioplus 2B application at 0.15, 0.5 and g/kg have no significant effect on growth and survival of angelfish and so, is not advised for incorporation in its diet.

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