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Effect of *Withania Somnifera* as Feed Ingredient on Growth and Behavioral Changes of *Laebo Rohita*

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Abstract- The research was planned to study the effects of *withania somnifera* as feed ingredient on growth and behavioral changes of *Labeo Rohita.* For this purpose four aquarium were selected. Each aquarium was stocked with 15 fishes. Before stocking, fishes for each aquarium were treated with 5g/L sodium chloride (NaCl) to prevent fish from fungal infection. Fish sample were taken from Fish Hatchery which is situated at staina road. Two types of diets were given to fish one was normal diet which was given to fish and second was plant based diet which was obtained from *withania somnifera.* 1st aquarium was served as control while others three served as experimental. After every one week fish was collected at regular intervals to check the growth parameters. Growth parameters such as fresh weight, fork length, total length and standard length were monitored weekly. The result showed that final average body weight was found 24.5, 26.2 and 28 in *Withania somnifera*. Water quality parameters like DO, Alkalinity, Carbon dioxide, pH, Temperature and chloride ions was also checked by taking water samples from the aquarium. Data analyzed with the help of analysis of variance to reach some conclusions.

I. Introduction

Due to increasing population, world is facing many problems in which most important one is shortage of food and undernourishment. Meat, milk and eggs are the source of protein which is obtained from animals. With the establishment of poultry and fish farming meat production is increasing to fulfill the requirements of proteins. Good quality protein is obtained with the development of fisheries (Sheikh and Sheikh, 2004).

Aquaculture is a type of agriculture which means to synthesize aquatic plants and animals in water instead of on land while agriculture is farming on land. Agriculture and aquaculture consist of same step for producing animals and plants. Due to continued expansion of shellfish and cultured fish species aquaculture has become a major component of animal health industry (Kolkovski and Kolkovski 2011).

Aquaculture requires continued research because it is a developing industrial sector (Alicia *et al* 2005). In the world most vastly growing food production is through aquaculture. Since 1984 aquaculture production rather than harvest from wild fisheries may become the great cause of providing fish in future (Wantanabe, 2002). The demand of high quality protein is rising due to increase in population. We acquire 16% of animal protein from fish. Antibiotics are used for the prevention of bacterial diseases in aquaculture (FAO, 2002).

Fish plays very important role in human nutrition as a protein source. In developed and developing countries it fulfills the requirement of protein but in under-developed countries it does not fulfils the requirement. The population is increasing as fast as 2.66% per annum and 66mg/person per day is standard amount of animal protein. In Pakistan only 2Kg/person/year fish meat is available. With the increasing income, improved diet and population growth demand of fish meat will continuously increases. As compared to other meat such as goat, cow, sheep fish meat can easily digestible in body. The ranges of its digestibility are between 85-90% (Rudolf, 1971).

Fish is an excellent substitute for red meat and excellent source of protein. Percentage of proteins in fish protein is high as compared to other protein based diet likewise 12% in eggs, 3.5% in milk, 6.6% in rice and 16-20% proteins in fish (Kumar, 1992). All the essential amino acids and minerals viz. copper, potassium, iron, iodine and vitamin A and D are included in fish meat (Gerking, 1966). Fish meat contains unsaturated fat contents and low concentration of carbohydrates. Fish meat contains anticancer properties and lessens the risk of heart diseases (Barlas, 1986). High quality protein diet increases the production of fish as compared to low quality protein diet (Virk and Sexena, 2003).

Fish meal can be replaced by grain and oilseed meals. The most commonly used protein source is soybean which has round about 48% protein and is frequently used in diet of aquatic and terrestrial animals. Substitution of fish meal is very less due to many reasons. Plant meals usually contain high levels of fiber, starch, non-soluble carbohydrates that influence on the growth of fish and its digestibility. Fishes perform an important role to providing food for human beings and also help in different actions. Now a day's main problem which is facing by fish nutritionals is that nutrients in which protein sources are low such as lipids and carbohydrate are required for extra protein sources. If less level protein energy sources given in fish diet they

