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ANALYSIS

Efficacy of different breeds of cow urine distillate on growth and food utilization Of Indian Major Carp, *Labeo Rohita* (Hamilton) Fingerlings

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EFFICACY OF DIFFERENT BREEDS OF COW URINE DISTILLATE ON GROWTH AND FOOD UTILIZATION OF INDIAN MAJOR CARP, *LABEO ROHITA* (HAMILTON) FINGERLINGS

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ABSTRACT

Indian system of medicines, especially *Ayurved*, has been using cow-urine for betterment of physical and mental health of mankind since thousands of years ago. Cows were regarded as wealth and were the backbone of the economy of ancient Indians. Most of the medicines are made by distilling urine and collecting vapors known as Cow Urine Distillate or distillate. Cow urine is considered to be the most effective animal origin substance having intrinsic property of general health improvement. Different breeds (Gir, Holstein frecien and Haryana) of Cow urine distillate (Cow Urine Distillate) were used in this present study, to evaluate its efficiency in enhancing growth and improving food utilization parameters in *Labeo rohita* fingerlings, one of the Indian major carps. The fingerlings were treated with Cow Urine Distillate by immersion of the medium in (0.1%) concentration for 1 hrs. Investigations were undertaken to study of the efficacy of Cow urine distillate on growth, food utilization parameters and survival rate. The results showed significant effect of Cow Urine Distillate on the growth performance and food utilization of the fingerlings of India major carp *Labeo rohita* and it is showed that Gir Cow Urine Distillate was more effective at the 0.1% concentrations. The maximum growth rate of 0.0016gm/day was observed in the *Labeo rohita* fingerlings treated with 0.1% of Gir Cow Urine Distillate when compared with control. The maximum feeding rate of 0.0052 mg/day was observed in the *Labeo rohita* fingerlings treated with 0.1% Cow Urine Distillate, when compared with control. Survival rate of 90% was observed in Gir Cow Urine Distillate treated group when compared with 60% survival rate in control.

Key words: Aquaculture, Cow Urine Distillate, Growth and Food utilization, *Labeo rohita*

INTRODUCTION

Indian aquaculture has shown significantly higher growth rate than that captures fisheries during last decades (Basudev, *et al*., 2011). Over the last decade fish farming has been fast developing from traditional extensive system to semi intensive system and intensive culture system the utilization of water resources. The global production of fish and shellfish from capture fisheries and aquaculture has shown a steady increase over the last few years and recorded a production level of 121 million tons (mt) in 1996, with contributions of 94.6 mt from capture and aquaculture, respectively (FAO., 1998). Fish farming and aquaculture industry play significant role in contributing fish protein to large Asian population. Fish is a good source of protein and also has essential amino acids with minerals like zinc, magnesium, sodium etc (Barlas., 1986).

Cows were regarded as wealth and were the backbone of the economy of ancient Indians. Wars were fought for acquiring cows. Cattle were one of the most frequently used animals described in Vedas. Cattle husbandry was well developed during the Rigvedic period and the cow (*Kamadhenu*) was adored and considered the 'best wealth' of mankind. Atharva veda provides interesting information about ailments of animals, herbal medicines, and cure of diseases. Urine was also considered as an antidote to poisons (Sushrut Samhita). From the ancient period, cow's urine has been used as a medicine. In Veda, cow's urine was compared to the nectar. In Sushrut, several medicinal properties of cow's urine have been mentioned and cow urine was known to cause weight loss and to cure leprosy, cardiac and kidney problems, indigestion, stomach ache, edema, *etc*. (Kaviratna and Sharma., 1996).

Now days, a lot of emphasis has been given on the medicinal use of cow urine in India. Recently the cow urine has been granted U.S. Patents (No. 6,896,907 and 6,410,059) for its medicinal properties, particularly for its use along with antibiotics for the control of bacterial infection and fight against cancers (Dhama *et al.*, 2005a). Cow urine contents are 95% water, 2.5% urea and 2.5% minerals, salts, hormones, and enzymes. It contains iron, calcium, phosphorus, carbonic acid, potash, nitrogen, ammonia, manganese, sulphur, phosphates, potassium, urea, uric acid, amino acids, enzymes, cytokine, lactose etc. (Bhadauria, 2002).

