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Haematological Parameters of Savanna Brown Does Fed Varying Dietary Levels of Flamboyant Tree Seed Meal

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Abstract: Fifteen (15) nulliparous Savanna Brown does aged 6-8 months with a mean live weight of 9.55 kg were randomly allotted into five dietary treatments comprising of three animals per treatment. Five different diets with varying levels of flamboyant tree seed meal were fed as supplement at the rate of 0.50 kg/head/day. T_1 which had no flamboyant tree seed served as control while diet T_2, T_3, T_4 and T_5 which served as the treatment diet had 25, 50, 75 and 100% flamboyant tree seed meal, respectively. The animals were managed semi-intensively. 5 mls of blood samples were collected via jugular vein puncture into well labeled EDTA bottles and were immediately placed in an ice-chest containing ice cubes and analyzed within 2 h of collection for blood glucose, protein and plasma urea. The average total blood glucose and protein were significantly ($p<0.05$) different with diets T_1 and T_2 recording higher values while plasma urea level did not differ significantly ($p<0.05$) among the treatment groups. All the values obtained were within the recommended normal range. It is therefore concluded that up to 100% level of inclusion of flamboyant tree seed meal in the diets of Savanna Brown does was not deleterious on the blood parameters.

Key words: Haematology, savanna brown does, flamboyant tree seed meal

INTRODUCTION

Goats constitute a very important component of the livestock sub-sector of the Nigerian agricultural economy. The potential of goat production in alleviating the low level of consumption of animal protein by human in developing nations, Nigeria inclusion needs no emphasis (Animashaun *et al*., 2006). The high cost of formulating concentrate and pelletized feed has been a major constraint militating against the increased production of valuable sources of animal protein (Animashaun *et al*., 2006). Hence, the urgent need to incorporate non-conventional feedstuffs into goat diet. One of such feedstuffs is the flamboyant tree (*Delonix regia*) seed which is widely grown as an ornamental plant.

Animashaun *et al*. (2006), observed that nutritional studies should not be limited to performance, carcass quality and nitrogen alone, but the effect on blood constituent is also very relevant. Laboratory tests on the blood are very vital tools that help to detect any deviation from normal in the animal or human body. Haematology aid the clinician to arrive at a definitive diagnosis of a disease, enables him/her to make a prognosis and also to assess the efficiency of therapy and toxicity of drugs and chemical substances (Ihedioha and Ibeachu, 2005). Currently in veterinary practices, a diagnosis is considered incomplete or not definitive if information obtained from history and chemical examination is not combined with laboratory test results including the result of haematology (Ihedioha and Ibeachu, 2005).

Consequently, this study aims to determine the effect of replacing groundnut cake with varying levels of flamboyant tree seed meal on some blood parameters of Savanna Brown does.

MATERIALS AND METHODS

The study was conducted at the Ruminant Animal Production Unit of the Teaching and Research Farm, Federal University of Technology, Minna, Niger State. The study area lies within the Southern Guinea Savanna ecological zone of Nigeria. It has a mean annual rainfall of 1102.6-1361.7 mm and an annual temperature range of between 26.66°C and 27.77°C.

Fifteen (15) nulliparous Savanna Brown does aged 6-8 months with average body weight of 9.55 kg were used for the study which lasted 12 weeks. The animals were allowed a pre-treatment periods of two weeks prior to study in order to enable them acclimatize. They were given prophylactic treatment against helminthes and other parasites and were randomly allotted into five treatment groups with three animals per treatment. Flamboyant tree seed were collected during the dry season, dried properly and roasted using open flame for 15 min in an open pot with little sand to prevent friction and burning. The roasted seed was sieved, ground and incorporated at different levels into the experimental diets.

