Effectual employment of Probiotics supplements on growth performance of *labeo rohita* fingerlings.

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Abstract: In present investigation we were designed five experimental diets with containing changeable concentration of probiotic (*Lactobacillus acidophilus) like* 0.20,0.40,0.70 and 1.0% were formulated using full fat soybean as the protein source. *Labeo rohita* fingerling were obtained from local fish supplier and kept in glass aquaria (40x20x20cm) with aeration facilities in the laboratory where the temperature was kept as 27+1.c ,.(Mean body weigh 2.90 ± 4.0 g) were arbitrarily distributed among the aquaria, with 10 fish per aquarium. Each diet treatment was tested in replicate of four (Four aquaria per diet). All fish were fed twice daily. The feeding rate was at 5 percent of body weight per day for the whole rearing period of 60 days, and the amount of feed was adjusted every tenth day following a bulk weighing of each group of fish. The fish were exposed to their respective diet for 4h during each ration, Fish growth, digestibility and nutrient retention result shows that, survival was not affected by the inclusion levels of probiotic. Growth performance (in terms of live weight gain), growth percent gain in BW and final length), SGR and nutrient retention (PER, GPR, GER and APD)] increased when dietary probiotic level were increased from 0.20g to 0.70g $100g^{-1}$ of diet; further increase in dietary probiotic level (>0.70g $100g^{-1}$) resulted in a significant ($P<0.05$) growth depression and nutrient depletion. Apparent protein digestibility was significantly ($P<0.05$) higher in fish which were fed diets containing probiotic at 0.70g 100g-1 than in fish fed probiotics free diet (Control) or diets containing low or high levels of *lactobacillus acidophillus*. FCR values observed were also significantly ($P<0.05$) lower in fish fed diet containing *Lactobacillus acidophillus* at 0.70g $100g^{-1}$ than fish fed other dietary preparations including control diet.

Key words: *Lactobacillus acidophillus*, growth performance, *Labeo rohita*

Introduction

Fish borne disease outcomes are common problems occurring now a days, this is the period of scientific improvement and consciousness of hygiene. There is an vital need in aquaculture to develop microbial control approach, since disease outbreaks are recognized as import constraints to aquaculture production, Vaccines are being formulated and marketed and they generally cannot be used as a universal disease control measure in the field of aquaculture. Young fish are fully immune competent and do not always respond to vaccination. Vaccination by injection, sometimes are the only effective route of administration, is impractical when supplied to small fish or large number of fish. This situation is avoided by an alternative in the production system through the use of beneficial bacteria to fight against pathogenic bacteria i.e., through the use of probiotic which is an acceptable practice in aquaculture. The health of the fish thus can be improved by the elimination of pathogens or at least by minimizing their effects in aquaculture.(1,2) Due to outbreak of various disease in aquaculture industry in

the last decades, use of antibiotics have guide to the development of drug-resistant strains resulting in reduction of natural defense mechanism in the aqua cultural fauna. alternatively, probiotics can give better immune response, augment survival and endorse growth and nutrient utilization. Its use can thus assure the nutritional security in the next millennium. Probiotics for aquaculture are generally selected by their ability to produce antimicrobial metabolites; however, attachment to intestinal mucus is important in order to remain within the gut of the host (3)

Materials and Methods

Diet preparation: Five experimental diets with containing varying concentrations of *Lactobacillus acidophilus acidophilus* (Probiotic) (0.20, 0.40, 0.70 and 1.0%) were formulated using processed full fat soybean as the protein source. The dietary ingredients and proximate composition of the formulated diets are given in table 1

Table 1. Ingredient content (%) and proximate analysis (% dry weight basis) of five experimental diets with different levels of probiotic

Ingredient	Diets (g $100g^{-1}$ of diet)				
	LAD0	LAD1	LAD2	LAD3	LAD4
Groundnut oil cake	60.00	60.00	60.00	60.00	60.00
Wheat flour	3.20	3.20	3.20	3.20	3.20
Bran of rice	3.20	2.95	2.70	2.45	2.20
soybean	31.60	31.60	31.60	31.60	31.60
Chromic oxide	1.00	1.00	1.00	1.00	1.00
Calcium		0.50	0.50	0.50	0.50
Vitamin premix	0.50	0.50	0.50	0.50	0.50
Probiotics	-	0.20	0.40	0.70	1.00

Live weight gain (in grams), growth percentage gain, specific growth rate [% body weight (BW) per day], feed conversion ratio (FCR), gross protein retention (GPR) and gross energy retention (GER) were calculated using standard methods (4). Apparent protein digestibility (APD) of the diets was calculated according to Cho (5) as follows

$$APD = 100 - 100 \times \frac{\%\ Cr_2O_3 \text{ in diet}}{\%\ Cr_2O_3 \text{ in faeces}} \times \frac{\%\ \text{nutrient in faeces}}{\%\ \text{nutrient in diet}}$$

Gross energy content of the diets and fish were calculated using the average caloric conversion factors of 0.3954, 0.1715 and 0.2364 kJ g^{-1} for lipid, carbohydrate and protein, respectively (6)

Statistics Analysis

For present investigation we did calculations by using ANOVA and Duncan's multiple range test (7) and student 't' test were applied to find out the significant differences between different treatments.

