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**EFFECT OF *MANGIFERA INDICA* LEAVES EXTRACT ON GROWTH RESPONSE OF *OREOCHROMIS NILOTICUS***

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Effect of *Mangifera indica* leaves extracts on growth response of *Oreochromis niloticus* was evaluated for 42 days. 5 diets at approximately 40% crude protein containing varying levels of the extracts at 0%, 5%, 15% and 25% were formulated. These were fed to fingerlings of *O. niloticus* (mean weight, 5.25 – 6.05g) that were randomly distributed into 45 litres of waters in plastic basins at 5% of their body weight (2.5% in the morning and 2.5% in the evening). Feed 0% and 5% inclusion levels shows best growth with no significant difference ( $P>0.05$ ) between them. The lowest feed conversion ratio of  $1.96\pm 1.05$  was observed in diet with 5% inclusion level of the leaves extract. Decrease in growth was observed as the inclusion level increases, fish mortality was also observed to increase as the inclusion levels increases. *Mangifera indica* leaves which are widely available and easily assessable throughout the country, could serve as growth promoter especially when incorporated at a very low level into fish feed.

**Keywords:** *Mangifera indica*, growth promoter, weight, inclusion, leaf extract.

**INTRODUCTION**

Fish is noted for high quality protein and its protein content can be as high as 60% on dry matter basis it is also an important source of protein in human diet. Feed has been estimated to account for about 60-80% of the total cost of production of fish depending on species and environment [1].

With the shifting of attention from synthetic drugs to natural plant products as they have been found to be environmentally friendly and their effects in most cases has been found to be reversible, the use of plant extracts for enhancing growth performance in animals is now on the increase. Investigation into plants with medicinal potentials is informed by recent surge and quest for use of plant materials for medicament [2]. Plants has been found to contain antioxidants a type of molecules that neutralizes harmful compounds called free radicals that damage living cells and spoil food. Hernandez *et al.* [3] observed that antibiotics and plant extract supplementation improved apparent whole tract and also in a related development Dada and Ikuero [4] observed that ethanolic extract of *Garcinia kola* seeds can be used as growth promoter in *Clarias garipinus*. Khan *et al.* [5] also observed an increase in weight on visceral organs of broiler chicks when fed with seeds extract of *Trigonella foenum-graecum*. Increases in the solvent extracted cotton seed fed to rainbow trouts were observed to have led to a 2-fold increase in growth in all 5 treatment groups [6]. *Mangifera indica*, the most widely cultivated fruit in the Sahel and one of the most important tree crops in the tropics, it is easily recognized by its large, even, dense, widely spreading crown, leaves are alternate, copper colour when young and dark green when mature [7].

*Oreochromis niloticus* can be recognized at a glance by the characteristics pattern of dark band crossing the caudal fin [8]. *O. niloticus* is a suitable fish for culture because it has rapid growth rate, high tolerance to low oxygen content, efficient food conversion, ease of spawning, resistance to diseases and it is also socially acceptable [1]. The aim of this work was to observe the effect of *Mangifera indica* leaves extract on growth response of *Oreochromis niloticus*.

## **MATERIALS AND METHODS**

*Oreochromis niloticus* used for these research work were obtained from Fishery Department of Ministry of Agriculture Ilorin, Kwara state. The research work was carried out at the Department of Zoology (University of Ilorin), Kwara state. The plant specimen was authenticated at the herbarium of Plant Biology Department of the University of Ilorin). The feedstuffs used were source for locally. *Mangifera indica* leaves were shade dried, ground into powder and sieved, the crude ethanolic extraction was done by soaking 500g into 2 litres of 95% ethanol for 24 hours. The filtrate was evaporated by heating it at 40°C it was further left open for 3 days in the sample bottles. Diets of 40% crude protein was formulated for 0, 5, 15, 25% inclusion levels of the leaves extract. Ingredients for each diets were weighed and hand mixed in a bowl, the extracts were also weighed and dissolved in 0.25 litres of water these were sprinkled to obtained a homogenous mass of diet and gelatinized starch was added. The feeds were sun dried, packed in a polythene bags and stored in a cool dry place.

A total of 120 fingerlings average weight of 6.75g were acclimatized for 3 days before dividing them into 4 groups representing the treatments, with each replicated 3 times. Fingerlings were stocked in 12 of 45 litres plastic bowls and fed 5% of their body weight. 2.5% was administered between 08:00-09:00 hours and the other 2.5% was between 17:00-18:00 hours daily for 42 days. The proximate analyses of the experimental diets were carried out according to AOAC [9].

## **Data Collection and Analysis**

Leftovers were collected at intervals and oven dried, weight were also taken and recorded on weekly basis. Water quality parameters were also monitored on weekly basis. The specific growth rate, food conversion ratio (FCR), protein efficiency ratio (PER) and survival rates (SR) were calculated from the data obtained. Statistical analysis was done using one-way analysis of variance (ANOVA), differences between means were separated using Duncan Multiple Range Test [10].

## **RESULTS**

*Growth Performance and Nutrient Utilization in Oreochromis niloticus.*

Table 1 shows the composition and proximate analysis of experimental diet (% dry weight) at different level of inclusion of *Mangifera indica* leaves extracts. Data on fish growth are showed in Table 2. There were no significant differences between the control and the 5% inclusion level in term of mean weight gain, average growth rate, feed conversion ratio,

specific growth rate and protein efficiency ratio. A significant difference was observed between 5% and 15% level of inclusion with 5% level of inclusion giving the best growth.

