

Effect Of Processed Cassava Peel Meal On The Haematology Of Pullets

C.O. Ajuonuma¹ and C.I. Uchendu²

¹Department of Animal Breeding and Physiology, University of Agriculture, Makurdi

²Department of Veterinary Physiology and Pharmacology, University of Nigeria, Nsukka

Abstract: Haematological characteristics was studied in 108 Dominant black pullets fed diets with varying levels of cassava peel meal (CPM). The birds were assigned into three experimental groups; A, B & C comprising 36 pullets each. The first group, Group A was given the control diets containing 0% CPM, while Groups C and B diets contained 10% and 20% CPM respectively. The packed cell volume (PCV) values in diet C at the 37th week was significantly higher ($P < 0.05$) than the value recorded in the control diet, while the total white blood cell counts in diet B in the 12 week declined significantly ($P < 0.05$) when compared with diet C. Diets did not affect the Haemoglobin concentration (Hb). The red blood cells of the pullets showed no significant ($P > 0.05$) difference among the various treatments.

I. Introduction

The recent global escalation of food crises call for sober reflection, owing to the fact that the world is facing a worsening food crises period unseen in the last 30years and that has a potential of leading to a catastrophe. Nigeria's population growth rate of over 3% per annum far outstrips the less than 2% annual growth in food production. Whereas her population increased at an annual rate of between 3% and 3.32%, total food production rose by no more than an average of 1.5% per annum between 1983 and 1990 (World Bank, 1988; 1995), and 1.03% per annum between 1990 and 2000 (CBN, 2002). The strong correlation that has been established between Nigeria's total GDP and the agriculture GDP suggests that the prospects of the non-oil sub-sector and the overall economy are closely tied to the performance of the agricultural sector (Eboh, 2005). One of the alternatives to partial replacement of maize in animal diets is processed cassava peel meal (Abu and Onifade, 1996; Ikurior and Onu, 1996; Eruvbetine et al., 1996; Salami 1999 and 2000). Aside from the lower values of crude protein and energy of the peel relative to those of maize, the greatest limitation to the use of cassava peels as a substitute for maize is that of its hydrocyanic acid (HCN) content which is harmful to the monogastrics. Several processing methods have been applied to fresh cassava peels to reduce the cyanide content. The levels of various substances in the blood can provide clues to the animals condition. The best indicator of animals well being and its potential for production is its health status. Haematological profiles are important indicators of health and disease in animals and have become indispensable in the diagnosis, treatment and prognosis of many diseases.

II. Materials and Methods

This experiment was carried out in Makurdi, Benue State, Nigeria. Dominant black pullet chicks for this research were purchased from Global Millennium Chicks Hatchery in Ibadan, Nigeria. One hundred and eighty pullets were used in this research. The pullets were housed in an open-sided poultry house, which was partitioned into homogenous pens. The experimental diets consisted of a control diet without cassava peel meal; T₁(0%) and others containing cassava peel meal at graded levels; T₂ (10%) and T₃ (20%) respectively. After soaking the cassava peels inside a closed metal drum for 5 days, the peels were removed from the sticky water and drained with a basket and subsequently sun-dried for 3 – 5 days. Haematological parameters determined included the packed cell volume (PCV), haemoglobin (Hb) concentration, total white blood cell counts (total leucocytes count). Blood was collected from the jugular vein of the pullets into clean dry glass tubes containing a pinch of the anticoagulant, ethylene diamine tetracetic acid (EDTA) and taken to the laboratory for haematological analysis. The PCV, Hb concentration and total leucocytes count were evaluated on the 12th, 24th and 37th weeks of the study. Four samples were collected from each group (treatment). The PCV was determined by the microhaematocrit method (Coles, 1986), the Hb concentration was determined by the cyanomethaemoglobin method (Kachmar, 1970), while the total white blood cell count was determined using the method of Schalm, *et al.* (1975).

III. Results and Discussion

The Table shows the percentage composition of layers diets, while the Figure shows the influence of CPM on mean periodic haematological characteristics of pullets at the 12th, 24th and 37th weeks. In weeks 12, 24

and 37, the mean values of PCV were not affected by all the diets. However, mean PVC values in diet C at the 37th week was significantly higher ($P < 0.05$) than the value recorded in the control diet. Diets did not affect the Hb concentration and red blood cells across the weeks. With increasing CPM inclusions in week 24, diets led to a slight increase in the values of total white blood cell counts. The red blood cells of the pullets showed no significant ($P > 0.05$) difference among the various treatments. Haematological values such as PCV are of great importance in practical husbandry since they reflect the response of the animals to its environment and diseases. They can also act as useful aids to prognosis and may reveal adverse conditions even when the animal did not display obvious clinical signs of ill health (Eze *et al.* 2010). The overall range of PCV obtained in this study is generally within the range reported by Bounous and Stedman (2000) as the normal PCV for chickens and turkeys, Sogunle *et al.* (2009) obtained higher PCV values in growing pullets fed CPM diets supplemented with cashew nut reject meal in 13 weeks old Yaafa Brown pullet chicks. Enyenihi *et al.* (2008) obtained comparable PCV and WBC values in laying hens fed wetted sun-dried cassava tuber meal, while Oladunjoye *et al.* (2010) obtained higher PCV values in point of lay Haco strain pullets fed diets containing sun-dried CPM and ly-treated cassava peels. Apart from lower values recorded in all the groups at the 37th week, Hb concentration values of pullets and layers on all diets in weeks 12 and 24 were within the range established as normal values for chickens (Mituika and Rawsley, 1977). That the Hb concentration values did not decline below normal throughout the duration of this study is an indication that anti-nutritional factors which may be present in traces (residual hydrocyanic acid) did not influence this haematological parameter. There is evidence from the results that CPM did not alter the normal values of WBC in the pullets. The implication of these normal ranges observed throughout the study is that the birds were better equipped immunologically to fight infections arising from, micro – organisms which is evident in the low mortality recorded in this study. Also, the RBC values were similar to the reference values documented by Mituika and Rawsley (1977) for healthy chickens. Hackbath *et al.* (1983) reported that increased RBC values were associated with high quality dietary protein and with disease-free animals. Enyenihi *et al.* (2008) and Afolabi *et al.* (2010) recorded similar RBC values while Sogunle *et al.* (2009) recorded slightly higher values and observed that RBC increased with increasing CPM inclusions.

