CARCASS AND BLOOD INDICES OF WEANED GRASS-CUTTERS FED DIET CONTAINING SNAIL SHELL AS REPLACEMENT FOR OYSTER SHELL

[1]Fayenuwo, J.O., [1] Oladele-Bukola, M. O., [1]Popoola, Y.A., [1]Omole, A.J., [1]Owosibo,O.T., [2]Okpeze, V. E.

[1]Obafemi Awolowo University, Institute Of Agricultural Research and Training Moor Plantation, Ibadan, Nigeria.

[2]Federal College of Agriculture, Moor Plantation, Ibadan.

Abstract

A total of thirty six weaned grass-cutters of mixed sexes of mean weight of 412.23±2.6g were used to determine the effect of inclusion of snail shell (SS) in the diet of grass-cutters on dressing percentage, meat qualities, haematological and serum biochemical indices. Four diets were formulated to contain SS at 0% (SS_1) which was the control, 50% (SS_2), 75% (SS_3) and 100% (SS_4) as replacement for oyster shell in the diet of grass-cutters. Each dietary treatment was replicated thrice with 3 grass-cutters per replicate in a completely randomized design. Data were collected on dressing percentage, heamoglobin, red blood cell, white blood cell, blood calcium and phosphorus etc. The results of the carcass analysis showed that the dressing percentage was not significantly influenced by substituting oyster shell with snail shell in the diet ($P>0.05$). The red blood corpuscles, haemoglobin and white blood cell values were not significantly influenced ($P>0.05$) by the inclusion of snail shell in the diet and fell within the recommended range It could be concluded that carcass qualities and blood indices were not significantly influenced by the inclusion of varying levels of snails shell as partial or total replacement for Oyster shell in the diet of weaned grass-cutter, hence snail shell could be used as replacement for Oyster shell in the diet of weaned grass-cutters

Keywords: Grass-cutters, dressing percentage, haemoglobin, white blood corpuscles, calcium

Introduction

The importance of minerals in animal nutrition cannot be overemphasized. They are important for bone formation, growth and are required in several metabolic activities in the body system (Houndonougbo, *et al.*, 2012). Minerals such as calcium and phosphorus in animal nutrition are derived from conventional feed resources such as oyster shell, Di-calcium phosphate (DCP), limestone, bone meal etc (Omole and Owosibo 2006; Lichovnikova, 2007). Oyster shell among other mineral sources is biological source of mineral that is used extensively in the diet of livestock such as chicken, sheep, cattle, goat, turkey, swine and rabbit. However, its availability all year round poses a limitation to its use as a constituent of livestock feed. Thus the need for good alternative source of calcium in the diet of livestock. Snail shell which is usually considered as a waste after killing and processing of snail for meat and could serve as a good source of biological calcium in the diet of different livestock species (Omole and Owosibo, 2006). With the significant increase in the popularity of snail farming and snail meat consumption, there is also increase in the availability of snail shell. The snail shell is not smelly, it can be further processed as source of calcium for different livestock species. Assessment of samples of snail shell in the laboratory has indicated that it is rich in mineral, especially calcium which is required for bone development, egg formation in poultry species, growth and other metabolic activities in the body (Omole and Owosibo 2006;Houndonougbo, *et al.*, 2012). The objectives of the study was to determine the effect of inclusion of snail shell in the diet of grass-cutters on dressing percentage, meat qualities, haematological and serum biochemical indices.

Materials and Methods

A total of thirty six weaned grass-cutters of mixed sexes of mean weight of 412.23±2.6g were used for the feeding trial. The grass-cutters were acclimatized for one week before the commencement of the feeding trial. Snail shell was collected from Institute of Agric. Snailery Unit, Ibadan, Oyo state, Nigeria. The snail shell was washed, dried and ground later before incorporated with other feedstuffs. Four diets were formulated to contain SS at 0% (SS_1) Control, 50% (SS_2), 75% (SS_3) and 100% (SS_4) as replacement for oyster shell in the diet of grass-cutters. Each dietary treatment was replicated thrice with 3 grass-cutters per replicate in a complete randomized design. The diets were formulated to contain about 16% crude protein and energy of about 2600 kcalME/kg (Table 1). Each grass-cutters was given 30g each of elephant grass stem as a basal diet. At the end of the feeding trial, 2

grass-cutters per replicate were randomly selected and weighed for carcass and organ evaluation. The grass-cutters were starved overnight before slaughtering. The fur was removed by scalding. The dressing percentage was calculated as the ratio of dressed weight to live weight. Organs like kidneys, lung, liver and heart were removed and weighed individually.

