

EFFECT OF GRADED LEVELS OF CASSAVA PEEL MEAL ON THE HAEMATOLOGICAL PARAMETERS OF COCKERELS

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ABSTRACT

Twenty nine cockerels were used to investigate the effect of graded level of cassava peel meal on the haematology of cockerels. The birds were assigned to 3 treatments namely D1, D2 and D3. D1 served as control. D2 and D3 contained 20% and 30% CPM, respectively. Statistical analysis of the haematological parameters showed significant differences ($P < 0.05$) between the control diet (D1) and the cassava peel based diets (D2 and D3) in the levels of PCV and HB. Mean total WBC values were 6235.56 ± 19 for D1, 7888.00 ± 73.56 for D2 and 9906.80 ± 144.17 for D3, respectively. Among the differential count, significant differences ($P < 0.05$) were observed between the 3 treatments in the levels of neutrophils, between D1 and D3 in lymphocytes and between D1 and D2 and D1 and D3 in eosinophils. The result of this study finally suggested that the cassava peel based diets (D2 and D3) with higher haematological values in PCV and HB which ultimately reflected better physiological status of the birds seemed to be superior to the control diet (D1) with no cassava peel meal and that cassava peels could be safely used as an alternative energy source for cockerel production.

Keywords: Cassava peel meal, haematology, cockerels.

INTRODUCTION

There may be more competition between man and livestock, especially the monogastrics for the conventional feed stuff and efficient animals must be produced which can compete successfully with humans by their ability to feed from alternative feed sources (Fasley, 1987). We must look for alternative feed sources by using unconventional feed stuff which can supplement the conventional feeds being competed for by humans. Continuous use of maize will result in perpetual increase in livestock and as well as on livestock product. Unconventional feed material like cassava peel meal has since been discovered as a replacement for maize in poultry ration (Egbewale, 2009 and Bamgbose *et al.*, 2010). Although cassava peel was observed to contain toxic substance such as phytates and large amount of cyanogenic glycosides, it should thus be processed to reduce cyanogenic and phytate content (Salami, 2000). Different processing methods have been adopted as ways of reducing cyanogenic glycoside, such as soaking and sun drying. The cassava peel meal has been used with success in cattle, sheep, goat, as well as in pig production.

Since the adoption of alternative feeds for livestock would largely depend on the steady-all-

year-round availability of such feeds, cassava peels would likely meet such a requirement since cassava peels can now be found in large quantities throughout the country due to the proliferation of the milling industries and garri processing factories. Since the production of livestock is largely dependent on good nutritional budgets with least cost, the use of cassava peels in diets of livestock will curtail the cost of livestock production and consequently, animal protein cost for the average Nigerian (Egbewale, 2009 and Bamgbose *et al.*, 2010).

A lot of literature has shown that cassava peels can replace maize in poultry rations without any marked adverse effects on the performance of birds (Salami, 2000; Egbewale, 2009), but not much is known about the cassava peels locally. It is therefore necessary to explore ways in which cassava peel meal can be highly utilized in the feed of poultry locally in order to minimize the rate of wastage and spoilage in the factories. Most of the reports in the literature on the investigations of cassava peel meal in poultry rations did not cover the possible effects on the hematology of the birds. The objective of this study was therefore to find the effect of cassava peel meal on the haematology of cockerels.

MATERIALS AND METHOD

Experimental Plan

This study was conducted at the Poultry unit of the Teaching and Research farm of the Department of Animal Production, University of Agriculture, Makurdi. Cassava peels were collected from the *garri* processing centre located at North bank, Makurdi. The cassava peels were sun-dried on clean cement floor immediately after collection for seven days after which the dried samples were ground and packed in polythene bags and stored at room temperature. Thirty(30) five(5) weeks old Harco Breed of cockerels were used for the study and three(3) experimental diets were formulated with diet 1(D1) serving as a control containing no cassava peel meal. Diet2 (D2) and Diet3 (D3) contained 20% and 30% cassava peel meals, respectively. All the diets however contained maize and other ingredients in varying proportions except bone meal, vitamin premix and salt which remained the same in all the diets. All rations were iso-nitrogenous and iso-caloric. Ten (10) cockerels were assigned to each of the pens labeled D1, D2 and D3, respectively. One of the birds in D1 got lost thereby leaving D1 with only nine (9) birds which served as the control unit. On the whole, a total of twenty-nine (29) birds of five (5) weeks old were used in this study. The birds received the necessary vaccinations before their arrival. Seven (7) days equilibration period were allowed the birds. The birds were fed *ad libitum* and water supplied liberally. They were weighed weekly while the left-over feeds were weighed daily. The experiment lasted for five (5) weeks.

