Hematological Changes in *Labeo rohita* (Rohu Fish) on fed with Spirulina Supplementation

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ABSTRACT

The aim of the study was to evaluate the effects of Spirulina on Haematological of common carp as Labeo rohita. The results of the study concluded that 1% Spirulina diet supplementation to Labeo rohita showed significantly improved the hematological performance of fish as associated with that of control diet. The potential health benefits of spirulina diet may be due to the micro and macro nutritional compositions as compared to other diet supplementations. So the present study recommends the use of Spirulina and in fish feed in modest amount as it enhances the feed quality without much affecting the cost factor.

KEYWORDS: *Labeo rohita, Spirulina, Hematology*

INTRODUCTION

Carp farming is the livelihood of Indian aquaculture contributing more than 85% of the total production (Arredondo Figueroa *et al*., 2013). In recent years, technological advancement and modification of supplementation of feed, culture practice from traditional to semiintensive and intensive system has led to various environmental related stressors in the culture species (Eddy and Williams, 1987). The Indian main carps, catla, rohu, mrigal and kalbasu are fast growing and highly preferred food fishes in India. These carps have also gained popularity in other Southeast Asian countries. The Indian main carps *Catla catla, Labeo rohita* and *Cirrhinus mrigala* are the most important commercial fishes in India with a maximum market demand and acceptability as eatable by the consumers due to their taste and flesh. They donate about 67% of total freshwater fish production (Biswas *et al*., 2007). In India, the aquaculture practices mainly revolve around a few species of finfish and shellfish, among which the Indian famous Carp's viz. *Catla catla* and *Labeo rohita* contribute substantially to the inland production. Although carp culture is widely practiced, the non- availability of appropriate compounded feed to meet the demands of the species still remains as a inportant constraint. The quantity and quality of feed consumed have a pronounced effect on growth rate, efficiency of feed conversion and biochemical composition of fish. Development of aquaculture will be greatly upgrade by finding alternative and less expensive ingredients (Abdel-Tawwab amd Ahmad, 2009). Therefore the aim of the study was to evaluate the effects of Spirulina on Haematological of common carp as *Labeo rohita*

MATERIALS AND METHODS

Preparation of Spirulina extract:

2 gram of the powder of Spirulina were transferred in to conical flask (250ml). The conical flask containing 50ml of water. The conical flask containing Spirulina were shake it well for 30 minutes by free hand. After 24 hrs, the extracts were filtered using whatman filter paper No.1 and filtrate used for further analysis.

Experimental fishes:

Fingerlings of Labeo rohita (average weight 8.43 ± 1.59g) were procured from Fish farm, Thitta, Thanjavur District, Tamil Nadu, India, using cast net and preserved in the laboratory in a glass aquarium tank and acclimated in aerated tap water with continuous aeration for two weeks prior to experimentation. During this period of time, fishes were fed with a known amount of fish food

Distribution of Indian Major carps:

The Indian major carps Rohu (Labeo rohita) which are also known as the (Gangetic) craps are the natural inhabitants of the river Ganga network, namely the river Gomati, the Yamuna, the Ganga and the Brahmaputra and the Indus river system in North India. The river system of Ganga running to a total length of about 8,047 km, besides the major carps, harbors the richest freshwater fauna of India, ranging from mahaseers and the torrential fishes of hills to a large array of other fishes of huge commercial value.

Preparation of Diet:

The Spirulina was obtained from PARRY Nutraceuticals Division of EID Parry (India) Ltd. at Pannangudi, Pudukkottai Dist. Tamilnadu, India. The fingerlings were fed 1% of their body weight twice a day for 30 days. Every ten days, tanks were partially cleaned and water was partially changed. The temperature averaged is 28±1.5°C, oxygen dissolved is 7.4±0.6 mg/l, and total ammonia 0.5±0.2 mg/l

Sampling of the fish:

Fishes were sampled once a month for six months using drags net. Length and weight of ach species were measured separately to assess the health of condition of fish and their growth. The length in (mm) and weight in (g) of individual of fish were documented separately on treatment wise with the help of measuring scale and portable sensitive balance. Fishes were captured randomly from each experimental treatment and these fishes were used for hematological analysis.