### Histological Evaluation

Histological tissue sectioning of liver from the control fish showed normal cell distribution, liver from fish fed with 5% inclusion level appears to be normal except in slight pale colouration, liver from fish fed with 10% inclusion level shows pale colouration, and few irregular walls while liver from fish fed with the highest level of inclusion shows focal necrosis just as reported by Fasina *et al.* [11] when toxicological assessment of *Vernonia amygdaliana* leaf meal in nutrition of starter broiler chicks was investigated and irregular walls.

**Table 1:** Composition and proximate analysis of experimental diets (% dry weight)

Treatments	A	B	C	D
<i>M. indica</i> leaves extracts	0	5	10	15
Fish meal	25	25	25	25
Soybean meal	30	30	30	30
Yellow maize	09	7.93	6.87	5.79
G. nut cake	10	8.81	7.62	6.43
Cassava flour	08	7.05	6.10	5.14
Blood meal	15	13.22	11.43	9.65
Vit/Min premix	2	2	2	2
Binder (Cassava starch)	1	1	1	1
Moisture	2.25	2.38	2.50	2.48
Crude protein	40.25	40.10	39.94	40.15
Crude lipid	12.75	13.25	12.95	13.10
Crude fibre	3.00	3.12	3.24	3.18
Ash	7.50	7.65	7.45	7.52

Vitamin/Mineral premix: Vitamin A, 20,000,000 iu. Vitamin D, 4,000,000. iu; Vitamin E.200,000 iu; Vitamin K 1,200mgr; thiamine B1 10,000 mgr, Riboflavin B2 30,000 mgr, Pyridoxine B6 19,000 mgr, Lysine 100,000 mgr, Phosphorus 400,000 mgr, Niacin 200,000 mgr, Vitamin B<sub>12</sub> 100mgr, Panthothenic acid 50,000mgr; Folic acid 5,000mgr; Biotin, 400mgr; Choline Choride 400mgr, Antioxidant, 125rmg, Methionine 100gr, Manganese 30gr, Zinc 40gr, Iron 40gr, Copper 4gr; Iodine, 5gr, Selenium, 0.2mgr; Cobalt 0.2 mgr and Calcium 600gr.

**Table 2:** Growth performance and feed utilization of *Oreochromis niloticus*

	Inclusion levels of plant extracts			
	0%	5%	10%	15%
Mortality (%)	0±0.00	3.33±0.00	6.67±0.04	23.33±0.70
Mean initial weight (g)	5.58±1.22	5.25±1.65	5.95±0.82	6.05±0.77
Mean final weight (G)	14.84±0.98 <sup>a</sup>	14.21±0.72 <sup>a</sup>	10.54±1.05 <sup>b</sup>	8.22±0.76 <sup>c</sup>
Mean weight gain (g)	9.25±0.57 <sup>a</sup>	8.96±0.79 <sup>a</sup>	4.59±0.99 <sup>b</sup>	2.17±0.18 <sup>c</sup>
ADG <sup>1</sup>	0.22±0.10 <sup>a</sup>	0.21±0.80 <sup>ab</sup>	0.11±0.05 <sup>b</sup>	0.05±0.02 <sup>c</sup>
FCR <sup>2</sup>	2.11±1.34 <sup>a</sup>	1.96±1.05 <sup>b</sup>	3.19±1.66 <sup>c</sup>	4.07±0.63 <sup>c</sup>
SGR <sup>3</sup>	2.24±0.72 <sup>a</sup>	2.28±0.72 <sup>a</sup>	1.32±0.49 <sup>b</sup>	0.71±0.37 <sup>b</sup>
PER <sup>4</sup>	3.17±0.54 <sup>a</sup>	2.98±0.75 <sup>a</sup>	1.97±0.68 <sup>b</sup>	1.04±0.32 <sup>c</sup>

<sup>1</sup>average daily growth (g) = final wt. – initial wt./no. of days

<sup>2</sup>feed conversion ratio = feed intake (g)/wt. gain (g)

<sup>3</sup>specific growth rate (%. Day –1) = (In final wt. – In initial wt./no of days) × 100

<sup>4</sup>protein efficiency ratio = wt gain/\*protein intake

\*protein intake calculated as the difference between the quantity of feed fed and the left over on dry matter basis.

## DISCUSSION

The highest mean weight gain of 9.25±0.57 (Table 2) was observed in the control feed followed by diet with inclusion level of 5% although there was no significant difference between them. The specific growth rate was found to be higher than that reported by Adeparusi [12]. The feed conversion ratio was found to be at the lower rate than that reported by Dada and Ikuerowo [4]. The histopathological studies shows that at high level of inclusion *M. indica* leaves extract could be hazardous to the fish just as the mortality rate was observed to increases with increase in the leaves extracts. Generally decrease in average growth rate and specific growth rate were observed as the inclusion levels increases.

## CONCLUSION

In the quest for cheap, readily available and environmental friendly growth promoters *Mangifera indica* leaves commonly known as mango which is widely distributed, cheap and readily available could be a potential growth promoters especially at a very low level as reported by Dada and Ikuerowo [4] who observed that 1.0g/kg diet of ethanolic extracts of *Garcinia kola* seeds had the best weight gain and Fiuza, *et al.* [13] also suggested use of small dose of ethanol extracts to reduce toxic effects. *M. indica* leaf extracts could be beneficial to the culture of *O. niloticus*.

## **RECOMENDATION**

There is need for more research on effects of *Mangifera indica* and other readily available plants which will involve a very low level of inclusion of these plant extracts, with focus on their medicament potentials rather than on their values as feed ingredients.

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