Results

Survival was not exaggerated by the addition level of probiotic. Growth concert (in terms of live weight gain, growth percent gain in BW and final length), SGR and nutrient retention (PER, GPR, GER and APD) increased when dietary probiotic level were increased from 0.25g to 0.70g 100 g^{-1} of diet; further increase in dietary probiotics level (>0.70g 100g^{-1}) resulted in a significant (P<0.05) growth depression and nutrient depletion. Apparent protein digestibility was recorded significantly (P<0.05) upper in fish which were fed diets contain probiotics at 0.70g 100 g^{-1} than in fish fed probiotic free diet which served as Control. FCR values were also recorded significantly (P<0.05) lower in fish fed diet containing *Lactobacillus acidophillu* sat 0.70g 100g^{-1} than fish fed other dietary preparations including control diet (Table 3)

Discussion

The rate of survivability of *Labeo rohita* in all treatments was observerved better. The optimum probiotics levels which resulted in high growth in *Labeo rohita* in terms of live weight gain (grams), growth percentage gain, SGR and nutrient retention (PER, GPR, GER and APD) was found to be around 0.70g 100 g^{-1} of diet. FCR values decreased with each increase in the dietary probiotic contents of the diet up to 0.70 g 100g^{-1} of diet, thereafter, increases in dietary probiotic levels resulted in an increase in FCR and growth depression.

The high APD values for the diet containing Lactobacillus acidophilus at 0.70g 100 g^{-1} of diet may be show the probiotic concentration, which was used in diet LAD3 might be helpful for optimum dietary utilization. Similar results were also reported by Tapasa Kumar Sahoo(8)-.which further confirms that concentration of probiotics in feed might be helpful for proper nutrient utilization.

Table 2.Effect of various level of probiotic on growth performance, *labeo rohita* fingerlings in laboratory conditions

Sr no	parameters	Diets				
		LAD0 (control)	**LAD1**	**LAD2**	**LAD3**	**LAD4**
1	Initial weight (g)	1.18±0.02a	1.25±0.03a	1.20±0.02a	1.11±0.03a	1.18±0.02a
2	Initial length	4.10±0.05a	4.15±0.05a	4.04±0.07a	4.00±0.06a	4.10±0.06a
3	Final weight	2.98±0.03e	3.41±0.02d	5.32±0.05b	6.71±0.2a	4.03±0.04c
4	Final length	5.68±0.08d	6.02±0.9cd	6.77±0.10b	7.62±0.12a	6.11±0.08c
5	Live weight	1.70±0.02e	2.12±0.03d	4.10±0.06b	5.54±0.24a	2.83±0.06c
6	Growth (%gain in BW)	136.19±2.06d	164.20±7.16d	332.63±7.16b	479.21±20.42 a	232.60±7.28c
7	Specific growth rate (SGR)	1.19±0.02e	1.35±0.04d	2.01±0.02a	2.49±0.05b	1.71±0.04c

All values are mean±SE of mean. Means bearing different letters in the same row differ significantly (P<0.05)

Table 3.Effect of different levels of probiotics supplement on digestibility, nutrient retention and *labeo rohita* fingerlings under laboratory conditions

parameters	Diets				
	LAD0	**LAD1**	**LAD2**	**LAD3**	**LAD4**
Feed conversion ratio (FCR)	2.02±0.06a	1.87±0.05a	1.86±0.05a	1.71±0.08b	2.02±0.08a
Gross Protein retention (GPR)	23.52±1.05b	24.91±0.68b	26.43±0.65b	30.91±1.19a	24.71±1.07b
Protein Efficiency Ratio (PER)	1.23±0.05b	1.18±0.04b	1.22±0.04b	1.36±0.09a	1.16±0.06b
Apparent protein Digestibility (APD)	78.10±0.14d	79.38±0.21c	80.51±0.17b	84.41±0.29a	80.10±0.10c

All values are mean±SE of mean. Means bearing different letters in the same row differ significantly (P<0.05)

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