Biochemical estimations:

Hematological profile was analysed by Dacie and Lewis, (1968).

Statistical Analysis:

Values will be expressed as mean ± SD for six fish in the each group and the results are statistically analyzed by Graphpad Instat Software (Graphpad Software, San Diego, CA, USA) version 3 was used and $p < 0.05$ was considered to be significant.

RESULTS AND DISCUSSION

Hematological profile of freshwater fish *Labeo rohita* (Fingerlings) with *Spirulina* supplemented fish in different days

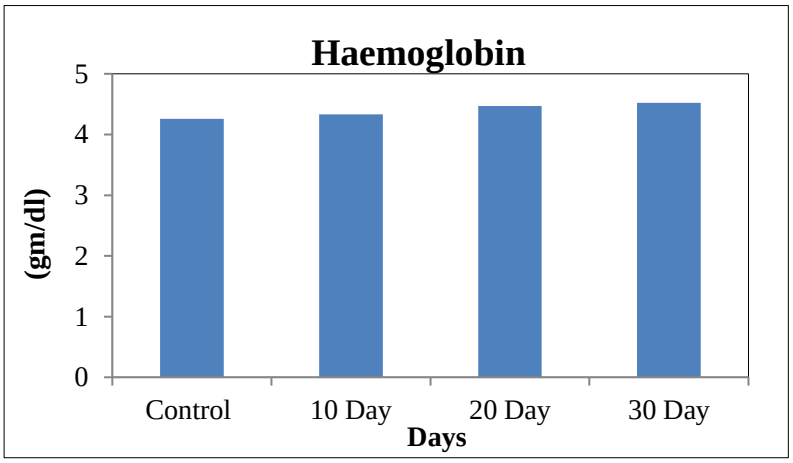
More recently, the administration of Spirulina to fish through the diet has seemed as a very important control monitor in fish farms. Therefore, currently an effort has been made to investigate the effect of 1% *Spirulina* diet on Hematological parameters (RBC, Hb, WBC) of fish for the experimental period of 30, 90 and 180 days.

Labeo rohita fingerlings showed (Table 7 and fig.7) the content of Hb (4.26 ± 0.11), WBC, (5700 ± 39.9) and RBC (1.15 ± 0.08) were observed in control fish while Hb (4.33 ± 0.26), WBC, (5710 ± 39.97) and RBC (1.21 ± 0.8) content were increased in 10 days *Spirulina* supplemented fish. The content of Hb (4.47 ± 0.21), WBC, (5730 ± 40.11) and RBC (1.28 ± 0.09) were observed in 20 days *Spirulina* supplemented fish while Hb (4.52 ± 0.23), WBC, (5750 ± 40.25) and RBC (1.32 ± 0.09) content were increased in *Spirulina* supplemented fish 30 days. . The increased in the hematological composition of freshwater fish *Labeo rohita* was greater in *Spirulina* diet in 30 days.

Table.7: Hematological profile of freshwater fish *Labeo rohita* (Fingerlings) with *Spirulina* supplemented fish at 30 days

Test	Hematology estimations			
	Control fish	**10 Day**	**20 Day**	**30 Day**
Hemoglobin (gm/dl)	4.26 ± 0.11	4.33 ± 0.26	4.47 ± 0.21	4.52 ± 0.23
WBC (Cu.mm)	5700 ± 39.9	5710 ±39.97	5730 ±40.11	5750 ±40.25
RBC (Million/Cu.mm)	1.15 ± 0.08	1.21 ± 0.8	1.28 ± 0.09	1.32 ± 0.09

