



HAEMATOLOGICAL PARAMETERS AND NUTRIENTS DIGESTIBILITY OF RED SOKOTO GOATS FED GMELINA AND FICUS LEAVES SUPPLEMENTED WITH CASSAVA PEELS AND COWPEA HUSKS

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Abstract

The experiment was conducted to determine the nutrient digestibility and haematological parameters of goats fed two different plant leaves, (Gmelina and Ficus) based diet supplement with cassava peels and cowpea husk. The experimental feeds contains the combination of Gmelina leaves + cassava peel and Gmelina + Cowpea husks, Ficus leaves + Cassava peels and Ficus leaves + cowpea husks in designed treatment as T1, T2, T3 and T4 respectively. After the adaptation period of two weeks sixteen female goats were randomly allotted to four treatment components in a randomize block design with four replicates each. Data was collected for nutrient digestibility and haematological parameters was subjected to analysis of variance using Statix 9.0. The result of nutrient digestibility was significant ($P < 0.05$) with the highest (81.45%) crude protein level of and lowest (52.09%) in T2 and T1 respectively, while the dry matter content was significantly highest (83.22%) in T4 and lowest (27.34%) in T1. There was no significant differences observed for all the blood indices and among the four treatment components, except for PCV, where T3 and T4 were significantly ($P < 0.05$) different from T1 and T2. This finding therefore show that all the feeds components supports the health status of the animals. In conclusion browse plants and crop by-products should be encouraged among farmers in order to improve the ruminant performance.

Key words: Nutrient, Digestibility, Haematological, Supplement, Cassava, Cowpea, Gmelina and Ficus

Introduction

Poor nutrition is one of the major constraints of small ruminant livestock productivity in tropics. Even where the forage resources are abundant, seasonal fluctuation in their nutritive value make substantial gains in production from good management and disease controlled programme unrealistic. (Sanusi *et al* 2011). Furthermore, the limited supply of raw materials for livestock feed industry has resulted in a continuous increase in the cost of production caused phenomenal rise in the unit cost of production (Onwuka *et al.*, 1992). The shortage of good quality feed needed to sustain livestock growth especially during dry season months has been a perennial problem which can be reduced or eliminated by finding alternative sources of protein and energy concentrated mixture given to animals. It was reported that an inverse relationship exists between nutrient consumption and digestibility (McDonald *et al.*, 2002). There is poor degree of utilization of nutrient with reduced ration of concentrate in diet (Yashim *et al.*, 2011). That nitrogen excreted in urine depends on urea recycling and efficiency of utilization of ammonia produced in the rumen by microbes for microbial protein synthesis. Therefore the percentage nitrogen digestibility and retention decrease with increase in the level of roughage and decrease in the level of crude protein in diet. Ojebiyi *et al.*, (2009) also reported that a readily available and fast means accessed clinical and nutritional status of animals on feeding trials is the use of blood analysis. That ingestion of dietary components has measureable effects on



the blood composition. This may be considered an appropriate measure of long term nutritional status of the animals. Blood analysis is important because it contains a myriad of metabolites and other constituents which provide a valuable medium for clinical investigation and nutritional status of human beings and animals (Abegunde, 2008). Blood is used in nutritional evaluation and health survey of animals. According to Yusuf *et al* (2012) the blood profile of animals often reflect their nutritional adequacy or otherwise. Therefore, dietary components have measurable effects on blood constituents, such that significant changes in their values can be used to draw inference on the nutritive values of feeds to animals. The objective of this paper was designed to assess the haematological parameters and nutrient digestibility of Sahel goats fed Gmelina and Ficus leaves supplemented with cassava peels and cowpea husks

Materials and methods

Study area

The experiment was carried out at the small ruminant unit of teaching and research farm of the federal polytechnic Bali, Taraba state. Bali is situated at latitude 7°12'N to 12°00' North of the equator and longitude 10°00' "N to 12°00'" east of Green Which Meridian (GWM) at an altitude of 450mm above sea level and lies within the guinea savannah zone of Nigeria (TSD. 2008).

Experimental layout and Animal management

Sixteen goats Red Sokoto goats of average age of eight months and mean weight of 7 kg were sourced from local market around Bali environment. Their ages were determined through their dental formulae. The animals were quarantined for two weeks during which they were fed the experiment diet for adaptation. They were dewormed with Albendazole and vaccinated against PPR and CCBP. At the end of the adaptation period, the animals were tagged, randomly allocated to treatments and balanced on weight bases for all treatments. They were weighed to get the Initial weights before embarking data collection. Toward the end of the experimental period of three months, the animals were individually housed for digestibility trials for the period of one week.

Experimental diet

There were four treatments replicated four times, making a total of sixteen experimental animals. The experimental diet consists of: T1 (Gmelina arborea leaves+ 1.2 kg of cassava), T2 (Gmelina arborea leaves+1.2 kg of cowpea husk), T3 (Ficus sycamores leaves+1.2kg of cassava peels), T4 (1.2kg of cowpea husk+ Ficus sycamores leaves) The cassava peels and cowpea husk were the supplement portions and were fed to the animals at 300g/head/day. The Gmelina and Ficus leaves formed the base diet and fed *ad- libitum*. Randomized complete Block Design (RCBD) was employed in the study.

