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Hematological Parameters of West African Dwarf Goats Fed Mixture of Cassava Sievate with Groundnut Husk Supplement

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Abstract

The effect of cassava root sievate (CRS) with groundnut husk supplementation on haematological indices was assessed in goats. Sixteen (16) West African dwarf male goats with an average live weight of 5 ± 0.42 kg were assigned to four dietary treatments with four animals per treatment in a completely randomized design. The dietary treatments were; diets 1 (80% guinea grass), 2 (50% guinea grass, 27% CRS and 3% groundnut husk), 3 (50% guinea grass, 23% CRS and 7% groundnut husk) and 4 (50% guinea grass, 19% CRS and 11% groundnut husk). Concentrate diet of 20% was also added to all the treatment diets. The results showed that goats on diet 1 had significant higher ($p < 0.05$) haemoglobin (10.02 g/dl), while goats on treatment diet 2 were higher ($p < 0.05$) in packed cell volume (30.32%), red blood cell ($10.93 \times 10^6/\text{ml}$), mean corpuscular volume (9.85 fl), mean corpuscular haemoglobin (29.03 pg), mean corpuscular haemoglobin concentration (33.86 g/dl) and white blood cell ($12.29 \times 10^3/\text{ml}$) than other treatment diets. It can be concluded that 50% guinea grass, 27% CRS, 3% groundnut husk and 20% concentrate diet has the potential to enhance haematological indices of goats.

Keywords: Guinea grass, agro by- products, cassava root sievate, blood, goats

Introduction

Lack of adequate supply of feedstuffs at economic prices is one of the major constraints facing ruminant development in Nigeria. Seasonal variation in forage quantity and quality which causes fluctuation in ruminant productivity throughout the year, in particular during the dry season is also compounding the problem of feed shortage in ruminant production (Okoruwa *et al.*, 2016). However, one of the ways of addressing this problem of feed shortage in ruminants is the use of agro by-products as an alternative feeds. Thus, the need to supplement cassava root sievate with groundnut husk in the diets of goats has been advocated, as it can enhance the productivity of goats in Nigeria. Cassava root sievate is the chaff that results from processing cassava tuber into a popular Nigerian food (*fufu*). Though, the potential of cassava root sievate as ruminant feeds include an energy source and non-seasonal supply, it may not be fed solely as their low crude protein with high fiber content cannot support optimum rumen fermentation. Hence, their optimal utilization requires supplementation with protein feed sources (Aderemi and Nworgu, 2007). Groundnut husk, a by-product of groundnut is discarded as waste to the environment. Though it contains high fibre, the crude protein content is moderate in content. Hence, combining it with cassava root sievate as a feed supplement for goats may solve the problem of feed scarcity in Nigeria.

The objective of this study was therefore to determine the haematological indices of West African dwarf goats fed mixture of cassava root sievate with groundnut husk supplement.

Materials and Methods

The study was carried out at the Small Ruminant Unit of the Teaching and Research Farm, Ambrose Alli University, Ekpoma. Guinea grass, cassava root sievate and groundnut husk, with concentrate composition of 50% wheat offal, 30% dried brewery grain, 18% maize sievate, 0.65% limestone, 0.35% bone meal, 0.50% salt and 0.50% vitamin premix were used for the treatment diets. The four diets prepared were; diet 1 (80% guinea grass that served as the control), diet 2 (50% guinea grass, 27% cassava root sievate and 3% groundnut husk), diet 3 (50% guinea grass, 23% cassava root sievate and 7% groundnut husk) and diet 4 (50% guinea grass, 19% cassava root sievate and 11% groundnut husk). The concentrate diet of 20% was added to all the treatment diets. Sixteen (16) growing West African dwarf male goats, age between 5 – 6 months old with an average live weight of 5 ± 0.42 kg were used for the study. They were assigned to the four dietary treatments in a completely randomized design. Each treatment was replicated twice with two animals. The treatment diets were given at 5% of their body weight daily at about 8:00 am in the morning and 4:00 pm in the evening. They also had free access to clean water daily. Recommended vaccination and medication were adequately administered to the goats during the study.