Values are expresses as Mean ± SD for 10 fishes



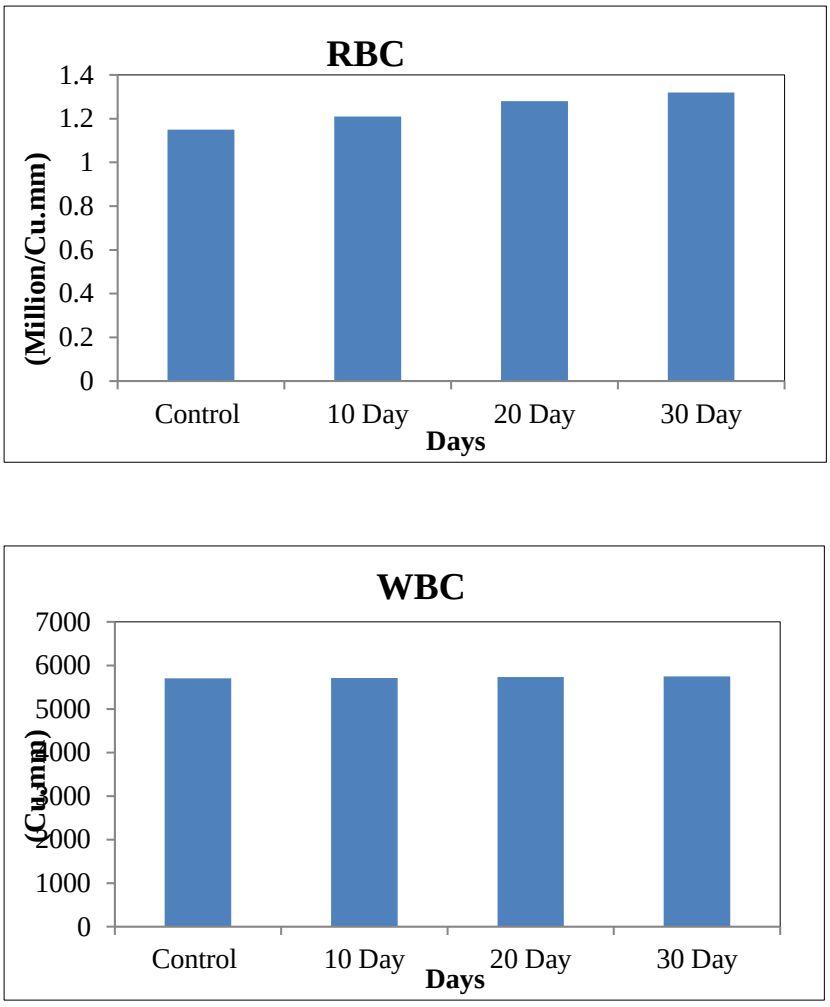


Fig.7: Hematological profile of freshwater fish *Labeo rohita* (Fingerlings) with *Spirulina* supplemented fish at 30 days

Hematological studies help in understanding the relationship of blood characteristics to the habitat and adaptability of the species to the environment. Hematological analysis are related to the animal environment which indicates that the environment where fishes live could exert some influence on the Hematological characteristics (Gabriel *et al*., 2004). In current years, haematological variables have been used more extensively where clinical diagnosis of fish physiology was applied. This was used to determine the effects of extremely stressors and toxic substances brought about by the close association between the circulatory system and the external enviromncnt (Cech *et al*., 1996; Taofik *et al*., 2008)

Haematological studies contribute to an understanding of the relationship between blood characteristics and the habitat and the adaptability of the species to the environment, so there is a need for establishing normal haematological values in different species of the *Labeo rohita*, under the supplementation conditions (Cnaani, 2004). The results of our research provide a contribution to the knowledge of the hematological parameters of the *Labeo rohita*, under the supplementation conditions employed in this study. This study might be supportive as a tool to screen the fish health status.

CONCLUSION

The results of the study concluded that 1% *Spirulina* diet supplementation to *Labeo rohita* showed significantly improved the hematological performance of fish as associated with that of control diet. This might be due to high nutritional content of *Spirulina*.

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