BODY COMPOSITION AND NUTRIENT UTILIZATION OF *Clarias gariepinus* FINGERLINGS FED COOKED *Albizia lebbeck* SEED MEAL

Orire[1]*, A. M., O.J. ESTHER[1]

[1] Department of water resources, Aquaculture and Fisheries Technology

Federal University of Technology Minna, Niger State

*Corresponding Author' s E-mail: abdul.orire@futminna.edu.ng GSM: 07032552295

A BSTRACT

Clarias gariepinus fingerlings of average weight of 3.6g was u sed to evaluate the effect of cooked Albizia lebbeck seed meal (CASM) on nutrient utilization and body composition of the fish. Three diets were formulated to contain 40% crude protein as thus, 0% CASM (diet 1) control, 50% CASM) (diet 2) and 100% CASM (diet 3). The w eight gain, specific growth rate (SGR), feed conversion ratio (FCR), protein efficiency ratio (PER), apparent net protein utilization (ANPU) were determined as growth indices with significant differences (P<0.05). Diet 2 (50% inclusion of cooked Albizia lebbeck seed meal showed significantly (P<0.05P) high values for the growth indices. Carcass nutrients composition also followed the same pattern with significant difference (P<0.05) to other diets while diet 1 performed significantly low (P<0.05). Albizia lebbeck seed meal when boiled and at 50% inclusion has high potential of being utilized efficiently by Clarias gariepinus fingerlings without any adverse effect on its growth and body compositions.

KEYWORDS: *Clarias gariepinus. Albizia lebbeck seed meal. Growth indices.*

I NTRODUCTION

The rise in the demand for animal protein has raised greater pursuit in the production of fast growing animals (fish) (Obinne and Okorie 2008). *Clarias gariepinus* is a fast growing species of Africa catfish that are commonly raised to provide meat for human consumption. However, the rising cost of fish feed has continued to be a concern in fish farming. This is because the feed alone account for about 70% of the total production (Olorede and Longe, 1999). This high cost combined with lack of enough knowledge of potential unconventional and low cost ingredients are limitation to commercial fish production in Nigeria (Olorede and Ajayi, 2005). There exist some leguminous plant which are underutilized but have pronounced capabilities of been advanced into fish feed. One of such is *Albizia lebbeck*. However, there is a prerogative of toxicity in the seed (Olorede and Ajayi, 2005). There is therefore the need for processing before usage.

METHODOLOGY

Matured and dried pods Albizia lebbeck fruit were pluked f rom the trees in around Bosso campus Federal university of Technology minna. The

pods were cooked at 60°C for 45 minutes and further dried in the air for 3 hours and then manually crushed with hammer miller.

Experimental Fish

Ninety *Clarias gariepinus* fingerlings were produced from Eco Rehab Environmental Centre Kuje Fish Farm

Hatcheries and transported in 50-liter jerican to the laboratory for one-week acclimatization. They were fed commercial feed. before the experiment commenced. Six plastic bowls were filled with bore hole water and stocked with 15 fingerlings which were weighed at the commencement of the feeding trial.

Feeding rate and management

The fish feeding rate was commenced at 3% body weight but was adjusted and fed three times daily. However, the quantity of ration was adjusted fortnightly to reflect weight increase and feed consumption. The bowls were cleaned and feacal water were siphoned out before morning feeding. The bowls were cleaned weekly to maintain good water quality medium. The water temperature, pH, conductivity and dissolved oxygen were monitored on weekly basis with the aid of appropriate water quality meters.

Fish growth and evaluation

Growth performance and diet nutrient were analyzed in terms of mean weight gain (MWG), final weight gain (FWG) feed conversion ratio (FCR), specific growth rate (SGR), protein efficiency ratio (PER) and apparent net protein utilization (ANPU).

Experimental Diets

Three diets containing varied treatments of *Albizia lebbeck* were formulated at 0%, 50% and 100% inclusion levels. Diets were formulated using Pearson Square Method to obtain the formulated crude protein level as shown in Table 1

Statistical analyses

Data were analyzed using one -- way analysis of variance (ANOVA) using statistical 6.0 (stat soft, Inc., USA). Difference between treatments were compared by t urkey's test. Level of s ignificance was tested at $P<0.05$.

R ESULTS AND DISCUSSION

The results showed that the values of water quality parameter measured in the contexts of the experimental period did not vary significantly ($p>0.05$) with each other, the water temperature in all the treatments ranged from 25 -28°C. Dissolved oxygen ranged from

5.8mg/l – 8.5mg/l, pH from 6.25 to 7.95 and conductivity from 264 to 331. There was no significant difference among treatments as values obtained were within the acceptable and optimum range for fish culture (Omitoyin, 1995; Swann, 2006; Madu *et al.*,

2001). The growth parameters showed that fish fed with 5 0% i nclusion (Diet 2) of cooked *Albizia lebbeck* seed meal had the highest value of all growth performance and was significantly different from other treatment ($P<0.05$). this could be attributed to the

palatability of the diet (Riche *et al.*, 2001; Ahmed,

2008). However, fish fed 100% inclusion of cooked *Albizia lebbeck* sed meal and 0% inclusion of cooked *Albizia lebbeck* seed meal (Diet 1) are not significantly different ($P>0.05$) from each other. This could be as a result of the varying inclusion level of *Albizia* lebbeck seed meal Watanabe *et al.* (1987). The protein efficiency ratio (PER) and specific growth rate (SGR) of *Clarias gariepinus* fingerlings fed 0% and 100% *Albizia lebbeck* cooked seed meal are not significantly different ($P>0.05$) than each other but are significantly different ($P<0.05$) from 50% inclusion of cooked *Albizia lebbeck* seed meal. Mean final weight (MFW) and feed conversion ratio (FCR) and apparent net protein utilization (ANPU) showed the same trend with

50% inclusion cooked *Albizia lebbeck* seed meal with significant difference ($P<0.05$). There was a

significant difference ($P<0.05$) in the survival of *Clarias gariepinus* fingerlings fed with 50% CALSM having

46% survival rate followed by diet 3 (100% CALSM)

40% while 0% CALSM h ad 33% survival rate.

