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BLOOD METABOLITES OF RED SOKOTO BUCKS FED UREA-MOLASSES TREATED MAIZE COB SUPPLEMENTED WITH CONCENTRATES OF DIFFERENT PROTEIN SOURCES

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ABSTRACT

The study was conducted to evaluate the effect of feeding urea-molasses treated maize cob supplemented with concentrates of different protein sources on the blood profile of Red Sokoto bucks. The maize cobs were obtained as post-harvest waste from farms around Samaru and Shika in Zaria, Kaduna State. The maize cob was grounded, and treated with urea at 2% (i.e. 20 g urea dissolved in 1 liter of water to treat 1 kg of maize cob) to enable homogenous mixing with other ingredients which were packaged and stored in jute bags until it was used. Sixteen (16) Red Sokoto bucks, aged 8 – 12 months and weighing 10 – 12kg were randomly allotted to four (4) dietary treatment containing treated maize cob with cotton seed cake (CSC), poultry litter (PL), rosell seed cake (RSC), and brewers dried grain (BDG), respectively with four bucks per treatments in a completely randomized design (CRD). The maize cob was treated with 2% urea and 5% molasses and ensiled for a period of 2 weeks. The diets were formulated to contain 13% crude protein. The experiment lasted for 90 days. Blood samples were collected once from three animals in each of the treatment group at the end of the feeding trial (which lasted for 90 days) using syringe for determination of serum biochemical indices (such as blood glucose, total protein, creatinine, and urea nitrogen). The results for total protein, blood urea and glucose were significantly ($P < 0.05$) influenced by supplementation with protein but were within the normal range with a few slightly below the normal range although the bucks gained weight. It can be concluded that urea-molasses treated maize cob can be utilized as feed for Red Sokoto goats when supplemented with protein without affecting the blood parameters.

INTRODUCTION

In recent times, ruminant nutritionist are directing their research towards harnessing and enhancing the utilization of agro-industrial by-product and crop residues like maize stover, sorghum stover, maize cobs, cowpea husk, soya bean straw, and pigeon pea pod husk as alternative sources of cheap, nutritionally adequate with no or minimal deleterious effect on the animals (Yashim *et al.*, 2018). Hematological parameters are important and reliable medium used to monitor and evaluate health and nutritional status of animals (Gupta *et al.*, 2007). Blood metabolites are widely used in nutritional evaluation and survey of animal feed and have been reported to have a measurable effect on blood components (Opara *et al.*, 2006). Blood constituents reflect the physiological responsiveness of the animal to its internal and external environment, which include feed and feeding. The significance of determining blood indices of



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domestic animals is well documented (Opara *et al.*, 2006). Nutrition, age, sex, genetics, stress and transportation are known to affect blood parameters observed between tropical and temperate animals (Yashim *et al.*, 2018).

There is limited scientific information on the blood profile of Red Sokoto goats fed urea-molasses treated maize cob supplemented with concentrates of different protein sources. Therefore, the objective of the study was to determine the effect of feeding urea-molasses treated maize cob supplemented with concentrates of different protein sources on the blood profile of Red Sokoto goats.

MATERIALS AND METHODS

The experiment was conducted at the Teaching and Research Farm of the Department of Animal Science, Ahmadu Bello University Zaria, located on latitude 11° 11' N and longitude 07° 38' E (Ovimaps, 2017). Maize cobs were obtained as post-harvest waste from farms around Samaru and Shika, Zaria, Kaduna State, Nigeria. The maize cob was grounded, and treated with urea at 2% (20 g urea dissolved in 1 liter of water to treat 1 kg of maize cob). To prepare urea molasses treated maize cob, 20 g of urea was added to a liter of water and stirred very well until urea was dissolved and clumps of urea disappeared from the solution. Then 5% of molasses was added and stirred very well until the molasses and the urea solution gets mixed up (Chenost, 1995). The solution was uniformly sprayed and thoroughly mixed with the ground maize cob. The urea-molasses treated maize cob was then ensiled in Purdue Improved Cowpea Storage (PICS) triple bags for a period of two weeks. The ensiled urea-molasses treated maize cob was then air dried before being used to feed the animals. The other ingredients (CSC=cotton seed cake, PL=poultry litter, RSC=rosell seed cake, BDG=brewers dried grain, BM=bone meal, urea and molasses.) were sourced from commercial feed mills in Samaru and were milled before incorporation into the supplementary concentrate diets. The experimental diets were formulated to contain approximately 13% crude protein and each protein source serves as treatment. (Table 1)

Table 1: Gross composition of concentrate diet

Ingredients	Treatments			
	CSC	PL	RSC	BDG
Maize offal	27.75	30.75	30.75	27.75
Rice offal	17	17	18	17
Bone meal	1.5	1.5	1.5	1.5
Premix	0.25	0.25	0.25	0.25
Salt	0.5	0.5	0.5	0.5
CPS	30	30	30	30
Protein sources	23	20	19	23
Total	100	100	100	100
<i>Calculated analysis</i>				
Crude protein	13.20	13.40	13.30	13.40
ME (Kcal/kg)	2002.30	1982	2083.5	2150
Cost /kgdiet (₦)	43.70	32.50	46.50	46.50