Copper has the power to destroy diseases and act as an antidote. Cytokines and amino acids might play a role in immune enhancement. *Gomutra* alone has got all such chemical

properties, potentialities and constituents that are capable of removing all the ill effects and imbalances in the body (Chauhan and Singh, 2001). Cow urine contains various inorganic compounds including silver, Na-K ratio of 4:1 (36%:9% in dried urine), apart from about 3% urea. Fresh cow urine also contains 50-100 mg oestrogens/100 ml; 20- 200 μg of cortico-steroids /100 ml and 0.05-0.15 mg of 17-keto-steroids/100 ml (Apte and Balachandra 2002).

Major carp. *Labeo rohita* commonly known as rohu, the prime carp species cultivated mainly as a component of polyculture systems with other indigenous and exotic carp species (Abidi and Khan., 2004). Rohu is likely to become an even more important aquaculture species in near future, as research on selective breeding of rohu in India lead to the availability of the seed of faster growing strains. Monoculture of rohu in cages, pens, running waters and closed re-circulatory systems might be possible. Both fresh and processed rohu might then become significant commodities with much wider markets. Hence the present study's objective of stimulating growth of rohu with Cow Urine Distillate of different cow breeds is having more socio economic and ethical importance.

Materials and methods:

Experimental Fish

Fingerlings of *Labeo rohita* (Hamilton) were procured from S.M. Fish farm, Swamimalai, Thanjavur District and were brought to the laboratory in polythene bags filled with oxygen. The polythene bags were kept floated for 30 minutes in the cement tank for acclimatization of the fingerlings before being released into the tank. Glass aquaria were washed to avoid fungal contamination and then sundried. Healthy fishes were then transferred to glass aquaria (Vol 20 lt) containing decholrinated tap water. Fish of both sexes weighing 1.0±0.2g were used in the present study. They were regularly fed with formulated food and the medium (Tap water) was changed daily to remove faeces and food remnants.

Collection of Cow Urine

Six disease free cows of Gir, Haryana and Holstein Frecien were selected for urine collection. The early morning (4.00am) first urine was collected from Goshala, Sri Vittal Rukminni Samsthan, Govindhapuram near Kumbakonam. The urine was pooled and transported to laboratory in airtight sterile containers (Suthanthirakannan .R and Rameshkumar. K., 2014).

Cow Urine Distillate

Cow urine was distilled at 100°C for 2 hrs using glass distillation apparatus (Kekuda, *et al.*, 2007). The cow urine distillate (Go-Ark) was used in the same day for treatment without storage.

Experimental setup

After two weeks of acclimatization three groups of fish were treated, each with different breeds cow urine distillate at 0.1% concentration by immersion in the medium. A control group was maintained separately without cow urine treatment (Padmapriya and Venkatalakshmi., 2014).

Morphological growth analysis

For length and weight the fishes were measured individually at the interval of 10 days. The fishes were weighted by digital electronic balance. Ruler was used to measure the total length from head and tip of caudal fin. The fingerlings were released in water immediately after body measurements. Each of the growth treatment was fed with formulated feed of 2% total body weight (Venkatalakshmi., 2006). The experimental fish were fed twice a day for an hour between 9.00am to 10.00am and 4.00pm to 5.00pm. The unfed was collected and dried (60º C) in a hot air oven and weighed. The faeces were also collected separately, dried and weighed.

Food utilization parameters

The weight and length of individual fish were recorded at the initiation of experiment and then at the interval of 10 days. The growth and food utilization parameters were calculated by using the following formulae (Petursewiez and Macfutyen., 1970)

$$\text{Growth} = \text{Final weight} - \text{Initial weight (mg)}$$

$$\text{Growth Rate} = \frac{\text{Weight gain}}{\text{No of days x initial weight}} \text{ (mg. day-1)}$$

$$\text{Percentage of Increase in Body weight} = \frac{\text{Final weight} - \text{Initial weight}}{\text{Initial weight}} \times 100$$

$$\text{Average Daily Growth} = \frac{\text{Final body weight} - \text{Initial body weight}}{\text{No of feeding days}} \text{ (gm/day)}$$

Food utilization parameters were calculated as follows:

$$\text{Feeding rate} = \frac{\text{Total dry food consumed}}{\text{No of days x initial live wt. of fish}} \text{ (mg. g body wt. -1 day -1)}$$

