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THE PERFORMANCE OF RABBITS FED DIETS CONTAINING WATER HYACINTH *(Eichhornia Grassipes)* LEAF MEAL

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Target Audience: Rabbit farmers, animal nutritionist/feed producers.

ABSTRACT

Thirty-two crossbred weaner rabbits (Newzeland White x California White) with an initial weight that ranged between 0.84 and 0.94kg at 8 weeks old were randomly alloted to 4 experimental dietary treatments in which water hyacinth leaf meal (WHLM) replaced maize at 0,5,10 and 15% inclusion levels. The average feed consumed, feed conversion ratio, operative protein efficiency raio and crude fibre (CF) retention were significantly influenced ($P<0.05$). The body weight gain, dry matter (DM) and the nitrogen retention were not affected significantly. There were no sex and treatment interaction on all the parameters monitored. The coefficient of determination R^2, for the average feed consumed, DM and CF retention were 0.77, 0.83 and 0.84 respectively. Water hyacinth can replace maize at 15% inclusion level without adverse effects on the rabbit performance.

Key words: Water hyacinth leaf meal; rabbit; performance

DESCRIPTION OF PROBLEM

Rabbit rearing is fast becoming very popular in Nigeria. However, one of the problems that limits its wide acceptability by farmers is the high cost of compounded feed. The high costs of energy (e.g maize) and protein (e.g. soybean) sources are contributing factors. These are feedstuffs that are keenly competed for by man and livestock.

Some agro-indusrial by-products and leaf meal have been investigated (1,2) and are being used in th feeding of livestock and poultry. Water hyacinth, *Eichhornia crassipes* (WH) has been used in the feeding of ruminants and non-ruminants (3). This study therefore evaluated the utilization of water hyacinth by growing rabbits.

MATERIALS AND METHODS

Preparation of Experimental Diets

Fresh water hyacinth was harvested from one of the rivulets in Ikorodu town, in Lagos State of Nigeria, processed accordingly (4) and sundried. The dried water hycinth was milled and the meal included into a formulated rabbit feed at 0,5,10, and 15% as replacement for maize. Starch was used as a binder for feed pelleting done at the Nigerian Institute for Oceanography and Marine

Research feedmill. The ground WH leaf meal and the experimental diets were chemically analysed according to AOAC methods (5) and are shown in Table 1.

Table 1 Gross and proximate composition of experimental diets and water Hyacint leaf meal (WHLM)

	% WHLM inculsion				
	0	5	10	15	
Maize	25.00	20.00	15.00	10.00	
Maize offal	16.50	16.50	16.50	16.50	
Palm kernel cake	20.00	20.00	20.00	20.00	
Groudnut cake	11.00	11.00	11.00	11.00	
Brewers dried grain	24.00	24.00	24.00	24.00	
Bone meal	3.00	3.00	3.00	3.00	
Salt	0.25	0.25	0.25	0.25	
Premix*	0.25	0.25	0.25	0.25	
Water hyacinth leaf meal	—	5.00	10.00	15.00	
	100.00	100.00	100.00	100.00	
Determined Analyses (%)					
Dry matter	98.30	96.90	96.83	96.01	10.02
Crude Protein	18.11	17.68	17.57	17.96	14.30
Ether extract	7.16	7.06	6.96	6.86	2.30
Crude fibre	9.25	10.32	11.38	12.45	18.10
Ca	1.34	1.21	1.38	1.08	—
P	0.72	0.65	0.70	0.59	—
M.E Kcal/g (Calc.)	2.45	2.39	2.33	2.27	2.24

*Contains the following:
Vit. A, D_3, E, B_{12}, riboflavin, pantothenic acid, nicotinic acid, folic acid, choline chloride, Se, P, Ca, I, Cu, Mn, Zn, Fe, Terramycin and anti-oxidant agents.

Experimental Procedure and Animal Management

Thirty-two weaner rabbits of equal sexes were used in this study. They were randomly alloted to four treatments of four replicates each in a randomised complete block design arrangement to remove effect of sex. There were two rabbits of same sex per replicate i.e two replicates of male rabbits and two replicates of female rabbits in a treatment. The weaner rabbits had an initial weight range of 0.838-0.931kg.

