

Possible utilization of medicinal plant Holy Basil (*Ocimum basilicum*) as dietary supplement on growth parameters *Cirrhinus mrigala* fingerlings.

Shivaji G Jetithor*, Datta A.Nalle**

*Assistant Professor, Department of Fishery Science, Yeshwantrao Chavan Mahavidyalaya, Tuljapur Dist. Osmanabad. (Maharashtra) India.

**Department of Zoology & Fishery Science, Rajarshi Shahu Mahavidyalaya (Autonomous) Latur (Maharashtra) India.

Abstract- In present investigation dietary supplement of holy basil plant leaves and stem soxlet extract were used in variable concentration by using soybean and other essential dietary ingredients as per need. Each diet then mix along with holy basil extract by using four different concentrations like 40 ml/100g⁻¹ (ED-2) , 60 ml/100g⁻¹ (ED-3) , 80 ml/100g⁻¹ (ED-4), 100 ml/100g⁻¹ (ED-4). Diet 1 i.e. ED-1 kept as control. After 60 day experimental feeding trial HIS (Hepato Somatic Index) and VSI (Viscera Somatic Index) were determined. better results were shown in diet ED-3 (80 ml/ /100g-1) followed by ED-2 (60 ml/ 100g-1) , ED-4 (100 ml/ 100g-1) , ED-1 (40 ml/ 100g-1) and control.

Index Terms- Fish Diet, Plant Diet, Holy Basil, *Cirrhinus mrigala*, Growth Parameter.

I. INTRODUCTION

The medicinal plants and herbs supplementary to the feed heal many diseases, endorse growth, decrease stress, recover immunity and avert infections in fish under culture. [1]

Medicinal plants can also be used as feed additives; it can improve animal growth performance, due to pleasant smell sometime work as feeding attractants. Medicinal plants are best possible additives of formulated diets for aquatic fauna from the perspective of their antimicrobial and antiseptic actions. Widespread basil (*Ocimum basilicum* L.), belong to the Lamiaceae family. Holy Basil is an necessary oil crop which is cultured in farms at commercial level in many countries [2] it

also been employ in food due to its immune modulatory ability [3]

Photochemical screening of *holy basil* revealed the presence of glycoside, mucilage, various proteins and amino acids, phenol compound, along with triterpenoids, steroids. [4]. A total of twenty nine compounds showing 98.0–99.7% of the oils are recognized by Hussain *et al.* [5]. The green colored leaves of holy basil contain abundant level of various vitamins, essential minerals and oils [6]

Further Dakar *et al.* [7] record that holy basil leaves are rich in ocimene, and linalool which were mainly effectual compounds in the unstable oil and holy basil leaves food may be useful in fish growth, protein conversion, and nutrient retention holy basil also work as antioxidant and antimicrobial agent as it having phenol and aromatic compounds [8]

The present investigation had been focused upon the dietary use of medicinal plant holy basil , tulasi (*Ocimum tenuiflorum*) on f growth parameters of *Cirrhinus mrigala* fingerlings

II. MATERIALS AND METHODS

Study plant: It is commonly known as Tulasi or Tulas in Marathi regional language and common English name is Holy

Basil or Sacred Basil the scientific name is Ocimum tenuiflorum

Experimental fish and feeding experiment:

Cirrhinus mrigala fingerlings were obtained from local fish supplier from osmanabad. Fish adaptation period were 2 weeks. Physico- chemical factors were observed at each week end by following standard methods of water analysis suggested by [APHA](#) [9]. Physico- chemical factors; use for monitoring are temperature which were found $21\text{ }^{\circ}\text{C} \pm 0.03$, pH (7.4 ± 0.4). Along with controlled DO and salinity. All the experimental Fishes were fed the commercial feed during adaptation, 7 days at laboratory level. The Experiment was of 60 days. At the end of experiment from experimental aquarium fishes were selected to take their weight and length. The length weight data were recorded up to 60 day

and seen the growth change at each dietary feed application. FCR were noted.

Dried holy basil whole plant were selected after that leaf and stem part selected to make soxlet extract .after that test feeds were formulated by using standard procedure of square formula by using soybean and other essential dietary ingredients as per need. Each diet then mix along with holy basil extract by using four different concentrations like $40\text{ ml}/100\text{g}^{-1}$ (ED-2) , $60\text{ ml}/100\text{g}^{-1}$ (ED-3) , $80\text{ ml}/100\text{g}^{-1}$ (ED-4), $100\text{ ml}/100\text{g}^{-1}$ (ED-4). Diet 1 i.e. ED-1 kept as control. Proximate analysis % shows all value in standard .the amount of crude fat after diet making shows permissible values dry matter crude protein ,crude fibre are in appropriate amount .

Determination of Growth Factors

After completion of 60 days experimental fishes from each aquarium further scarified and were used to examination of growth related parameters like HSI (hepatosomatic index), VSI (viscerosomatic index). The formula used to calculate of $\text{VSI} = \frac{\text{visceral mass (weight)}}{A} \times 100$ HSI as $\frac{\text{liver weight (g)}}{A} \times 100$ where A is total weight of sample fish in grams,

III. RESULTS

Growth: During 60 days feeding trial all fishes from each aquarium selected and their length and weight record were

shows better growth rate. Shown in table B. After 60 day experimental feeding trial HSI (Hepato somatic Index) and VSI (viscera somatic Index) were determined values calculated were shown in table C. better results were shown in diet ED-3 ($80\text{ ml}/100\text{g}^{-1}$) followed by ED-2 ($60\text{ ml}/100\text{g}^{-1}$) , ED-4 ($100\text{ ml}/100\text{g}^{-1}$) , ED-1 ($40\text{ ml}/100\text{g}^{-1}$) and control without holy basil extract.