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will be increased growth of fish. Recently non protein energy sources are used in diet of fish such as lipids and carbohydrates. Several studies shows that how much nutrition is important in aquaculture Adiukwu, 1999, Fasakin *et. al.,* (2003). Carnivorous fishes used less amount of carbohydrate as compared to herbivorous and omnivorous fishes Kaushik *et al.*, (1989) but they badly consume carbohydrate at both metabolic and digestive leaves Lovell, (1989). If fatty fish is producing its means lipid amount is greater in diet. Increase of lipid levels may reduce fish growth and produce fatty fish. In production of carnivorous fish only fish meal is sufficient for fed which fulfill the protein and lipid requirement.

Herbs are well-suited with body of fish because they have fewer side effects and also used as medicine due to nature of plants Borimnejad, (2008). So flourishing freshwater fish culture environment friendly inexpensive and ayurvedic plants should be used. The roots of herb *Asparagus racemosus* which is commonly called shatavari is used in different medicinal purposes. Roots of this herb contain saponins Sharma *et al.,* (2000), Jameela *et al., (*2011).

The commonly used herbal extracts are from *Withania somnifera* (Ashwagandha*), Ocimum sanctum* (Tulsi) and Amlaki with the dealing of Immunosuppressive conditions for animals and humans Devasagayan (1997). If Macrobrachium rosenbergii given ImmuPlus at the rate of 1g/kg for three weeks immunity level will definitely increased Kumari Jaya, (2004). ImmuPlus is an indian herb that consists of Indian plants extracts Jadhav and Bhutani (2006), Jaya Kumari *et al.,* (2007).

In Ayurvedic drugs basic source is Plant alkaloids. Due to their beneficial effects these drugs are used in medicines. Different quantity of plants is used in medicines and for treatment. Different drugs are being prepared from plants which are useful in the field of medicine (Singh *et. al.,* 2003, Tiwari and Singh 2004,).It is roughly estimated that total number of plants on earth is 2,50,000 in which eighty thousand are used as medicinal plants (Kumar and Joshi1987).

II. Materials and Methods

The present project was carried out to determine the effect of feed (25%) which is sunflower, wheat bran, rice polish based and *Withania somnifera* feed (30%, 35%, 40%) which is also plant based diet on the growth of *Labeo rohita* fingerlings. This experiment was conducted in Laboratory department of zoology Sargodha University Jaranwala campus Faisalabad.

a) Experimental Fish

Labeo rohita, fingerlings were taken from the Government Fish seed Hatchery satiana road Faisalabad. Each aquarium stocked with 15 fishes. Before start the experiment *Labeo rohita* fingerlings were bathed with 5g/L NaCl to ensure them free from fungal infection and ectoparasites. Experimental diets were given to fish twice a day. Other water parameters like dissolved oxygen, temperature and pH were also checked with digital meter. Air was supplied in the aquarium so that level of oxygen should maintain through air pumps.

III. Results and Discussion

a) Gain in Average Body Weight

Analysis of Variance demonstrated highly significant differences in different fortnights and treatments. The interaction between fortnights and treatments was also highly significant.

Table 1 : Analysis of variance table for weight

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F-value
Date	6	58.0637	9.6773	90.60**
Group	3	5.1252	1.7084	15.99**
Date*Group	18	10.6004	0.5889	5.51**
Error	252	26.9165	0.1068	
Total	279	100.7059		

** = *Highly significant (P<0.01)*

Date x Group interaction mean±SE

Date	Group				Mean
	Control	Group A	Group B	Group C	
24/06/2015	1.550±0.017i	1.550±0.017i	1.550±0.017i	1.550±0.017i	1.550±0.008E
07/07/2015	1.590±0.060hi	1.585±0.045hi	1.570±0.023i	1.800±0.114ghi	1.636±0.037E
24/07/2015	1.630±0.123hi	1.620±0.089hi	1.590±0.035hi	2.050±0.222f-i	1.723±0.072E
08/07/2015	2.000±0.087f-i	1.830±0.032f-i	1.925±0.020f-i	2.115±0.109f-i	1.968±0.039D
24/08/2015	2.370±0.073c-f	2.040±0.040f-i	2.260±0.022d-g	2.180±0.065efg	2.213±0.032C
09/07/2015	2.245±0.067d-g	2.345±0.019c-f	2.825±0.083bc	2.730±0.146cd	2.536±0.059B
22/09/2015	2.120±0.132e-h	2.650±0.027cde	3.390±0.152a	3.280±0.313ab	2.860±0.122A
Mean	1.929±0.049B	1.946±0.050B	2.159±0.083AB	2.244±0.089A	