The rabbits were dewormed at 8 weeks, vitamins were orally administered as antistress and fed the experimental diets for a 14-day adjustment period. The rabbits were given water and the experimental feeds *ad libitum* for a period of 42 days of the experiment. At the beginning of the last seven days

of the experiment, two rabbits of both sexes from the respective treatments were put in a layer cage adapted for metabolic studies. Polythene nets were used for faecal collection on daily basis for the last 4 days of the study. The net allowed seperation of the urine and the faeces. The daily faecal collections were preserved by spraying with 1% boric acid, weighed on wet basis, pooled and samples were taken and dried in the oven at 60^{0}C for three days. The samples were later ground in Christy and Noris Portable laboratory mill for the dry matter (DM), crude fibre (CF) and nitrogen retention determinations acordingly (5). The data obtained were subjected to analysis of variance and linear regression analysis accordingly to Steel and Torrie (6).

RESULTS AND DISCUSSION

The proximate composition of water hyacinth leaf meal and the experimental diet is presented in Table 1. The performance and some nutrient retention results are presented in Tables 2 and 3. The average feed consumed, feed conversion ratio, operative protein efficiency ratio and the crude fibre retention were all; significantly ($P<0.05$) influenced by the treatment. However, the body weight, DM and nitrogen retention were not affected significantly. The coefficient of determinaion, R^2, was high for the average feed consumed, DM and CF retention (Table 2 and 3)

Table 2: Performance Characteristics of Rabbits fed graded levels of water hyacinth in the feed

	% WHLM inclusion						
	0	**5**	**10**	**15**	**SEM**	**R^2**	**Regression Equation Y = a + bx**
Av. Feed Consumed (g)	115.28^b	125.51^a	126.36^a	128.17^a	1.88	0.77	Y = 117.90 + 0.79x
Av. Daily body weight gained (g)	41.91	35.36	36.44	36.86	6.71	0.52	Y = 48.94 - 1.54x
Av. Feed conversion ratio	2.74^b	3.60^a	3.48^a	3.48^a	0.12	0.01	Y = 1.69 - 0.005x
Operative Protein efficiency ratio	2.05^a	1.32^b	1.64^a	1.67^a	0.04	0.02	Y = 1.71 - 002x

Mean values with different superscripts on the same row differ significantly ($P<0.05$).
Y = Treatment levels
X = Parameters' levels
SEM: Standard Error of Means

The WH leaf meal inclusion level increased the fibre content of the feed which had an energy dilution effect on the feed and a consequential increased feed consumption (7). Although the CF was not characterised in this study, the increased feed consumption might be an indication of the presence of

fermentable polysaccharides in the WH (8). The significant increase in the consumption of feed containing 15% WH leaf meal is contrary to the reported 10% optimum feed consumption with the WH leaf meal inclusion. The body weight gain also increased as the level of WHLM increases. The control recorded the highest weight gain, followed by treatment 4 containing 15% WHLM. The feed conversion ratio (FCR) and the operated protein efficiency ratio (PER) followed the same trend as the body weight gain.

TABLE 3: Some Nutrient retention of rabbits fed graded levels of water hyacinth leaf meal in the diets

	% Water hyacinth						Regression Equation
	0	5	10	15	SEM	R^2	Y = a + bx
Dry matter retention	79.26	69.87	67.09	66.01	2.45	0.83	Y = 76.96 - 0.85x
Crude Fibre retention	88.22[a]	78.54[b]	77.45[b]	74.55[c]	0.84	0.84	Y = 86.01 - 0.84x
Nitrogen retention	11.16	10.84	10.91	11.25	0.16	0.05	Y = 10.99 + 0.068x

Mean values with different superscript on the same row differ significantly ($P<0.05$)
Y = Treatment levels
X = Parameters' levels

The DM and CF retention values decreased as the WHLM inclusion increased. The observed significant decrease in CF might not be unconnected with increasing presence of the secondary cell wall in the diet. The nitrogen retention was not significantly affected ($P<0.05$) but might have been influenced by the activites of microflora on the cell wall component.

CONCLUSION

Water hyacinth leaf meal can replace up to 15% maize in rabbit diet.

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