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Research Article

INFLUENCES OF ISOLATED PROBIOTICS ON AMINO ACID PROFILE OF FRESH WATER FISH *CYPRINUS CARPIO*

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ABSTRACT

The aim of the present study is to find out the influences of isolated probiotics on total non essential amino acid content of the freshwater fish *Cyprinus carpio*. The experiment was carried out in three earthen ponds for three months. Pond A is control (without probiotics), Pond B is experimental I (with single probiotic *Bacillus* spp.) and Pond C is experimental II (with two probiotics *Bacillus spp. and Lactobacillus* spp). The total non essential amino acid content was analyzed at the end of 30th, 60th and 90th day of an experimental period. The total non essential amino acid was found to be significantly increased in Experimental group II (Pond C) than the experimental group I (Pond B) and Control group (Pond A).

INTRODUCTION

Aquaculture is one of the best options for rural people, which can generate employment and contribute significantly to alleviate rural poverty. The demand for animal protein is increasing day by day. Probiotics are the members of healthy intestinal microbiota and they reduce the wastage of antibiotics in aquaculture. Recent works have studied the beneficial effects of probiotics for aquaculture. Probiotics are defined as "a viable microbial food supplement which beneficially influences the health of the host" (Salminen *et al*., 1998). The fish fed with isolated intestinal microbes along with supplemented feed showed higher growth performance may be due to increased food absorption by enhancing protease enzyme level which results in better growth (Karthegaa *et al*., 2016). The probiotic improves the health of fish by improving water quality and modifies the microbial composition of the water and sediment (Verschuere *et al*., 2000). (Parvathi and Sivakumar, (2016) observed that probiotics played major role in maintaining optimum water quality and prevents bacterial disease in fish ponds. Probiotic bacteria directly decompose the organic matter in the water thus improving the water quality (Padmavathi *et al*., 2012). The common carp is one of the most important farmed species in the world's aquaculture especially in Asia, the production was about 3 444 203 in 2010 (FAO, 2012). It is a bottom feeder and its activity makes nutrients available to the eutrophic pond water results in the development of rich algal community. Carps are commonly bred fish in the world (FAO, 2010; Fishery. 2012). The research about probiotics on aquatic organisms is increasing with the demand for environmental friendly aquaculture (Vine *et al*., 2006).

Amino acid is an important biochemical compound for living organisms (Vetura and Catalan, 2010). Essential and non essential amino acids consist of oxygen, nitrogen, hydrogen and carbon atoms. Aquatic organism like fish required high AA level due to high growth and energy production during the larval stage (Aragao *et al*., 2004b). The aim of the present is to find out the influences of isolated probiotics on non essential amino acid content of the fresh water fish *Cyprinus carpio*.

MATERIALS AND METHODS

The experiment was carried out in three earthen ponds situated in Berruhalli village which is located at Pochampalli Taluk (12.33°N 78.36°E) Krishnagiri district in Tamil Nadu, India. The experimental animal *Cyprinus carpio* with similar size (5gm) were purchased from Sirago Fish farm Nerinjipet, Erode District, Tamil Nadu, India and acclimatized to natural condition. Among the three ponds, Pond A is control (without probiotics), Pond B is experimental I (with single probiotic *Bacillus* spp.) and Pond C was experimental II (with two probiotics *Bacillus spp. and Lactobacillus* spp). The fish in the pond A (control) fed with only with supplementary feed without probiotics. The fish in the pond B (Experimental I) were fed with supplementary feed along with *Bacillus* spp and the fish in the pond C (Experimental II) were fed with

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supplementary feed along with the two combined probiotics *Bacillus spp. and Lactobacillus spp* and feed were given early morning and evening regularly. The experiment was carried out for three months and the muscle sample was taken from both control groups and experimental groups at the end of 30th, 60th and 90th day of an experimental period and amino acid profile was analyzed by HPTLC method of Moore and Stein, (1984).

Statistical Analysis

The data were expressed in Mean ± SD. The significant differences were determined by one way ANOVA and significant difference at $p<0.05$ level were considered.

RESULT AND DISCUSSION

The amino acid profile was analyzed in *Cyprinus carpio* at the end of 30th, 60th and 90th day of an experimental periods and data were presented in tables and figures.

Fig. 1). The total non essential amino acid content was found to be significantly increased in Experimental group II (Pond C) than experimental I (Pond B) and Control group (Pond A).

Protein is a part of each cell, as it assembles and repairs tissues. Amino acids are "building blocks" of protein and they are most vital in all the living species. Non- essential amino acid is a slightly deceptive because these amino acids actually fill essential roles, but since they are possess by own body, they are not an essential part of diet. Non essential amino acid plays important role in regulating gene expression, cell signaling, neurotransmission, antioxidative response and immunity (Bruhat *et al*., 2009). The non-essential amino acids are most important for the generation of proteins and other body functions.