Discussion:

Now a day's aquaculture sector increases rapidly and there is need of growth promoting as well as health booster diet .in this present experimental trial we had been concentrate upon to use of appropriate dose of holy basil soxlet extract results were shown in diet ED-3 ($80\text{ ml}/100\text{g}^{-1}$) followed by ED-2 ($60\text{ ml}/100\text{g}^{-1}$) , ED-4 ($100\text{ ml}/100\text{g}^{-1}$) , ED-1 ($40\text{ ml}/100\text{g}^{-1}$) and control without holy basil extract. Recently Ghasem Rashidian *et.al.* [10] Studies on Oregano (*Origanum vulgare*) extract on zebra fish they noted that it plant extract shows improvement in health and immunology of fish. Holy basil extract also show the better results in terms of growth by its dietary utilization [11] Study carried out shows that herbal extract useful to improve maturation and reproduction. [12]. In non fish animals also some similar themed experiments were carried out which shows that poultry chicks which feed with holy basil at rate three gram per kilo gram shows better growth parameters [13]. So these few attempts shows the significant utilization of holy basil based feed supplement for *Cirrhinus mrigala* fingerlings in terms of their better growth rate.

Acknowledgement: : We express our sincere gratitude to all our laboratory colleagues and to the local fisherman's and farmers for providing us fish fingerlings and holy basil plants.

Table A: Experimental diets with different levels Holy Basil (*Ocimum basilicum*) (g per 100g¹)

Ingredients	Experimental diets				
	ED- 1	ED-2	ED-3	ED- 4	ED- 5
Ground nut cake	50	50	50	50	50
Protein mix	15	15	15	15	15
Rice bran	5	5	5	5	5
Fish guano	5	5	5	5	5
soybean	25	25	25	25	25
<i>Ocimum</i> extract	40*	60 *	80 *	100 *
Factors	Proximate analysis %				
Crude fibre	4.61 ±0.10	4.80±0.11	4.55 ±0.07	4.50 ±0.10	4.53 ±0.13
Crude protein	34.06 ±0.21	34.10 ±0.09	34.15 ±0.10	34.16 ±0.15	34.26 ±0.22
Crude fat	6.93 ±0.20	7.11 ±0.29	7.01 ±0.26	6.88 ±0.34	6.91 ±0.30
Dry matter	79.10 ±0.02	91.11 ±0.02	91 .15 ±0.01	91.16 ±0.02	93.18±0.01
* ml/100g ⁻¹					

Table B. Effects of dietary Holy Basil (*Ocimum tenuiflorum*) on growth & FCR of *Cirrhinus mrigala* fingerlings

Growth Parameters	Experimental diets				
	ED-0 Control	ED-1 (40 ml/100g ⁻¹)	ED-2 (60 ml/ 100g ⁻¹)	ED-3 (80 ml/ /100g ⁻¹)	ED-4 (100 ml/100g ⁻¹)
IW (Initial weight of fish)	1.80 ± 0.1b	1.81 ± 0.2 c	1.82 ± 0.1b	1.83 ± 0.2 a	1.80 ± 0.2ab
FW (Final weight of fish)	6.40±0.03c	6.43±0.15c	7.50±0.30a	7.60 ±0.52a	7.40 ±0.52ab
FWG (Final weight gain)	4.61 ±0.50 c	4.62 ±0.17 c	5.68±0.33 b	5.79 ±0.49 a	5.65 ±0.49 ab
SGR (Specific	1.18±0.01c	1.18±0.04c	1.31 ±0.07b	1.36±0.09a	1.30 ±0.09ab

growth rate)					
FCR (Feed conversion ratio)	1.10 ±0.06c	1.86±0.03c	1.61 ±0.07b	1.68 ±0.14b	1.68 ±0.14b
SR (Survival rate)	94 ± 02 b	96 ± 02c	98 ± 01b	100 ± 03a	97 ± 02 ab
<i>Different letters shows significant value (P < 0.05)</i>					

Table C. HSI & VSI of *Cirrhinus mrigala* fingerlings

Parameters	Experimental Diets ((ED)				
	ED-0 Control	ED-1 (40 ml/100g ⁻¹)	ED-2 (60 ml/ 100g ⁻¹)	ED-3 (80 ml/ /100g ⁻¹)	ED-4 (100 ml/100g ⁻¹)
VSI (Viscerosomatic index)	2.50 ± 0.10 c	3.40 ± 0.13 c	4.20 ± 0.21b	4 .90 ± 0.18 a	4 .55 ± 0.14 ab
HSI (Hepatosomatic index)	1.5 ± 0.07 c	1.4 ± 0.09 c	1.6 ± 0.06 b	1.9 ± 0.10 a	1.7 ± 0.11 ab
<i>Different letters (a, b, ab) shows significant value (P < 0.05)</i>					

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AUTHORS

First Author – Shivaji G Jetithor (M.Sc. B.Ed. Ph.D.) Assistant Professor, Department of Fishery Science, *Yeshwantrao Chavan Mahavidyalaya, Tuljapur* Dist. Osmanabad. (Maharashtra) India

Second Author – Datta A.Nalle (M.Sc.Fisheries Science Ph.D. pursuing) Assistant Professor, Department of Zoology & Fishery Science, *Rajarshi Shahu Mahavidyalaya (Autonomous) Latur* (Maharashtra) India.