Food absorbed = Food consumed – faeces produced (mg. g. body wt.-1 day -1)

$$\text{Absorption rate} = \frac{\text{Total food absorbed (dry)}}{\text{No of days x initial live wt. of fish}}$$

$$\text{Absorption efficiency} = \frac{\text{Food absorbed}}{\text{Food consumed}} \text{X } 100$$

$$\text{Gross Conversion efficiency (K1)} = \frac{\text{Growth rate}}{\text{Feeding rate}} \text{ X } 100$$

$$\text{Net Conversion efficiency (K2)} = \frac{\text{Growth rate}}{\text{Absorption rate}} \text{ X } 100$$

Survival rate is calculated by following formulae:

$$\text{Survival rate} = \frac{\text{Initial number of fish – mortality}}{\text{Initial number of fish}} \text{ X } 100$$

Statistical analysis

The test of significance was done manually with student's-t test assuming unequal variance in MS-Excel.

Results

Growth performance

The growth response of *Labeo rohita* in terms of increase in body weight, growth rate, and specific growth rate (SGR) and body length are presented in Table 1. The results revealed that on the 30th day, the highest growth rate was recorded in T1 Gir Cow Urine Distillate with a growth rate of 0.0096, when compared with 0.0008 of control. Hence the 0.1% Cow Urine Distillate of Gir breed cattle has a significant effect on the growth rate ($P < 0.005$), (Table 1).

Food utilization parameters

The effect of Cow Urine Distillate in *Labeo rohita* fingerlings on food utilization parameters of feeding rate, food absorbed, absorption rate, absorption efficiency, Gross conversion efficiency and Net conversion efficiency were showed in table 2. The food utilization

parameters were significantly higher in experimental fishes treated with Cow Urine Distillate, when compared to the controls. It was noted that highest feeding rate of 0.0052 was observed in T1, which is higher ($P<0.005$) when compared with control which feeding rate is 0.0049 (Table 2).

Survival Rate

The mortality was recorded at 10 days interval. The highest survival rate of 90% was recorded in the T1, which is significantly higher ($P<0.005$) than the untreated control group having a survival rate of 60%. T3 shows a lesser survival rate while T2 has 70% survival rate, (Figure 1).

Discussion:

The easy index for assessing the influence of any chemical or biological agent on fish and in aquaculture production is growth. Pollutants are known to reduce growth rate and production potential of fishes (Ramaneswari *et al*., 2000). Growth promoters and hormones are used to enhance growth and production (Sambhu and Jayaprakash, 1997). Microbial probiotics are also used for enhancing growth (Ebanaser and Sheeja., 2003; Venkatalakshmi, 2006). However the potential of cow urine in growth enhancement is not explored.

In the present study the results confirm that the Cow Urine Distillate is capable of promoting growth and food utilization of cultured fishes as in the present experimental model of *Labeo rohita* fingerlings. The knowledge on the influence of any chemical in the environment over the growth and food utilization efficiency is essential for aquaculture practices in water bodies with such environmental conditions (Arunachalam *et al*., 1980 and Ramaneswari and Rao., 2000). Different authors reported the suitability of food components of both plant and animal origin for their ability to contribute better growth performance in cultured stocks (Sambu and Jayaprakash., 2001). Various growth promoters like vitamins, hormones and amino acids were used as growth promoters in different fishes and shrimps were well studied. Among the growth promotors, calcium plays a vital role in growth promoting as well as detoxifying (Howrath and Sprague, 1978; Meni, 1985). Increased levels of Calcium and hardness are also found to be having positive influence over growth promotors of *Cyprinus carpio* (Moni et al., 1990). Similar observations were also made by Navarathinam (2000) and Marimuthu (2001) in

Catla catla and *L. rohita* respectively. Cow urine has been reported to contain calcium and hence it may be the reason of the promotion of growth.

Cow dung is found to be an effective source of organic fertilization, which positively influences the growth performance of major carps of fish production (Sughra *et al*., 2003; Kanwal *et al*., 2003). Pond fertilization is a management protocol to enhance biological productivity using both organic manure and inorganic chemical fertilizers. Evaluation of fertilizer value of different organic manure (pig, cow, chicken and green manure) has been a subject of research in aquaculture (Green, 1990; Morissens *et al*., 1996; Yaro *et al*., 2005).

In semi-intensive polyculture system, the frequent application of organic manure, inorganic fertilizers, supplementary feed and stocking species ratio make the maintenance of production, population of natural food organism and the maximal utilization of productivity of pond ecosystem.