Blood samples were collected from 3 grass-cutters in each experimental group for the determination of the haematological and serum biochemical parameters. The grass-cutters randomly selected were fasted from 6.00 pm to 6.00 am and bled early in the morning to avoid temporary elevation of blood metabolites by feeding. Approximately 5ml of blood was collected from jugular vein of grass-cutter into two sets of sterilized glass bottles containing ethylene diaminetetra-acetic acid (EDTA) for haematology and without anticoagulant for serum separation. Samples for haematological study were collected into sample tubes containing EDTA as anticoagulant while serological samples were collected into sample tubes containing no EDTA. Serum was obtained after the blood was allowed to stand for 2 h at room temperature and centrifuged at 2,000 revolutions per minute (r.p.m) for 10 minutes to separate the cells from the serum (Scalm, et al., 1975). Haematological parameters included the packed cell volume (PCV), red blood cells (RBC), haemoglobin concentration (Hb) and white blood cells (WBC) Total protein, albumin, globulin, and creatine formed the biochemical data were determined (Scalm, et al 1975; Mitruka and Rawnsley 1997). Blood samples were analyzed for haematological parameters according to routinely available clinical methods (Scalm, et al 1975; Mitruka and Rawnsley, 1997). The chemical composition of the test ingredient, experimental diets and the meatwere carried out according to the method of (AOAC, 1990).

Results and Discussion

The results of carcass analysis showed that the dressing percentage was not significantly influenced by substituting oyster shell with snail shell in the diet (P>0.05). The values ranged between 72.39 and 72.51 % as shown in Table 2. No significant differences were observed in the ratio of heart to the live-weight. The mean lung to live-weight was not significantly different from one another (P>0.05). The lung to liveweight was not significantly different (P>0.05) from one another and the values varied between 1.81 and 1.82%. The ratio of liver to live-weight of the grass-cutter showed no significant differences among the means(P>0.05) and varied between 2.76 and 2.77%. The dressing percentage reported in this study was not significantly different from the observation of (Obi *et al.*,2009;Omole et al 2005). The protein content of the meat of the grass-cutters was not significantly influenced by the inclusion of snail shell in the diet and the values varied between 19.59 and 19.95%. The protein content reported was comparable to the observation of other authors (Olomu *et al.*, 2003; Obi *et al.*, 2009). The fat content was relatively the same across the treatments as shown in Table 2. The fat content of the meat is low when compared to that of pork, beef and broiler. The low fat content of grass-cutter meat make it a good antidote for those that have hypertension or other fat related diseases (Olomu *et al.*,2003; Ajasin *et al.*,2014). The results of Haematological and Biochemical indices indicated that the mean red blood corpuscles of the grasscutters were relatively the same and varied between 5.31 and 5.44 $10^6/\mu l$. The mean haemoglobin was not significantly influenced by the dietary treatments, the values varied between 12.23 and 12.57g/dl. The mean white blood cell were relatively the same across the treatments. The red blood corpuscles, haemoglobin and white blood cell values fell within the recommended range as reported by Scalm, *et al.*, 1975; Mitruka and Rawnsley, 1997. The results also buttress the facts that Snail shell could be used to replace Oyster shell without any detrimental effect. The mean albumin values of the grass-cutters were relatively the across the treatments as shown in Table 3. The mean globulin, calcium and phosphorus levels of the grass-cutters were not significantly influenced by substituting oyster shell with snail shell. It could be concluded that carcass qualities and blood indices were not significantly influenced by the inclusion of varying levels of Snails in the diet of weaned grass-cutter, hence snail shell could be used as replacement for Oyster shell in the diet of weaned grass-cutters

Table 1: Gross Composition of the Experimental Diet.

Ingredient (%)	SS_1 (0%)	SS_2 (50%)	SS_3 (75%)	SS_4 (100%)
Maize	32.0	32.0	32.0	32.0
Oyster shell	8.0	4.0	2.0	0.0
Snail shell	0.0	4.0	6.0	8.0
*Others	60.0	60.0	60.0	60.0
Total	**100.0**	**100.0**	**100.0**	**100.0**
Cost/kg feed (N/kg)	**42.32**	**41.21**	**40.63**	**40.04**
Calculated analysis				
Crude protein (%)	16.13	16.13	16.13	16.13
Metabolizable energy (kcal/KgME)	2628.1	2628.1	2628.1	2628.1

*Other fixed ingredients: Wheat offal-20, BDG, 25, Fish meal-0.5, Soya bean meal-5.55, Ground nut cake-7.0, Bone meal-1.70,, Premix-0.25.

