

Haematological Response of West African Dwarf Goats fed Ensiled Corncobs and Cassava peels.

Falola O.O¹ and Olufayo O. O²

¹Federal College of Animal Health and Production Technology, I. A .R. & T, Moor Plantation, P. M. B. 5029, Ibadan, Nigeria.

²Department of Agricultural Technology, The Federal Polytechnic Ilaro, P. M.B. 50, Ogun, Nigeria.

omobola.olufayo@federalpolyilaro.edu.ng, +2348056246950

Abstract

A feeding trial was conducted to investigate the haematological response of West African Dwarf goat fed ensiled corncobs and cassava peels. Fifteen West African Dwarf goats with average initial body weight of 7.09 ± 0.1 kg and 6-7 months old were balanced for weight and fed cassava peels (CPL) and ensiled corncobs (CC) in five different combinations as treatments, to determine their haematological response to the diets. Goats were randomly assigned to five dietary treatments in completely randomized design (CRD) with three animals per treatment which were replicated each. The dietary treatments were as follows; (T1) 100% corncobs (CC), (T2) 100% cassava peels (CPL); (T3) 50% CPL+50%CC; (T4) 25% corncobs+75% cassava peels; (T5) 75% corncobs+25% cassava peels. The crude protein value obtained were; 4.53%, 7.83%, 9.04%, 8.81%, 6.34% respectively. T3 shows the highest value while T1 shows the lowest value of crude protein. At the end of the experimental period, two goats were randomly selected from each treatment and bled via jugular vein. The haematological parameters (Packed cell volume 27.00 PCV, Haemoglobin (8.95) Hb, Red blood cell (4.36) RBC, Neutrophils (31.50) were highest in treatment 3 which were significantly ($p < 0.05$) different. Values for WBC, Neutrophils, eosinophyl and lymphocytes obtained in this study were all within the normal range for clinically healthy goats. Results obtained indicated that the WAD goats possess protection system, providing a rapid and potent defence against any infection. Therefore, goats can be fed with mixture of ensiled corncobs and cassava peels at 50% each without any detrimental effects.

Keywords: Haematological, response, WAD goats, Ensiled corncobs, cassava peel.

Introduction

Goats are multi-functional animals and play a significant role in the economy and nutrition of small and marginal farmers in most developing countries. Small ruminants especially goats can efficiently survive on available shrubs and trees in adverse harsh environment of low fertility land where no other crop can be grown. In spite of their continuous neglect and little or no attention given to them, they have however fulfilled a most useful task by way of supplying a part of human population with milk, meat, hair, leather and other products (Khan et al., 2006). Feed cost is a major burden of livestock farms, thus, a major strategy to develop the livestock industry in developing countries could be to increase the use of locally available feed resources thereby reducing the cost of importation. Moreover, meeting the nutritional needs of ruminants throughout the year is a major challenge facing ruminant owners in the tropics due to seasonality of forages. Poor nutrients status and limited supply of forages notwithstanding, agro- industrial by products (e.g cassava peel, plantain peel, brewer's spent grain and corncobs) constitute the largest feed resource for ruminants (Baah, 1994). Among the agro- industrial by products, cassava peel is the most abundant and has the greatest potential as a basal feedstuff for small ruminants (Otukoya and Babayemi, 2008). "Agricultural waste" is

increasingly viewed as valuable resources though are usually fibrous, with poor quality nutrients which make their digestibility low. However, to improve the nutrient composition of the crude protein, biochemically treated cassava peel and corn cobs silage meal is a high quality feed that contains a high concentration of energy, protein, and some mineral elements. Blood contains a myriad of metabolites and other constituents which provide a valuable medium for clinical investigation and nutritional status of human beings and animals. Dietary components have been reported (Olorode et al., 1995) to have measurable effects on blood components; hence blood constituents are widely used in nutritional evaluation and survey of animals. The study was designed to investigate the dietary effects of ensiled corncobs and cassava peels on haematological indices of WAD goats.

Materials and method

The experiment was carried out at the sheep and goat unit of Institute of Agricultural Research and Training, Moor Plantation, Ibadan which lasted for a period of 12 weeks. Fresh cassava peels was obtained at Kila area of Ogun state while corncobs was obtained at Omi –Adio market area of Ibadan, Oyo state. The corncobs obtained was cracked using feed mill hammer after which it was soaked in water for 24 hours to make it succulent for quick fermentation process . After 24 hours, the soaked corncobs was mixed with fresh cassava peels and molasses was used as an additives. The diets were ensiled into polythene bags at 10kg per bag with 1kg additive which was put separately into five silos on a period of one month. Fifteen post weaned male West African Dwarf goats with average initial body weight of 7.09kg \pm 0.1kg and 6-7 months old were purchased from Igbo- Ora area, Oyo state. The goats were vaccinated against ecto and endo parasites and randomly allotted to five dietary treatment groups with each treatment having three replicates in a completely randomized design. Pre-experimental body weight of the animals were recorded after which the animals were weighed weekly.

Chemical Analysis and Statistical analysis

Samples of the experimental diets were analysed for their proximate and fibre composition. Proximate analysis of the experimental diets and test ingredients were carried out according to A.O.A.C. 1995 procedure. Data collected were subjected to analysis of variance using the procedure of SAS, (2002), significant treatment means were compared using Duncan option of the same software.