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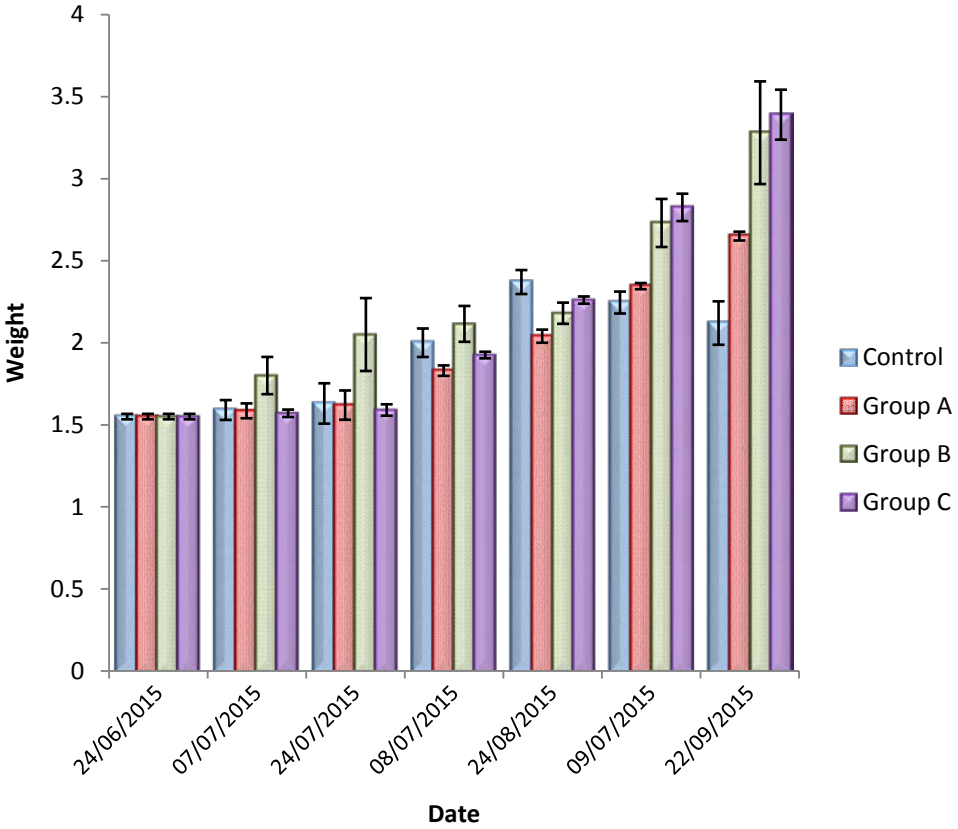
Means sharing similar letter in a row or in a column are statistically non-significant (P>0.05). Small letters represent comparison among interaction means and capital letters are used for overall mean.



b) Average Total length

Analysis of Variance demonstrated highly significant differences in different fortnights and treatments. The interaction between forth nights and treatments was non significant.

c) Gain in Average Total Length

Analysis of Variance showed highly significant differences in different fortnights and treatments. The interaction between fortnights and treatments was also highly significant.

In the present trial, studies on the growth parameters revealed highly significant difference in the growth parameters i.e. average and gain in total length.