Conceicao *et al.,* (2003) and Saavedra *et al*., (2008) stated that amino acid are an important energy source during fish larval stage.

Table 1 Influences of isolated probiotics on total non essential amino acid content of fresh water fish *Cyprinus carpio.*

S.NO	AminoAcid	30th day			60th day			90th day		
	NonEssential AA	Con A	Exp B	Exp C	Con A	Exp B	Exp C	Con A	Exp B	Exp C
1	Aspartic	4.56	2.19	2.40	2.43	2.10	2.09	3.45	2.34	2.36
2	Glutamic	1.02	1.38	1.40	1.65	1.64	1.62	1.24	1.60	1.72
3	Asparagine	1.12	0.94	0.99	1.14	1.12	1.09	8.94	1.11	1.20
4	Serine	0.12	0.50	0.50	0.55	0.54	0.52	1.02	0.60	0.63
5	Glutamine	1.34	1.15	1.17	1.24	1.23	1.21	2.85	1.18	1.22
6	Glycine	1.07	2.09	2.10	2.16	2.14	2.10	3.44	2.13	2.24
7	Arginine	7.89	10.13	10.18	10.21	10.20	10.16	1.67	11.25	11.36
8	Alanine	7.34	7.55	7.60	7.46	7.43	7.39	8.94	7.48	7.53
9	Cystine	7.89	7.78	7.41	7.56	7.54	7.50	9.12	8.13	8.20
10	Tyrosine	1.24	7.20	7.31	7.02	7.76	7.70	2.09	7.23	7.40
11	Proline	2.24	0.50	0.60	0.42	0.40	0.39	3.45	4.20	4.60
	TOTAL	35.83	41.41	41.66	41.84	42.1	44.77	46.21	47.25	48.46
TNEAA	Mean ±SD	35.8 ±0.02	41.43 ±0.04	41.66±0.02	41.84±0.04	42.43±0.35	44.74±0.02	46.22±0.03	47.28 ± 0.04	48.47± 0.07

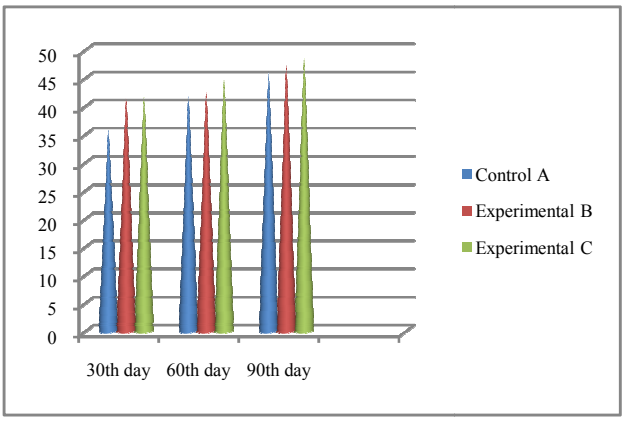

Fig 1 Influences of isolated probiotics on total non essential amino acid content of fresh water fish *Cyprinus carpio.*

The total non essential amino acid profile was found to be 35.8 ± 0.02 in control fish, 41.43 ± 0.04 in experimental group I (Pond B) and 41.66 ± 0.02 in experimental group II (Pond C). At the end of 60th day of experimental period, total non essential amino acid content was found to be 41.84 ± 0.04 in control group (Pond A), 42.43± 0.35 in experimental group 1 (Pond B) and 44.74 ± 0.02 in experimental group 2 (pond C). At the end of 90th day the total non essential amino acid content was found to be 46.22 ± 0.03, in control groups (Pond A), 47.28 ± 0.04 in Experimental group I (Pond B) and 48.47 ± 0.07 in Experimental group II(Pond C) respectively (Table 1 &

Farhoudi *et al*., (2013) reported tyrosine content raised or maintained at constant levels around the first feeding in *Cyprinus carpio*. Conceicao *et al.,* (1997) stated that the increased amino acids content might be associated with the onset of thyroid gland activity. These amino acids have vital physiological functions; they are precursors of thyroid hormones, melanin dopamine and cathecolamines (Aragao *et al.,* 2004b). In the present study increased total non- essential amino acid content may be due to onset of thyroid gland activity (Conceicao *et al*., 1997) and optimal fish growth (Wilson, 1989). Arginine is involved in various metabolic pathways such as synthesis of protein, production of urea, metabolism of glutamic acid and proline, synthesis of creatine and polyamines (Alam *et al*., 2002) and is considered for optimal growth of fish (Wilson, 1989). The use of diets with unsuitable amino acid profiles will lead to amino acid losses and increase in nitrogen excretion (Aragao *et al*., 2004b).

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