The five treatment diets were designated T_1, T_2, T_3, T_4 and T_5. The feeds were formulated to be isonitrogenous and isocaloric. T_1 served as the control with 0% inclusion of flamboyant tree seed and 100% groundnut cake while T_2, T_3, T_4 and T_5 had the groundnut cake component substituted for flamboyant tree seed meal at 25, 50, 75 and 100%, respectively (Table 1). The

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Table 1: Composition of experimental diets fed to Savanna Brown does during the experimental period

	Treatments				
Ingredients	T_1	T_2	T_3	T_4	T_5
Maize grain	65.35	55.10	43.50	31.90	20.57
Rice waste	29.91	37.19	48.78	60.38	71.71
Groundnut cake	6.22	4.66	3.11	1.56	0.00
Flamboyant tree seed meal	0.00	1.56	3.11	4.66	6.22
Bone meal	0.75	0.75	0.75	0.75	0.75
Salt	0.75	0.75	0.75	0.75	0.75
Total (kg)	100.00	100.00	100.00	100.00	100.00
Crude protein (%)	12.05	11.99	11.99	12.00	11.99
Energy (Kcal/kg)	3220.75	3197.13	3167.82	3138.52	3110.13

T_1 = 0% Flamboyant tree seed meal T_2 = 25% Flamboyant tree seed meal T_3 = 50% Flamboyant tree seed meal
T_4 = 75% Flamboyant tree seed meal T_5 = 100% Flamboyant tree seed meal

Table 2: Proximate composition of the experimental diets raw and roasted Flamboyant Tree Seed Meal (FTSM)

						Raw	Roasted
Nutrients (%)	T_1	T_2	T_3	T_4	T_5	FTSM	FTSM
Dry matter	91.00	92.01	91.00	93.00	90.00	81.80	89.40
Moisture	9.00	7.99	9.00	7.00	10.00	12.20	10.60
Crude protein	12.07	12.01	11.99	12.03	12.01	18.10	18.92
Crude fibre	12.25	18.32	22.88	24.69	29.35	7.50	11.00
Ether extract	13.36	17.38	10.74	18.16	13.96	7.50	9.00
Ash	5.01	7.00	7.00	9.01	11.00	3.60	3.40
Nitrogen Free Extract	57.31	45.29	47.41	36.11	33.68	53.30	57.70
Energy (Kcal/kg)	3977.60	3856.20	3342.60	3560.00	3084.00	3931.00	3874.70

T_1 = 0% Flamboyant tree seed meal T_2 = 25% Flamboyant tree seed meal T_3 = 50% Flamboyant tree seed meal
T_4 = 75% Flamboyant tree seed meal T_5 = 100% Flamboyant tree seed meal

animals were supplied clean water and salt lick *ad-libitum* and were allowed adequate grazing time from 10.00 am to 4.00 pm. 5 mls of blood were collected via the jugular vein of each animal into bottles containing disodium salts of Ethylene Diamine Tetra-acetic Acid (EDTA) as anti-coagulant. The EDTA bottles containing blood samples were transferred into an ice chest containing ice cubes and taken to the laboratory for analysis. The parameter analyzed were blood glucose, protein and urea.

The data obtained were subjected to one way analysis of variance (ANOVA) while means were separated using the Duncan's (1955) multiple range test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Proximate composition of the raw and roasted flamboyant tree seeds and the experimental diets is presented in Table 2. Dry matter, crude protein, crude fibre and ether extract were higher in the roasted than raw seeds while Moisture, Ash, Nitrogen Free Extract and Energy were higher in the raw seeds. The anti-nutritional factors in the raw and roasted seeds are presented in Table 3. The anti-nutritional factors in the raw seeds were greatly reduced by roasting. This is in agreement with the findings of Grant *et al.* (1991) that traditional processing methods can effectively reduce anti-nutritional factors in legume seeds. Table 4, 5 and 6 show the weekly record of haematological parameters