IV. Conclusion

Cassava peel meal at a maximum level of 20% inclusion in all pullet diets support exchange of substances in the blood as well as work of internal organs. Generally, the PCV, Hb concentration, WBC and RBC values obtained in this study indicate that the birds were healthy and could withstand respiratory stress. This suggests that the different diets were balanced in their formulation to support optimum performance and haematological profiles of the birds.

Table: PERCENTAGE COMPOSITION OF LAYER DIETS

Feedstuff	Diets		
	1	2	3
Retted Cassava Peel Meal	0.00	10.00	20.00
Fish Meal	2.00	2.00	3.00
Soyabean Meal	30.00	30.00	25.00
Maize Bran	9.60	-	-
Maize	48.00	47.60	43.70
Bone Meal	3.50	3.50	3.50
Limestone	6.00	6.00	4.50
Methionine	0.30	0.30	0.30
Premix (Layer)	0.30	0.30	0.25
Salt	0.30	0.30	0.25
Total	100.00	100.00	100.00
Calculated Analysis			
Crude Protein %	17.51	18.20	17.40
Energy Kcal/kg ME	2733	2705	2630
Calcium %	3.50	3.67	2.93
Phosphorus % (Total)	0.845	0.840	0.851
Methionine %	0.574	0.592	0.541
Lysine %	1.020	1.022	0.921

Layer Bio-organics Premix at the rate of inclusion provides the following additional nutrients per kg of diet: Vitamin A 8,500,000.00 i.u., Vit. D₃ 1,500,000.00 i.u., Vit. E 10, 000 mg., Vit. K₃ 1,000 mg., Vit. B₁ 1,500 mg., Vit. B₂ 4,500 mg., Niacine 15,000 mg., Pantothenic Acid, 4,500 mg., Vit. B₆ 3,000 mg., Vit. B₁₂ 15.00 mg., Folic Acid 600 mg., Biotin H₂ 500.00 mg., Choline Chloride 175,000.00 mgr., Cobalt 200.00 mg., Copper 3,000.00 mg., iodine 1,000 mg., Iron 20,000.00 mg., Manganese 40,000.00 mg., Selenium 200.00 mg., Zinc 30,000.00 mg., Antioxidant 1,250.00 mgr.

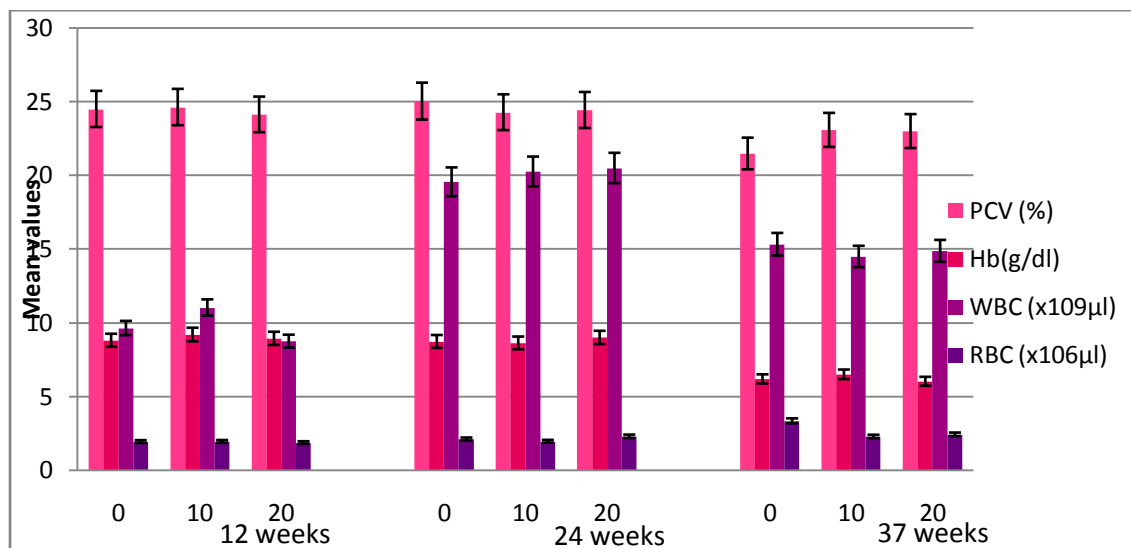


Figure . The influence of cassava peel meal on mean periodic haematological characteristics of pullets at 12th, 24th and 37th weeks

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