Blood Collection, Evaluation and analysis. At the end of the experiment, the birds were stunned and then bled by cutting the main jugular vein using sharp blades. Blood was collected in twenty-nine (29) clean dry ten (10) mls test tubes (one test tube per bird) with each test tube containing a pinch of anticoagulant (EDTA). The whole blood was taken to the laboratory in Makurdi where it was subjected to conventional hematological analyses. The result of the blood analyses showed the levels of the following in the blood:-Packed Cell Volume (PCV), Haemoglobin (Hb), White Blood Cell Count (WBC) and the Differential Count which is made up of:- Neutrophils, Lymphocytes, Monocytes, Eosinophils and Basophils. The means, standard

error of means of all haematological parameters were calculated for individual diets using Analyses of Variance (ANOVA) test in a Completely Randomized Design done in accordance with procedures outlined by Steel and Torrie (1980).

RESULTS AND DISCUSSION

The result of this study showed significant difference ($P<0.05$) of the effect of cassava peel meal on PCV between D1 (control) and D2 (20%CPM) and also between D1 and D3 (30%CPM). There was also significant difference on HB between D1 (control) and D2 (20%CPM) and between D1 and D3(30%CPM). The observed increase of PCV in D2 and D3 respectively, might reflect a possible increase in cassava peel meal utilization since it has been reported by Swenson (1993) that constant utilization of available oxygen in the tissue results in increase in RBC and HB. Haemoglobin, according to Swenson (1993) and Bamgbose *et al.* (2010) gives the red blood cells their ability to carry oxygen and aid the carbon dioxide transport and other metabolites. It appears that 20% and 30% cassava peel meal based diets which had higher values of HB than the control diet were able to fasten the ability of blood to transport nutrients which resulted in improved performance of the birds. According to Onyimonyi (2002), any factors that will reduce the ability of blood to transport nutrients may lead to reduced performance and vice versa. It seems therefore that dietary inclusion of 20% and 30% CPM in the feed of cockerels are the levels required to maintain homeostasis as indicated by their high PCV and HB values in the blood.

There were significant differences between the three diets with respect to total WBC count. Also among the differential count, significant differences were observed between the three diets in the percentage of neutrophils, between diets 1 and 3 in lymphocytes and between diets 1 and 2 and diets 1 and 3 in eosinophils. No significant ($P>0.05$) difference was noticed in monocytes between the three diets. It has been reported (Heat and Olusanya, 1985) that the number of eosinophils in circulation increases in parasitic diseases and in allergic reactions showing that D1 (control) with higher level of eosinophils may have had some infestation and

experienced some allergy. Lymphocytes, according to Heat and Olusanya,(1985) are phagocytic in function and also play a role of processing foreign materials(antigens) for antibody production. Higher value of lymphocytes observed in D1 still points to the fact that the birds in that treatment may have had some antigenic exposure. There was no significant difference ($P>0.05$) on monocytes between the three dietary treatments. No significant differences were also observed between D1 and D2 and between D2 and D3 in the level of lymphocytes. But significant differences occurred between the three dietary treatments in the level of neutrophils. Neutrophils function primarily as phagocytes at the sites of inflammation and infection (Heat and Olusanya, 1985). The values of neutrophils observed in the three treatments were far above the acceptable levels of 20 to 40% as stated by Heat and Olusanya (1985) for fowls. This definitely pointed to the fact that the three treatments may have suffered some form of infection which might be subclinical since no symptoms were observed among the treatments. The higher haematological values recorded in the cassava peel meal based diets with respect to PCV and HB levels could reflect a better physiological status of the birds in the treatments. But elevated white blood cells (Jain, 1986) may not be completely related to pathological conditions but to physiological conditions such as exercise and exposure to sunlight, so the high values of differential count observed in the control diet which had no cassava peel meal at all may not after all be due to infections or parasitic infestation.