Table 3: Anti-nutritional composition of raw and roasted flamboyant tree seed

Factors	Raw flamboyant tree seed	Roasted flamboyant tree seed
Tannin (mg/100 g)	93.10	11.20
Phytate (mg/100 g)	2.13	0.58
Saponin (%)	12.23	2.22
Typsin inhibitor (mg/g)	273.00	62.00

observed in the does. With the exception of the 1st and 4th week of study, the blood glucose level differed significantly ($p<0.05$) among the different groups. Remarkable decline was observed for animals in T_3-T_5 in the 7th and 8th week of study. Weekly protein level did not differ significantly ($p<0.05$) among treatments in the 1st six weeks of study. However, in the 7th and 8th week, a significant ($p<0.05$) decline in T_3-T_5 was recorded. Except in the 2nd week of study, the plasma urea level showed significant differences among all the treatment group. The overall summary of the value obtained for blood glucose, protein and plasma urea is presented in Table 7. Blood glucose and protein differed significantly among the treatments. It was observed that the weekly readings and cumulative reading obtained fell within the normal range prescribed by Fasae *et al.* (2005). The increase in total blood protein reflects the ability of the animals to store reserve protein when animals have reached the maximum capacity for less liable protein intake (Fasae *et al.*, 2005). Plasma urea levels

Table 4: Average weekly blood glucose level of savanna brown does fed varying levels of flamboyant tree seed meal

	Diets							
Weeks	T_1	T_2	T_3	T_4	T_5	SEM	LS	N/R
1	1.40^a	1.36^a	2.16^a	1.40^a	2.10^a	0.61	NS	3.5-6.0
2	3.67^{ab}	3.43^{ab}	4.23^a	3.80^{ab}	4.30^a	0.97	*	3.5-6.0
3	3.73^{ab}	3.60^{ab}	4.37^a	3.93^{ab}	4.45^a	0.87	*	3.5-6.0
4	4.63^a	3.60^a	4.37^a	4.30^a	4.25^a	0.63	N S	3.5-6.0
5	4.77^a	4.83^a	3.17^{ab}	2.80^b	4.55^a	1.48	*	3.5-6.0
6	5.10^a	5.13^a	3.60^b	3.03^b	4.90^a	1.55	*	3.5-6.0
7	5.17^a	5.50^a	3.50^{ab}	3.23^{ab}	2.45^b	2.30	*	3.5-6.0
8	5.13^a	5.53^a	3.53^{ab}	3.55^{ab}	2.55^b	2.42	*	3.5-6.0

^{a,b}Means along the same row with the same superscript are not significantly (p>0.05) different.
SEM = Standard Error of Means LS = Level of Significance NS = Not Significantly Different (p>0.05) N/R = Normal Range.
T_1 = 0% Flamboyant tree seed meal T_2 = 25% Flamboyant tree seed meal T_3 = 50% Flamboyant tree seed meal
T_4 = 75% Flamboyant tree seed meal T_5 = 100% Flamboyant tree seed meal

Table 5: Average weekly total protein level of savanna brown does (mg/l) fed varying level flamboyant tree seed meal

	Diets							
Weeks	T_1	T_2	T_3	T_4	T_5	SEM	LS	N/R
1	6.57^a	7.83^a	6.80^a	6.47^a	6.85^a	0.76	NS	6.4-7.0
2	6.97^{ab}	7.43^a	7.50^a	7.60^a	7.60^a	0.59	NS	6.4-7.0
3	7.03^a	7.40^a	6.60^a	7.57^a	7.65^a	0.59^a	NS	6.4-7.0
4	6.27^a	6.60^a	7.67^a	7.63^a	7.75	0.1.07	N S	6.4-7.0
5	6.43^a	8.43^a	5.83^a	5.47^a	8.45^a	2.85	NS	6.4-7.0
6	6.79^a	7.03^a	6.00^a	5.57^a	8.30^a	2.46	NS	6.4-7.0
7	7.70^a	8.37^a	5.03^{ab}	5.30^{ab}	4.35^b	3.75	*	6.4-7.0
8	7.67^a	8.20^a	5.03^{ab}	5.23^{ab}	4.40^b	3.75	*	6.4-7.0