CSC= Cotton seed cake, PL= Poultry litter, RSC=Rosell seed cake, BDG=Brewer's dried grain, CPS=Cowpea shell, ME = metabolizable energy

Sixteen (16) Red Sokoto bucks, aged 8 – 12 months and weighing 10 – 12 kg were used for this experiment. The bucks were purchased from Giwa market in Kaduna State. The bucks were randomly allotted into four dietary treatments in a completely randomized design (CRD), with 4



animals per treatment to evaluate the effect of urea-molasses treated maize cob supplemented with concentrates containing different protein sources. The basal diet was urea-molasses treated maize cob supplemented with concentrate containing cotton seed cake (CSC) as treatment 1, poultry litter (PL) as treatment 2, roselle seed cake (RSC) as treatment 3 and brewer's dried grain (BDG) as treatment 4. Other ingredients used in the formulation of the concentrate are: maize offal, rice offal, bone meal, premix, cowpea shell and table salt (Table 1). Blood samples were collected once from three animals in each of the treatment group at the end of the feeding trial (which lasted for 90 days) using syringe for determination of serum biochemical indices (such as blood glucose, total protein, creatinine, and urea nitrogen). Determination of the blood glucose levels was done by the Glucose Oxidase Principle (Beach and Turner, 1958). Data collected from this study were subjected to statistical analysis (SAS, 2002) significant means were compared using Duncan Multiple Range Test.

RESULTS AND DISCUSSION

Blood metabolites of Red Sokoto bucks fed urea- molasses treated maize cob supplemented with concentrates of different protein sources

Result of some blood metabolites are presented in Table 2. The different protein sources significantly ($P < 0.05$) affected total protein, blood urea N and glucose of Red Sokoto bucks fed Urea-molasses treated maize cob. The total protein quality indices for all the treatments were within the normal range (56 – 96 g/L) reported for total protein for healthy goats (Zubcic, 2001). The observed blood urea nitrogen in the present study were above the normal range (12-28 mg/dL) reported for healthy goats (Okafor, 2017). The glucose concentration values were within the normal range of 40-100 mg/dl (Merck, 2016). The importance of examining blood for their constituents and their use in monitoring and evaluation of health, reproduction and nutritional wellbeing of animals has been well documented (Opara *et al.*, 2010; Okafor, 2017). Dietary treatments had effect on haematological parameters. The values obtained for glucose were within the range for healthy goats (Latimer 2010). This result can be attributed to the fact that growing Red Sokoto bucks had higher metabolic activities. This agreed with the observation of Iriadam (2007) who reported that nutritional status and management practices can influence the physiological attributes and ability of animals to cope with stress. According to Hatfield *et al.* (1998), creatinine is a product of nitrogen metabolism related to muscle contraction and its synthesis rate may be considered an index of endogenous protein catabolism. The result obtained showed creatinine values in bucks fed CSC and PL diet were within the normal range of blood creatinine (0.9-2 mg/dl) reported by Kabir and Pazdeh (2002), and 0.89-1.32 mg/dL reported by Mojabi (2000), while bucks fed RSC and BDG diets creatinine values were slightly below the normal range recommended and this could be due to lower weight gain recorded in bucks fed RSC and BDG diets respectively. This result is indicative of good metabolism of dietary protein and amino acids in building body mass by the animals used in this study.

Table 2: Blood metabolites of Red Sokoto bucks fed urea- molasses treated maize cob supplemented with concentrates of different protein sources

Parameters	Treatments				SEM	Ref. value
	CSC	PL	RSC	BDG		
Total protein (g/l)	59.70 ^{ab}	57.50 ^{bc}	60.60 ^a	55.40 ^c	0.12*	56 – 96
blood urea N (mg/dl)	32.13 ^a	31.37 ^a	31.70 ^a	27.23 ^b	1.81*	12 – 28
Creatinine (mg/dl)	0.93	0.93	0.83	0.83	0.11 ^{NS}	0.9 to 2.0
Glucose (mg/dl)	54.80 ^a	50.33 ^b	54.23 ^a	51.03 ^b	1.58*	40 – 100

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^{a,b,c} Means with different superscripts along same row differed significantly at 0.05% SEM=standard error of means, CSC=cotton seed cake, PL=poultry litter, RSC=Rosell seed cake, BDG=brewers dried grain,

CONCLUSION

It can be concluded that total protein for bucks fed CSC, PL and RSC were within the normal range while blood urea for bucks fed CSC, PL and RSC were above the normal range whereas glucose values were within the normal range recommended for a healthy goats.

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