Table 2 Physico-chemical properties of weaned grass-cutter fed different levels of Oyster shell.

Parameters (Means)	T_1	T_2	T_3	T_4	± SEM
Live-weight (g)	2120.9	2131.2	2162.4	2123.3	41.3
Defurred weight	1537.65	1547.3	1567.9	1536.83	34.9
Fur weight %	5.38	5.34	5.31	5.29	1.23
Dressing %	72.5	72.6	72.51	72.39	2.12
Heart weight %	0.78	0.78	0.79	0.77	0.12
Liver weight %	2.78	2.76	2.76	2.77	0.21
Lung weight %	1.81	1.83	1.82	1.81	0.03
Crude protein%	19.59	19.93	19.95	19.93	0.12
Ether extract%	1.45	1.43	1.43	1.42	0.07

Means along rows with different superscript are significan tly different from each other (P<0.05)

Table 3 Haematology and Serum biochemical parameters of weaned grass-cutter fed different levels of Oyster shell.

Parameters (Means)	SSM_1 (0% SSM)	SSM_2 (50% SMM)	SSM_3 (75% SSM)	SSM_4 (100% SSM)	± SEM	Normal range
R.BC(x 10^6/µl)	5.31	5.32	5.28	5.44	0.48	4.5 - 9.0
Haemoglobin (g/dl)	12.23	12.45	12.57	12.34	0.51	10 -16
WBC (x 10^3/µl)	6.08	6.11	6.23	6.12	0.34	6 -10
Globulin (g/dl)	2.64	2.65	2.67	2.76	0.28	1 - 5
Glucose Mg/dl)	136.6	137.55	132.15	138.78	5.98	130 -155
Albumin g/dl	3.68	3.66	3.77	3.66	0.34	2.5 - 6.0
Phosphorus Mg/dl	5.78	5.67	5.79	5.68	0.42	3 - 7.5
Calcium Mg/dl	16.57	16.88	16.57	16.45	0.51	10 - 25

Means along rows with different superscript are significantly different from each other (P<0.05)

References

Ajasin, F.O., Omole, A.J., Okpeze, C.N., Ononogbu C.,Owosibo, A.O., Odunsi, O.O.,Oladele-Bukola, M. O. (2014) Evaluation of different varieties of quality protein maize as an energy source in grass-cutter diets *Agricultural Science Research Journal* 4(7); pp. 111-114

Houndonougbo, M F, Chrysostome, C A A M Odoulami, R C and J T C Codjia (2012) Snail shell as an efficient mineral feedstuff for layer hens: Effects and optimum rate. *Livestock Research for Rural Development 24 (9) 2012*

Lichovnikova M (2007) The effect of dietary calcium source, concentration and particle size on calcium retention, eggshell quality and overall calcium requirement in laying hens. *British Poultry Science 48(1): 71-75.*

Mitruka, B.M ans Rawnsley, H.M, (1977) Clinical Biochemical and haematology reference values in farm and experimental animal, Masson Publishing, U.SA PP134-178

Nigeria. Principles and practice. Jachem Publisher 62 pg.

Obi, O.O. Omole, A.J., Ajasin, F. O and O.O. Tewe (2009) Comparative evaluation of growing Grass – cutter fed pelletized or unpelletized feed. Moor Journal of Agric 9: 30-42.

Olomu, J. M., V.E. Ezieshi and A. M., Orhervata, (2003). Grass-cutter production in

Omole, A.J. and Owosibo, A.O. (2006). Effect of replacing oyster shell with snail and egg shell in the diet of weaned rabbits. *Tropical Journal of Animal Science 9 (1)*: 7–10. **(Nigeria)**

S.A.S. (1999). S.A.S. User's Guide. Statistical Analysis System Institute, Inc.Cary, N.C.

Scalm, O.W. Jane, N.C. Carol E.A. (1975) Veterinary Haematology, 3rd edition Lea and Febigar, Philadelphia, U.S.A pp 160-210