Kumar *et al.* (2004) evaluated the blastogenic activity of lymphocytes and effect of *in-vivo* cow urine treatment on blastogenesis, so as to find out their potential to mount protective immune response against diseases in chicks. The increase in lymphocyte proliferation activity was maximum during first two weeks of development. During developmental period cow urine enhanced the T- and B- cell blastogenesis by 1.81% and 2.21%, respectively. Similarly, Chauhan and Singh (2001) reported that cow urine significantly enhances T- and B- cell proliferative activity in mice.

A herbal preparation prepared using cow urine and *Gymnema sylvestre, Momordica charantia, Eugenia jambolana, Aegle marmelos, Cinnamomum tamala, Aloe barbadensis* and *Trigonella foenumgraecum* was studied by Jarald *et al.* (2008) for antidiabetic activity in alloxan-induced diabetic rats. They concluded that herbal preparations made of cow urine significantly lower the blood sugar level when compared to the preparation prepared using water. Fresh cow urine also exhibits antidiabetic effect. Vadivelan (2007) treated the diabetic induced rats with cow urine and observed weight gain, decreased blood glucose, serum cholesterol, triglycerides, BUN and serum creatinine when compared to the diabetic control group.

Garg *et al*., 2005 evaluated the effect of distilled cow urine on the nutrient utilization by the white leghorn layers with was increase in feed intake, decreased feed conversion ratio and feed efficiency ratio, digestibility of dry matter, crude protein, crude fiber and organic matter increased significantly in the cow urine treated group. Padmapriya and Venkatalakshmi., 2014

reported an increase in growth rate of *C. mrigala* fingerlings treated with the different breeds of cow urine. Sattanathan and Venkatalakshmi., 2015 reported an increase in growth rate and food utilization of *L. rohita* fingerlings treated with the different concentration of Gir Cow Urine Distillate.

As literature reveals, the present study also confirms the potential of cow urine distillate in promoting the health, which was expressed as good survival rate, increased growth rate and feeding rate in the present study. The results revealed that the Cow Urine Distillate of Gir has the maximum efficiency in increasing growth rate, feeding rate and survival rate. The native cows grow in Indian atmosphere and can tolerate the temperature variation. The indigenous breed is less susceptible to the diseases. The cow urine of indigenous breed is most effective medicine compared to exotic breeds.

Indigenous cow urine is known to have an immunopotentiating effect in animals and man (Chauhan, 2001; Chauhan, 2005; Chauhan, 2007; Dutta, *et al.*, 20006). It has been patented for its anti-oxidant, bio-enhancer, anticancer, anti-infection, and pest-repellent properties; it has also been studied that the urine of indigenous breeds of cows is far superior having rasayana in comparison to urine of cross-bred cows, buffaloes and exotic cows (Dhama *et al.*, 2005a,b). Immunomodulation is one of the important aspects of therapy and prevention of disease in man and animals. However, there is no such product available in the allopathic system of medicine, which can enhance immunity. Moreover in herbal and natural therapy, there are certain herbs, which enhance the immunity to a certain extent. The urine of indigenous cows particularly of Sahiwal, Badri and Gangatiri cows were found to be very effective, which modulate all the wings of the immune system, that is, humoral and cell mediated immunity (Banga *et al.*, 2005; Chauhan *et al.*, 2001).

In the present investigation, it has been observed that the Gir Cow Urine Distillate has significant increase in growth rate, body length, food utilization and survival rate. Whereas the cow urine distillate of Holstein Frecien has no significant effect on growth and food utilization of *Labeo rohita* fingerlings.

Conclusion

The results clearly showed that Cow Urine Distillate of Indian cows had beneficial effects on the growth performance. In conclusion, Cow Urine Distillate of Gir could be suggested for pond management at 0.1% concentration to get a better yield.

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Table 1: Effect of different breeds of Cow Urine Distillate on the Growth parameters of *Labeo rohita* fingerlings.