CONCLUSION

Since cockerels fed cassava peel meals in diets 2 and 3 had higher haematological values regarding PCV and HB levels which ultimately reflected a better physiological condition of the birds in the two treatments and since these 20% and 30% cassava peel meal based birds had lower values of differential counts which also showed that the birds in these treatments suffered no or less infections than the control, therefore the 20% and 30% cassava peel meal based diets seemed superior to the control which had no cassava meal.

REFERENCES

- Bamgbose, A.M., Oso, A.O., Olayemi, W.A., Yewande Ojo, Jegede, A.V., Fafiolu, A.O., Sobayo, R.A.,
- Kafayat, Y. and Taiwo, O. (2010). Carcass and sensory evaluation of indigenous turkey fed indomie noodles waste based diets with or without enzyme supplementation. *Proceeding of the 35th Annual Conference of Nigerian Society for Animal Production*: 840 - 842
- Egbewande, O.O. (2009). Poultry Industry and Alternative Feed Stuff's – A Mini review. *Proceedings of 14th Annual Animal Science Association of Nigeria*. 385 – 387.
- Fasley, J.E. (1978) Genetics of livestock improvement. Prentice Hall, Eagle Wood Cliffs New York.#
- Heath, E. and S. Olusanya (1985) Anatomy and Physiology of tropical livestock. Longman, London and Nweyork.
- Jain, N.C. (1986) Schalm's Veterinary Haematology, 4th ed. Lea and Febiger. Philadelphia, USA.
- Njike, M.C. (1980) Alternative energy and protein sources for poultry feeds in Nigeria, N.V.R.I. Vom, Nigeria.
- Okosun, S.E. (1987) Studies on caloric and protein requirements of cockerels. Ph.D. thesis, University of Ibadan.
- Onyimonyi, A.E. (2002) Nutritional evaluation of cassava peel and bambara waste in pig diets. Ph.D. thesis, University of Nigeria, Nsukka.
- Salami, R.I.(2000).Preliminary studies on the use of parboiled cassava peel meal as a substitute for maize in layers' diets. *Trop. Agric, (Trinidad)* 77: 199-204.
- Steel, R.G.D. and Torrie, J.H. (1980). Principles and procedures of statistics 2nd ed. McGraw Hill books Coy. New York
- Swenson, M.J. (1993) Physiological properties, cellular and chemical constituents of blood. In: Duke's physiology of domestic animals. M.J. Swenson and R.O.Williams (eds) 11thedu. Cornell University Press, New York.

Table 1. Composition of experimental ration

Ingredient	Diet (%)		
	D1(control)	D2 (20%CPM)	D3(30%CPM)
Maize	56.00	47.00	34.00
Rice offal	12.00	3.00	5.00
Groundnut cake	26.00	20.00	14.00
CPM	0.00	20.00	30.00
Fish meal	2.00	5.00	8.50
Vegetable oil	1.00	2.00	4.50
Bone meal	2.50	2.50	2.50
Vitamin premix	0.25	0.25	0.25
Salt	0.25	0.25	0.25
Total	100.00	100.00	100.00
Crude protein	17.40%	17.42%	16.85%
MEKcal/kg	2877	2673.40	2817.68

Table 2: Calculated analysis of the experimental ration

	D1	D2	D3
Crude protein (%)	17.40	17.42	16.85
Ca(%)	1.00	1.15	1.13
P (total%)	0.90	0.82	0.87
Meth+Cyst(%)	0.40	0.50	0.40
Lysine(%)	1.01	0.91	0.94
ME/kcal/kg	2877	2873.40	2817.68

Table 3. Effect of Cassava Peel Meal on the Haematology of Cockerels

Parameters	Diets			
	1	2	3	
PVC(%)		20.89±0.89 ^b	23.10±0.59 ^a	24.10±0.50 ^a
HBg/10ml		6.9±0.28 ^b	7.64±0.20 ^a	8.0±0.18 ^a
WBC total		6235.56±193.54	7888.00±73.56	9906.80±144.17
Differential counts(WBC)				
Neutrophils%		50.11±0.26 ^c	53.80±0.65 ^b	56.60±0.37 ^a
Lymphocyte%		40.89±1.48 ^b	38.60±0.79 ^{ab}	36.70±0.80 ^a
Monocytes%		6.11±0.61	6.40±0.60	5.80±0.51
Eosinophils%		2.11±0.39 ^a	1.00±0.26 ^b	1.20±0.25 ^b

*Values in the same row bearing different super scripts differ significantly.