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Effect of spirulina as a feed supplement on survival and growth of *pangasius sutchi*.

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ABSTRACT

The present investigation has been conducted to understand the effect of spirulina as a feed supplement on survival, length and weight of *pangasius sutchi* for a period of 90 days. Highest values for survival, length and weight gain in the fishes were observed in fishes fed with 5% Spirulina feed which was recorded to be 94% in case of survival rate, 13.07 cm in case of length and 60.4 gm in case of weight, respectively, hence coming to conclusion that using Spirulina in the fish can raise its growth performance and survival ability.

Keywords: Spirulina, *Pangasius sutchi*, Survival, Length and Weight.

1. Introduction

Pangus (*Pangasius sutchi*) is one of the most popular species in aquaculture compared to other species. It was introduced for cultivation in Bangladesh in 1989 because of its spectacular growth and acceptable proof^[1].

Traditionally, fish meal is the preferred dietary protein source for many farmed fish species^[2]. High quality fish meal normally contains between 60% to 72% crude protein by weight^[3, 4]. Spirulina are multi-cellular and filamentous blue-green algae that has gained considerable popularity in the health food industry and increasingly as a protein and vitamin supplement to aquaculture diets. It grows in water, can be harvested and processed easily and has very high macro- and micro-nutrient contents. It has long been used as a dietary supplement by people living close to the alkaline lakes where it is naturally found. In the present study the fishes were fed with Spirulina to assess its impact on survival and growth of *Pangasius sutchi*.

2. Material and Methods

2.1 Procurement of Spawn

For the purpose of present study, healthy, disease free fry of *Pangasius sutchi* were collected from Central Institute of Fisheries Education (CIFE) centre, Powarkheda, Madhya Pradesh. Fry were brought to the Department of Zoology and Applied Aquaculture, Barkatullah University under oxygen packing and were introduced in the Pond-1 and Pond-2 of the Department.

2.2 Preparation of control and experimental diet.

Artificial diet was prepared to feed the fishes with various feed ingredients. Fish meal, wheat flour were finally ground and proximate analysis was performed using standard methods^[5] (Table-1). The feed impregnated with Spirulina were prepared by replacing fishmeal in the control diet by Spirulina powder at the rate of 5%.

2.3 Details of the experiment:

The average length and weight of individual fry was recorded before transferring them into experimental ponds. 1000 fry were randomly selected and transferred to individual experimental ponds. Pond-1 was considered as control in which feed devoid of Spirulina was given. Pond-2 was supplied with feed impregnated with Spirulina, at the rate of 5% of the biomass, twice a day, morning (8.00 am) and evening (5:00 pm).

After every 15 days, mean average length and weight of the fishes was recorded separately for each pond for 90 days. Accordingly, feed ration was adjusted to 10% of the biomass, every time.

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Table 1: Percentage composition of various ingredients in experimental diets/100 g.

Constituents of Experimental Diets/100 g						
Diets	Fish meal	Wheat flour	Cod-liver oil	Vitamin premix	Spirulina	Protein content
Control	51.25%	36.75%	10.00%	2.00%	0%	34.79%
Experimental Feed (5% Spirulina)	46.25%	36.75%	10.00%	2.00%	5.00%	35.04%

3. Results

Highest value for average weight gain in the fishes was observed in feed impregnated with 5% Spirulina which came out to be 60.4 gm and lowest value for average weight gain in the fish was observed in feed without Spirulina as 57.7 gm at the termination of the experiment. Hence, feed impregnated with 5% Spirulina was found best as it had the highest value for average weight gain in the fishes (Fig.1). Highest value for average length in the fishes was observed in feed impregnated

with 5% Spirulina which came out to be 13.07 cm and lowest value for average length in the fish was observed in feed without Spirulina as 12.26 cm. Hence, feed impregnated with 5% Spirulina was found best as it had the highest value for average length in the fishes (Fig.2). 94% and 80% survival rate was observed in the feed impregnated with Spirulina at all the 5% age levels and without Spirulina, respectively at the termination of the experiment. (Fig.3).

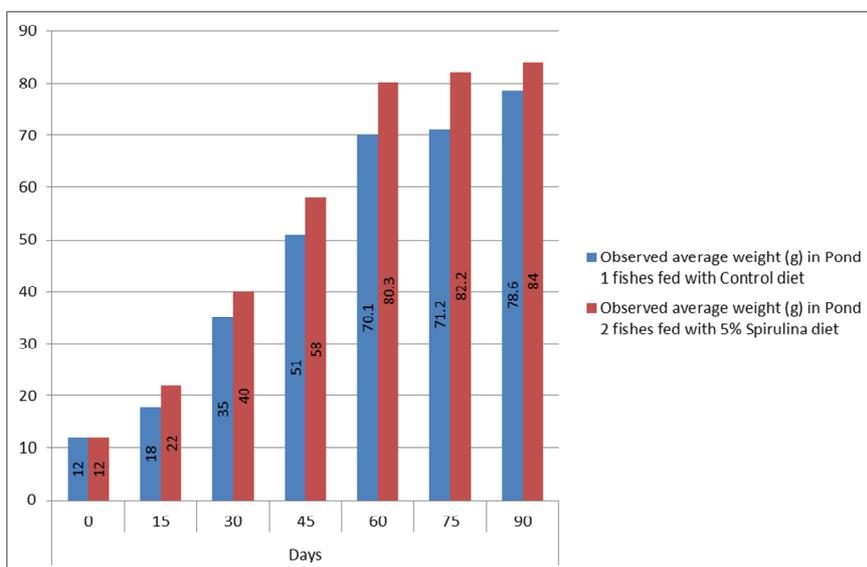


Fig 1: Showing observed average weight (gm) of *Pangasius sutchi* using different feeds.