The crude protein of the experimental fish in all treatment was significantly different from value obtained in the initial proximate composition of the experimental fish before the feeding trial commenced as shown in Table 3. The experimental diets resulted in higher protein, lipid and decreasing moisture in the experimental fishes compared to initial body composition analysis. However the crude ash content in the final body composition of the experimental fishes decrease with increased inclusion level of cooked *Albizia lebbeck* seed meal. The moisture content in the final body composition follows the same pattern with that of ash. Fishes fed diet 2 (50% CALSM) had the highest protein retention in the body mass of the experimental fishes which is significantly different from other treatments. However, 0%, and 100% inclusion level CALSM protein retention in the final body composition of the experimental fish are not significantly different from each other. Lipid content of the carcass analyzed showed that diet 1 (0% CALSM) had the highest lipid content which was significantly different from other inclusion levels. While diet 2 (50% CALSM) and diet 3 (100% CALSM) are not significantly different from each other. This compared favourably with findings of Burges (1989), although lower than Kaga (1999) but higher than Alegbeleye *et al.* (2004).

CONCLUSION AND RECOMMENDATIONS

From the result obtained in this study, it can be concluded that fingerlings of *Clarias gariepinus* can make use of cooked *Albizia lebbeck* seed meal under good processing and cooking method at an inclusion level of 50% in their diets to give excellent performance in growth, nutrient utilization and body composition without any adverse effect on their health and morphological structure. However, the increase in the inclusion level of *Albizia lebbeck* in the diet may also have contributed to a higher accumulation of carcass lipid. For effective utilization of cooked *Albizia lebbeck* seed meal and inclusion level beyond 50%, a longer feeding trial and further research work on the amino acid profile should be looked into.

Table 1: Diets formulated and their proximate compositions

Ingredients (%)	Diet 1	Diet 2	Diet 3
	0% CALSM	50% CALSM	100% CALSM
Soybean Meal	780.20	404.80	0.00
CASM	0.00	404.80	704.10
Maize Meal	79.80	48.20	155.90
Shear butter Oil	90.00	90.00	90.00
Vitamin Premix	50.00	50.00	50.00
Total	1000.00	1000.00	1000.00
Proximate Compositions of Formulated Diets			
Moisture (%)	4.5	5.5	6.5
Crude protein (%)	40.6	40.25	40.25
Crude lipid (%) 10.5	10.3	10.2	
Ash (%)	4.5	7.5	2.5
Crude fibre (%)	0.5	1.9	1.8

Table 2: Growth parameter of *Clarias gariepinus* fingerlings fed *cooked Albizia* lebbeck seed meal

Growth Parameter	Diet 1	Diet 2	Diet 3	SD±
Initial weight gain (g)	$3.64^{a}\pm0.04$	$3.63^{a}\pm0.14$	$3.66^{a}\pm0.00$	0.02
Final weight gain (g)	$7.41^{b}\pm1.67$	$8.54^{a}\pm0.35$	$7.73^{b}\pm0.72$	1.07
Mean weigh gain (g)	$3.78^{b}\pm1.63$	$4.92^{a}\pm0.36$	$4.07^{a}\pm$o.73	1.05
Feed conversion ratio	$0.76^{a}\pm0.28$	$0.66^{a}\pm0.04$	$0.76^{a}\pm0.13$	0.18
Specific growth rate (%)	$1.25^{b}\pm0.39$	$1.53^{a}\pm0.08$	$1.33^{b}\pm0.17$	0.25
Protein efficiency ratio	$3.34^{b}\pm1.18$	$3.83^{a}\pm0.19$	$3.31^{b}\pm0.54$	0.76
Apparent net protein utilization	$2.05^{b}\pm0.68$	$2.41^{a}\pm0.08$	$2.05^{b}\pm0.33$	0.44
Survival rate (%)	$33.33^{c}\pm0.00$	$46.67^{a}\pm0.00$	$40.00^{b}\pm0.00$	0.00

Table 3: Proximate composition analyses of whole body C. *gariepinus* fingerlings (dry basis) fed experimental diets for 56 days

Component (%)	Initial	Final carcass			
		Diet 1	Diet 2	Diet 3	SD±
Protein	57.75^{c}	59.68^{b}±0.25	60.82^{a}±0.62	59.98^{b}±0.04	0.38
Lipid	12.26^{b}	13.25^{b}±0.78	12.13^{a}±0.15	12.58^{b}±0.49	0.54
Ash	14.52^{a}	13.6^{b}2±0.28	13.37^{a}±0.57	13.18^{b}±0.54	0.4
Moisture	15.45^{d}	13.70^{b}±0.39	12.82^{b}±0.88	14.33^{a}±0.01	0.56

Values in the same row with different superscripts are significantly different ($p<0.05$) from each other

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