Blood samples were collected from each goat prior to feeding in the morning through the jugular-venipuncture at the last day of the experimental study. However, an average of 5ml of the blood samples were transferred immediately into sterile sample bottles containing ethylene-diamine tetraacetic acid (EDTA) as an anti-coagulant which were used for the haematological analysis (Ikhimioya and Imasuen, 2007; Jain, 1986). The trial lasted for 84 days excluding the 14 days of adjustment period. The proximate composition of the experimental diets was analyzed using the procedures of AOAC (1990).

Data that were generated from haematological parameters were subjected to analysis of variance and where significant difference occurred means were separated using Duncan multiple range test (SAS, 2000).

Results and Discussion

Table 1 shows the proximate composition of the experimental diets of West African goats. Hematological indices of West Africa dwarf goats fed experimental diets are shown in Table 2. The significant ($p < 0.05$) higher values of packed cell volume and red blood cell observed in goats on diets 2 (30.32% & $10.93 \times 10^6/\text{ml}$), 3 (28.73% & $10.27 \times 10^6/\text{ml}$) and 4 (26.46% & $9.89 \times 10^6/\text{ml}$) compared with diet 1 (24.73% & $8.84 \times 10^6/\text{ml}$) could be attributed to the nutritional adequacy and safety of the test diets. On the other hand, the low significant ($p < 0.05$) values recorded for haemoglobin in the test diets could probably be due to the residual cyanide in cassava root sievate which would have had a greater affinity for metals, thereby reducing the haemoglobin count. However, the haemoglobin counts recorded were still within the normal range of values (Okosun and Eguaoje, 2017; Okoruwa *et al.*, 2016). The higher ($p < 0.05$) effects of test diets on MCV, MCH and MCHC further attest the suitability of cassava root sievate and groundnut husk as a supplement to forage for goats feeds. The immune response of the study goats was not negatively affected by the test diets as observed in the values ($9.98 - 12.29 \times 10^3/\text{ml}$) of white blood cell that was normal (Jain, 1986).

Table 1: Proximate composition (%DM) of experimental diets

Parameters	Treatment Diets			
	1	2	3	4
Dry matter	79.86	91.34	89.75	86.03
Crude protein	10.76	10.29	10.38	10.47
Ether extract	3.72	3.84	3.65	3.46
Ash	8.52	8.96	8.66	8.37
Crude fibre	27.40	23.92	25.28	26.64
Nitrogen free extract	41.24	45.12	44.28	43.42

Table 2: Hematological parameters of West African dwarf goats fed experimental diets

Parameters	Treatment Diets				SEM
	1	2	3	4	
Packed cell volume (%)	24.73 ^d	30.32 ^a	28.73 ^b	26.46 ^c	0.28
Haemoglobin (g/dl)	10.02 ^a	8.12 ^b	8.23 ^b	8.89 ^b	0.06
Red blood cell ($\times 10^6/\text{ml}$)	8.84 ^c	10.93 ^a	10.27 ^a	9.89 ^b	0.08
Mean corpuscular volume (fl)	7.09 ^c	9.85 ^a	8.02 ^b	7.63 ^c	0.10
Mean corpuscular hemoglobin, (Pg)	25.99 ^b	29.03 ^a	28.79 ^a	26.98 ^b	0.24
mean corpuscular hemoglobin concentration (g/dl)	29.94 ^c	33.86 ^a	32.36 ^a	31.96 ^b	0.39
White blood cell ($\times 10^3/\text{ml}$)	9.98 ^b	12.29 ^a	11.99 ^a	10.63 ^b	0.17

^{ab,c,d} Means on the same row with different superscripts differ significantly ($p < 0.05$);

Conclusion

From the result obtained in this study, it can be concluded that 50% guinea grass, 27% cassava root sievate, 3% groundnut husk and 20% concentrate diet was more efficient on haematological indices of goats.

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