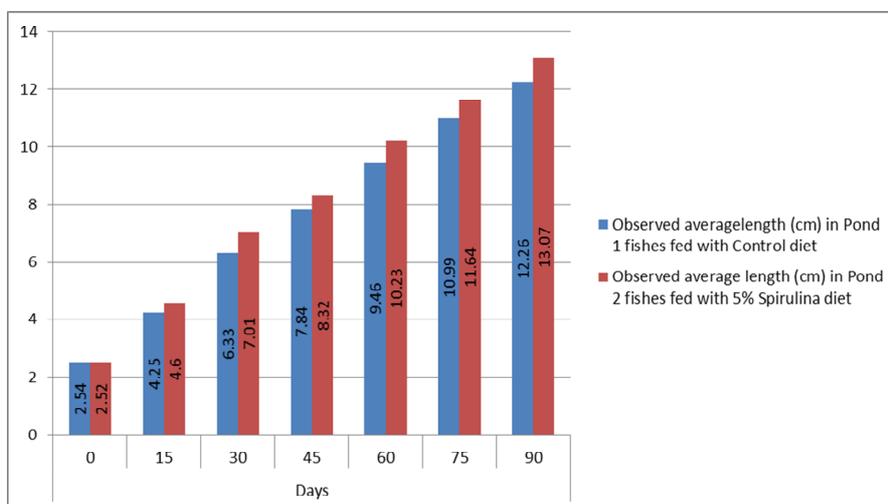


Fig 2: Showing observed average length (cm) of *Pangasius sutchi* using different feeds.

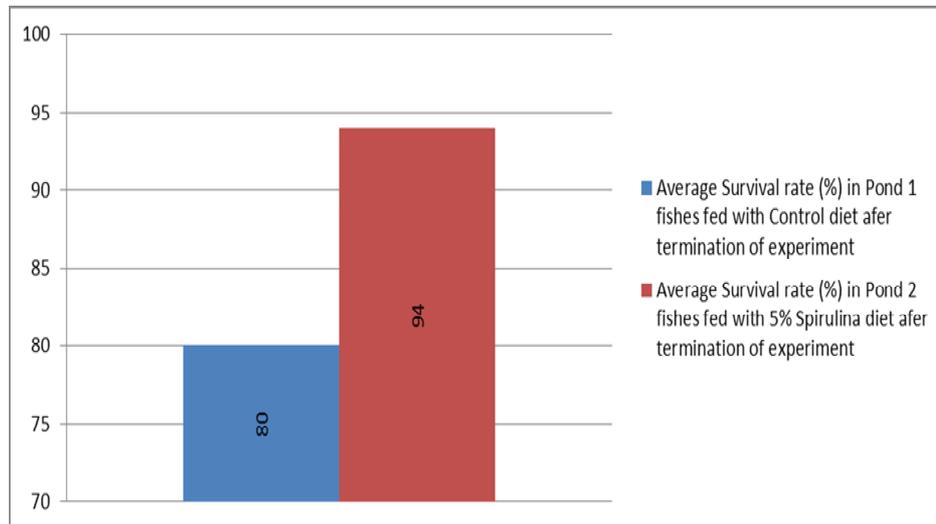


Fig 3: Showing Survival Rate of *Pangasius sutchi* at the termination of the experiment.

4. Discussion

Fish fed diets containing Spirulina (5 g/kg) had significantly better growth and feed utilization as compared to fish fed with the control diet. The present study proved that dietary supplementation of Spirulina enhanced fish growth. These results may possibly be due to the improved feed intake and nutrient digestibility. Moreover, Spirulina contains several nutrients especially vitamins and minerals that may help in fish growth promotion. These results agree with those found by several researchers^{16,81} who reported that feeding Spirulina to fish improved survival and growth rates. In this regard,¹⁹¹ mentioned that feed supplemented with Spirulina powder improved the feed conversion ratio and growth rates for striped jack, *Pseudocaranx Dentex*.

Lowest length gain was observed in case of control (20 cm) and highest was observed in case of fishes fed with 5% Spirulina (28.3 cm). Lowest weight gain was observed in case of control (20 gm) and highest was observed in case of fishes fed with 5% Spirulina. Survival was almost 100% in case of control and highest was observed in case of fishes fed with 5% Spirulina.

Nandeesh MC *et al.*¹⁰¹ studied the influence of *Spirulina platensis* meal on the growth of two Indian major carps, catla (*Catla catla*) and rohu (*Labeo rohita*) for a 90-day culture trial. The specific growth rate and protein efficiency ratio recorded in rohu improved with higher levels of Spirulina inclusion, while in catla they did not differ significantly from the control treatment. But in our study, it was observed that length, weight gain, and survival of *Pangasius sutchi* was significantly best with the addition in Spirulina content in the feed.

5. Conclusion

From the present investigation, it is clear that Spirulina impregnated feed enhanced length, weight gain and survival. With the addition of Spirulina in moderate amount (5%) in fish feed the quality of the feed is improved in the experiment.

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