^{a,b}-Means along the same row with same superscript are not significantly (p>0.05) different
SEM = Standard Error of Means LS = Level of Significance N/R = Normal Range
T_1 = 0% Flamboyant tree seed meal T_2 = 25 % Flamboyant tree seed meal T_3 = 50% Flamboyant tree seed meal
T_4 = 75 % Flamboyant tree seed meal T_5 = 100% Flamboyant tree seed meal

Table 6: Average weekly urea level in the blood of savanna brown does (m/mol) fed varying level of flamboyant tree seed meal

	Diets							
Weeks	T_1	T_2	T_3	T_4	T_5	SEM	LS	N/R
1	6.20^{ab}	4.36^b	5.00^a	6.33^{ab}	6.95^a	1.12	*	4.5-8.5
2	5.07^a	5.33^a	6.20^a	6.23^a	5.80^a	0.96	NS	4.5-8.5
3	5.37^b	5.60^{ab}	6.27^{ab}	6.67^a	5.95^{ab}	0.67	*	4.5-8.5
4	5.90^{ab}	6.13^a	6.03^a	6.40^a	4.70^b	1.67	*	4.5-8.5
5	6.10^a	6.20^a	3.83^b	4.37^b	4.80^b	2.34	*	4.5-8.5
6	6.63^a	6.43^a	4.07^b	4.57^b	5.45^a	2.24	*	4.5-8.5
7	6.47^a	6.70^a	4.47^b	4.73^b	3.10^b	3.08	*	4.5-8.5
8	6.50^a	6.63^a	4.27^b	4.77^b	3.50^b	3.08	*	4.5-8.5

^{a,b}Means along the same row with same superscript are not significantly (p>0.05) different.
SEM = Standard Error of Means LS = Level of Significance N/R = Normal Range
T_1 = 0% Flamboyant tree seed meal T_2 = 25% Flamboyant tree seed meal T_3 = 50% Flamboyant tree seed meal
T_4 = 75% Flamboyant tree seed meal T_5 = 100% Flamboyant tree seed meal

Table 7: Mean contents of some blood parameters in savanna brown does fed varying levels of flamboyant tree meal

	Diets							
Parameters	T_1	T_2	T_3	T_4	T_5	SEM	LS	N/R
Blood glucose (mmol/l)	4.20^a	4.20^a	3.60^{ab}	3.23^b	3.69^{ab}	0.29	*	3.5-6.0
Protein(mg/l)	6.55^{ab}	7.79^a	6.43^{ab}	6.09^b	6.92^{ab}	0.48	*	6.4-7.0
Urea (mmol/l)	6.03^a	5.59^a	5.01^a	5.53^a	5.03^a	0.41	NS	4.5-8.5

^{a,b}Means along the same row with same superscript are not significantly (p>0.05) different.
SEM = Standard Error of Means LS = Level of Significance N/R = Normal Range
T_1 = 0% Flamboyant tree seed meal inclusion T_2 = 25% Flamboyant tree seed meal inclusion
T_3 = 50% Flamboyant Tree seed meal inclusion T_4 = 75% Flamboyant tree seed meal inclusion
T_5 = 100% Flamboyant tree seed meal inclusion

increased throughout the period of study. The amount of urea is dependent on the protein content of the daily diet. When within normal range, it is an indication of proper functioning of the kidneys. The mean total value for blood parameters so measured fell within the normal range specified by Fasae *et al.* (2005). The implication of these findings is that flamboyant tree seed meal did not have any detrimental effect on the haematological performance of the animals.

Conclusion and recommendations: The result obtained from this study indicate that flamboyant tree seed meal can be used to substitute groundnut cake up to 100% without any deleterious effects on the blood parameters. Also, farmers should be encouraged to protect and plant flamboyant trees to serve as plant protein sources in addition to performing ornamental functions.

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