Blood collection

At the end of the experiment, two goats per treatment were randomly selected and bled through the jugular vein into a carefully labelled sample bottles that has been pre- treated with ethylene diamine tetraacetic acid (EDTA) to prevent blood coagulation and taken to the laboratory to determine packed cell volume, RBC, WBC, Erythrocytes, Lymphocytes, haemoglobin.

Results and Discussion

The proximate composition of the experimental diets is shown in Table 1. The amount of crude protein and ash contents in T1 4.53% and 2.36% respectively are the lowest. T3 had the highest value of crude protein (9.04%), crude fat (6.16%), crude fibre (29.79) and ash content of 5.91. Also, Nitrogen Free Extract and moisture content values of (43.26) and (5.84) were lowest in T3.

Table 2 shows the results of haematological parameters of West African Dwarf goats fed ensiled corn cobs and cassava peels. There were significant ($P<0.05$) effects of ensiled corn cobs and cassava peels on Packed cell volume, Haemoglobin, and Red blood cell. Goats fed with 50%CC + 50%CPL had the highest PCV value of 27.00%, Haemoglobin value of 8.95%, and Red blood cell value of 4.36% while the lowest PCV value of 15.50%, Haemoglobin value of 5.85% and RBC value of 2.45% were obtained in goats fed 100% corn cobs (T1). However, there were no significant ($p<0.05$) effects of ensiled corn cobs and cassava peel on the Neutrophils, Lymphocyte, Monocyte, Eosinophils and platelets of the goats ($p<0.05$).

Table 1: Proximate composition of the Ensiled Experimental Diets

Parameters %	T1	T2	T3	T4	T5
Crude protein	4.53	7.83	9.04	6.81	6.34
Crude fat	0.33	4.15	6.16	4.25	0.88
Crude fibre	26.91	17.67	29.79	21.57	19.74
Ash content	2.36	3.28	5.91	3.34	3.19
Moisture content	7.80	6.87	5.84	6.91	7.05
Nitrogen Free Extract	60.07	62.20	43.26	59.12	65.80

T 1 : 100% CC

T 2 : 100% CPL

T3 : 50% CC + 50% CPL

T4 : 25% CC + 75% CPL

T5 : 75% CC + 25% CPL

Table 2 : Haematological parameters of West African Dwarf Goats Fed Ensiled Corncobs and Cassava peels.

Parameters	T1	T2	T3	T4	T5	±SEM
PCV (%)	15.50b	18.50ab	27.00a	24.50ab	24.50ab	1.65
HB (g/100ml)	5.85b	6.10b	8.95a	8.00ab	8.20ab	0.47
RBC(10^6 /ml)	2.45b	2.88ab	4.36a	3.88ab	4.23a	0.29
WBC(10^3 /ml)	5.20	7.38	5.45	7.63	4.33	0.74
Neutrophils (%)	25.00	28.00	31.50	29.00	29.00	1.57
Lymphocytes (%)	71.00	68.00	64.50	67.50	67.50	1.46
Monocytes (%)	1.00	2.00	1.50	1.50	1.50	0.22
Eosinophils (%)	2.50	2.00	2.50	2.00	2.00	0.29
Platelet	8.9×10^4	1.44×10^5	9.3×10^4	1.46×10^5	9.1×10^4	15214.9

A,b : mean value in the same row are significantly ($p<0.05$) different.

SEM : Standard Error of Mean.

Discussion

The use of cassava peel as energy supplement was beneficial in terms of the availability and economy of production. Nigeria is one of the world's largest producer of cassava and therefore, its sustainability for livestock management is guaranteed. There were no variations in Haematological parameters measured across the treatments. The values obtained fell within normal physiological range reported for healthy goats. (Daramola et al. , 2005), Packed cell volume value (27.00) obtained in T3 of this study was higher than the values (22-24) reported by (Fasae et al ., 2012) ; which implies that the animals were not anaemic. The haemoglobin HB values obtained in T3 also fell within the normal values recorded for healthy goats (Benjamin , 1981 and Fajemisin et al ., 2008) an indication that the diets seemed to be capable of supporting high oxygen capacity in the animal. The Red blood cell (RBC) value of T3 (4.36) was higher than 2.39-3.50 reported by Amuda ,(2012). The values for White blood cell (WBC) , Neutrophils , Eosinophils and Lymphocytes obtained were all within the normal range (Daramola et al ., 2005) for clinically healthy goats. The function of White blood cell is their response to antigen or foreign substance by forming antibodies that circulates in the blood (Frandson , 1986) . Elevated WBC above the normal range attributed to bacterial infection. The result obtained in this study indicated that the WAD goats seem to possess protection system, providing a rapid and potent defense against any infection.

Conclusion

Based on the haematological indices obtained in this study, goats fed 50% CC +50%CPL had better performance than goats in other treatments. The feed had no detrimental effects on the haematology of the experimental animals ;

References

- A.O.A.C. (1995) : Official methods of analysis 16th edition. Association of official analytical chemist ; Washington. Journal of Agric. Science Vol. 3(5); 380-386, May 2013.
- Baah J (1994) : Selection and evaluation of feedstuffs for urban and peri-urban small ruminant production systems in Ghana. A system approach. Dissertation . university of British Columbia, Vancouver , BC , Canada. International Journal of Agric. Science Vol. 3(5): 380-386, May 2013.