Parameters	Control	T1	T2	T3
Initial Weight W1(g)	0.912±0.0278	0.911±0.0284	0.914±0.0377	0.913±0.03368
Final Weight W2 (g)	0.97±0.0208	1.031±0.0655	1.015±0.0423	1.012±0.0784
Initial Length (cm)	4.35±0.2345	4.23±0.315	4.175±0.2815	4.07±0.1488
Final Length (cm)	5.03±0.3055	5.2±0.3182	5.133±0.2516	
Growth W1-W2 (g)	0.0296	0.0545	0.0422	0.0384
Growth rate (mg/day)	0.0008	0.0016	0.0012	0.0011
Average Daily Growth	0.0009	0.0018	0.0014	0.0012
Percentage of increase in body weight (%)	3.2456	5.9824	4.6170	4.2081
Survival rate (%)	60	90	80	70
Mortality (%)	40	10	20	30

Table 2: Effect of different breeds of Cow Urine Distillate on the food utilization parameters of *Labeo rohita* fingerlings.

Parameters	Control	T1	T2	T3
Feeding rate (mg/day)	0.0048	0.0055	0.0048	0.0049
Food absorbed (mg/day)	0.12	0.14	0.09	0.012
Absorption rate (mg/day)	0.0049	0.0052	0.0046	0.0047
Absorption efficiency (mg/day)	97.08	93.74	69.39	92.84
Gross conversion efficiency (%)	184.1	298.85	263.6	233.01
Net conversion efficiency (%)	95.59	176.54	181.3	147.7

Figure 1: Survival rate of different breeds of Cow Urine Distillate on the Growth parameters of *Labeo rohita* fingerlings.

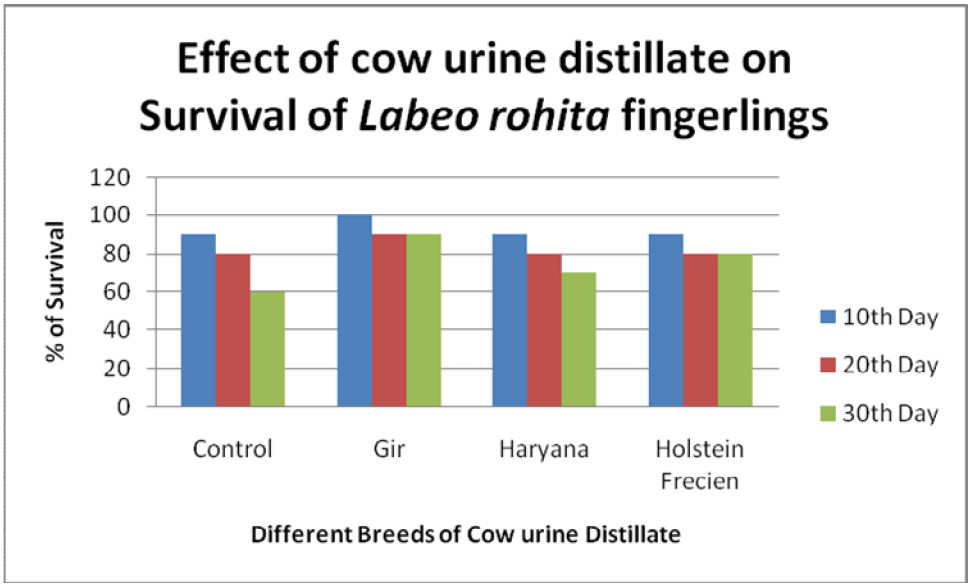

Table 1: t-Test: Two-Sample Assuming Unequal Variances between Control and T1

	Control	*T1*
Mean	0.941667	0.965556
Variance	0.000297	0.000678
Observations	6	9
Hypothesized Mean Difference	0	
df	13	
t Stat	-2.1388	
P(T<=t) one-tail	0.026100	
t Critical one-tail	1.770933	
P(T<=t) two-tail	0.052008	
t Critical two-tail	2.160369	

Table 2: t-Test: Two-Sample Assuming Unequal Variances between Control and T2

	Control	*T2*
Mean	0.941667	0.95625
Variance	0.000297	0.000512
Observations	6	8
Hypothesized Mean Difference	0	
Df	12	
t Stat	-1.36882	
P(T<=t) one-tail	0.098067	
t Critical one-tail	1.782288	
P(T<=t) two-tail	0.196134	
t Critical two-tail	2.178813	

Table 3: t-Test: Two-Sample Assuming Unequal Variances between Control and T3

	Control	*T3*
Mean	0.941667	0.951429
Variance	0.000297	0.000781
Observations	6	7
Hypothesized Mean Difference	0	

Df	10
t Stat	-0.76932
P(T<=t) one-tail	0.229743
t Critical one-tail	1.812461
P(T<=t) two-tail	0.459486
t Critical two-tail	2.228139