Table 2 : Analysis of variance table for length

Source of variation	Degrees of freedom	Sum of squares	Mean squares	F-value
Date	6	80.6200	13.4367	82.68**
Group	3	3.8489	1.2830	7.89**
Date*Group	18	5.4392	0.3022	1.86*
Error	252	40.9522	0.1625	
Total	279	130.8603		

** = Significant (P<0.05); ** = Highly significant (P<0.01)*

Date x Group interaction mean±SE

Date	Group				Mean
	Control	Group A	Group B	Group C	
24/06/2015	3.640±0.016i	3.640±0.016i	3.640±0.016i	3.640±0.016i	3.640±0.008D
07/07/2015	3.755±0.101hi	3.960±0.063ghi	3.835±0.043ghi	3.985±0.119ghi	3.884±0.044CD
24/07/2015	3.870±0.201ghi	4.280±0.125e-i	4.030±0.079f-i	4.330±0.236e-h	4.128±0.088C
08/07/2015	4.440±0.094d-g	4.495±0.042c-g	4.445±0.044d-g	4.755±0.123a-e	4.534±0.045B
24/08/2015	5.010±0.122a-d	4.710±0.085b-e	4.860±0.043a-e	5.180±0.203ab	4.940±0.067A

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09/07/2015	4.930±0.103a-e	4.695±0.060b-f	5.135±0.112abc	5.255±0.130ab	5.004±0.061A
22/09/2015	4.850±0.183a-e	4.680±0.150b-f	5.410±0.214a	5.330±0.260ab	5.068±0.111A
Mean	4.356±0.081B	4.351±0.056B	4.479±0.084AB	4.639±0.097A	

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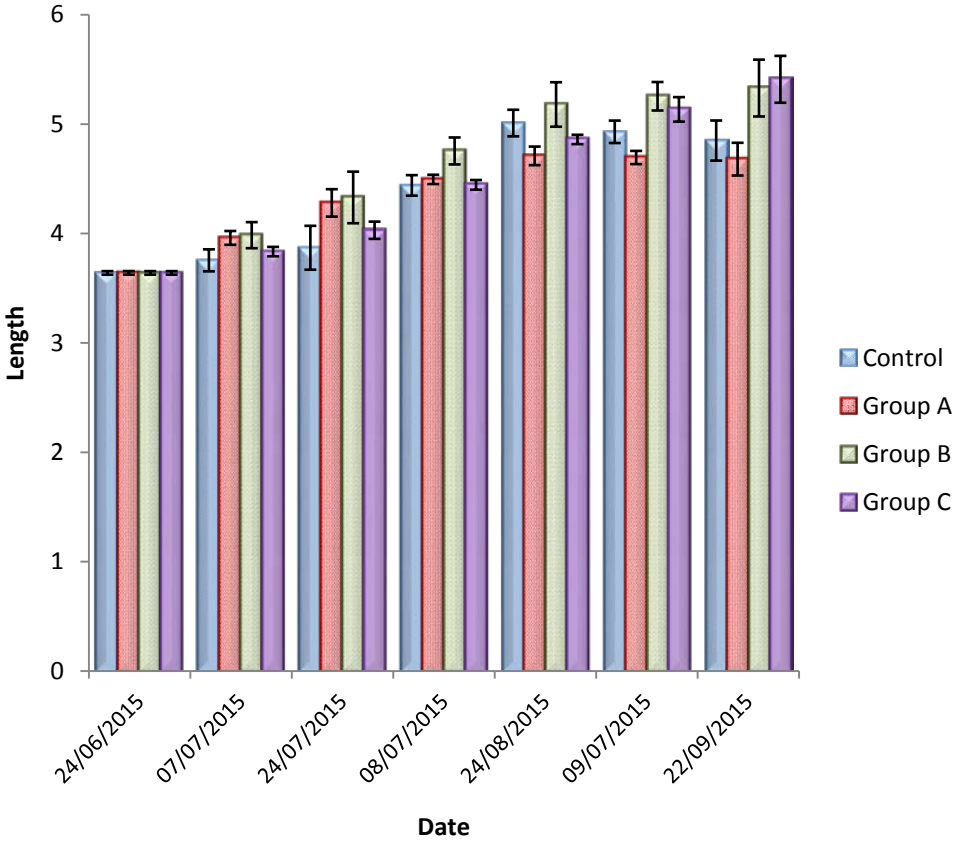

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