Parameters measured

Parameters determined, digestibility of the treatments diets and haematological indices. Proximate compositions were determined using the methods described by AOAC (2005). In determining the digestibility; the diets were given to the animals in a known amount. Faecal outputs were collected weighed daily. The proximate compositions of faeces were determined using the method described by AOAC (2005).

Haematological parameters were determined by drawing 5mls of blood from a jugular veins of each animal into a sample bottle containing anti- coagulant; Ethylene Diamante Tetra Acid (EDTA). The samples were used for the determination of the packed cell volume (PVC), Haemoglobin (Hb) concentration, Red Blood



cell counts (RBC) and White blood cell counts (WBC). Packed cell volumes (PVC) were measured for each animal using the micro haematocrit method. Haemoglobin concentration was also measured using sahl's (acid haematin), Oni *et al* (2010). Red blood cells were determined with acid of Neubator contains chamber (Haematocytometer). Blood smears were used for total while blood cell (WBC) counts determination. All data obtained were subjected to analysis of variance (ANOVA) using Statix 9.1 package, means were separated using LSD.

Results and Discussion

The effect of the experiment diets on the digestibility of goats are presented on Table 2. The results indicate that goats fed the combination of FL+CH (T4) and FL+CP significantly had better nutrient digestibility than the goats that were fed GL+CP(T1) and GL+CH(T2) the result obtained also agree with reports of Bankole *et al.*, (2004), that feeding browse plant has become an essential practice especially in the dry season when herbaceous forage are soirees animal feeds. In a similar development the use largely in agreement with Lufedaju *et al* (1992), who also identified the importance of feeding ruminant animals with cereal residue from sorghum, maize and millet it is evident in this study, that the ruminant and animals utilizes low pea husk more efficiently than cassava peels

Table 1: Nutrient Digestibility Sahel) of Goats fed Gmelina and Ficus leave as Basal diet Supplement with Cassava peels and Cowpea Husks.

Parameter	Treatments			
	T1 (GL+CP)	T2 (GL+CH)	T3 (FL+CP)	T4 (FL+CH)
Dry matter	27.335 ^c	62.415 ^d	70.645 ^a	83.220 ^a
ASH	58.225 ^b	75.520 ^a	77.400 ^a	83.220 ^a
Crude protein	52.090 ^b	81.450 ^a	60.230 ^b	75.915 ^a
Ether m tract	93.410 ^a	93.945 ^a	95.575 ^a	93.215 ^a
CF	25.450 ^b	70.875 ^a	50.855 ^a	76.975 ^a
ADF	62.380 ^a	76.765 ^a	58.135 ^a	79.095 ^a
NDF	36.915 ^b	73.490 ^a	55.040 ^b	76.875 ^a

a,b,c = means in the same row with different superscripts are significantly different (P<0. 5)

Table 2: Haematological Analysis of Sahel goats' Fed Crop Residues and Browse plants

Parameter	Treatments				SEM
	T ₁ (GL+CP)	T ₂ (GL+CH)	T ₃ (FL+CP)	T ₄ (FL+CH)	
HB	14.250 ^c	16.500 ^b	17.250 ^{ab}	20.250 ^d	2.7031
PCV	36.500 ^b	49.500 ^{ab}	49.750 ^{ab}	60.750 ^a	8.3540
RBC	8.253 ^b	9.932 ^b	10.053 ^a	2.078 ^a	1.5771
WBC	5.806 ^b	7.268 ^{ab}	7.973 ^{ab}	8.965 ^a	0.9961
MCH	1.728 ^a	1.653 ^a	1.633 ^a	1.640 ^a	0.0718
MCHC	0.431 ^a	0.333 ^b	0.327 ^b	0.333 ^{ab}	0.0346
MCV	4.422 ^b	4.958 ^b	4.990 ^b	5.100 ^a	3.6378



a = means in the same row with the same superscripts are not significantly different ($P > 0.05$)

The haematological parameters for the goat, those in T_4 had the highest values (20.250, 60.750, 12.078, 8.965 and 5.100) for HB, PCV RBC, WBC, and MCV respectively. However the same T_4 did not differ significantly from these in T_2 & T_3 for PCV, and WBC and T_3 for RBC. Those in T_1 were significantly ($P < 0.05$) higher (0.43) for MCHC than those in the other treatment, while MCH did not differ significantly from each other among treatment groups.

From the result it can be deduced that all the feed components has the ability to support the physiological activities of the animals. However where there is an inclusion of cowpea husk gives higher haematological values compared to where cassava peels were included. This finding is in consonant with the work of Ogunborijo (2009), who report that good feeds also influences the blood constituents, which is a vital tools that helps to detect any deviation from normal animals body. However the WBC obtained in the animals fed the experimental diets was within the range of $4.0\text{--}12.0 \times 10^3 \text{ mm}^{-1}$ for goats (Byanet *et al.*, 2008). All other hematological value was within the normal range for goats (Jain, 1993, IKhimoya and Imasuen 2007). It has also been reported that haematological indices gives an insight into the production potential and help to monitor and evaluate incidence of diseases in animals (Karesh and Cook, 1985; Orheruata and Aikhnomobhogbe, 2006).

Conclusions

The result of this study reveals that animal fed the combination of Gmelina leaves + cowpea husk, Ficus + cassava peels and Ficus leaves + cowpea husk, maintained good feed utilization by the animals as well as normal hematological indices, thereby keeping all animals on healthy condition. Hence feeding goats, with browse plants and crop by-products should be encouraged among farmers in order to improve ruminant performance.

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