Journal of Biology, Agriculture and Healthcare
ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)
Vol.4, No.13, 2014 www.iiste.org

Effect of Levels of Tephrosia Bracteolate (Guill Et Perr) on Minerals Balance in W.A.D Goats Fed Guinea Grass(Panicum maximum Jacq) with Concentrate

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Abstract
Sixteen west African Dwarf Goats (8 bucks and 8 does) were balanced for age,sex and weight (average of 5.79±0.60kg), to evaluate their mineral utilization . The animals were fed *Tephrosia bracteolata* based diets. They were allotted randomly to the following dietary treatments (*T. bracteolata, P. maximum,* Concentrate) namely,Tb20 as control, Tb40, Tb60 and Tb80for one hundred and twelve days; 14 day pre-growth adaptation, 84 days growth and 14 days digestibility (7 days adaptation and 7 days monitoring).. , Ca absorbed (gm) ranged from 0.64 (Tb) 20 to 1.57 (Tb80) and retention was from 0.62 (Tb20) to 1.56 (Tb80) which was partially linear, while for Tb20 and Tb80 had lowest $p < 0.05$ and highest ($p<0.05$) (0.27,027 and 0.47, 047) in gm respectively. Concerning Mg lowest (0.41, 0.40) and highest (0.67, 0.65) absorbed and retained was observed in Tb 20 and Tb 80 respectively. While Na was similar to trend observed in P (Tb 20;0.08, 0.08 and Tb 80; 0.14 0.14), K absorption and retention was lowest ($P<0.05$) in Tb 20 (0.44) and Tb40 (0.35) and Tb 80 (1.25) as well as Tb 80 (1.19) respectively. These results (all positive balance) exhibits majorly linear increment in absorption and retention with increase in *T.bracteolata* which might be due to leguminous properties in T.b that makes it possible. Adoptable and Adoptable technologies that are legume based and community driven must be sought for

Key words: Minerals-balance *Panicum maximum, Tephrosia bracteolata,* W.A.D-Goats

Introduction

The importance of forage legumes has been emphasized over the years and they form a very important parts of goats diets especially in the rural areas. The presence of mineral elements in animal feeds is vital for animal metabolic processes. Grazing or rural livestock from tropical countries do not receive mineral supplementation except for common salt (NaCl) and must depend almost exclusively upon forage for their mineral requirements (McDowell, 1985). Although, lack of energy and protein are the main limiting factors in livestock product. Minerals deficiencies also seem to limit various production and reproduction levels in animals, in that the role of trace elements in the production and welfare of grazing animals is a key feature of sustainable agricultural systems .Tephrosia being a legume has all the nutrients in almost complete and balance quantity (Protein, Energy, Vitamins and Minerals) and also phyto-oestrogens. These species have wide adaptability and biodiversity which can annual or biennial depending on habitat and can established through seedling recruitment (Daniel 1871). Guinea grass (*Panicum maximum*) is a widely distributed tussock lump forming grass that grows best on warm frost-free areas. It is considered the best grass for ruminant production, it is highly relished by goats, readily available and stimulates ruminal microbial growth (Ajayi *et al*.,2005).hence various works have been done in terms of performance characteristics of goats(Adeloye ,1994and Anugwa *et al.,* 2000) but there is little or no work on mineral utilization by goat of this herbage with concentrate

Materials and methods

Experimental site: The experiment took place at the goat research section of the Rocky-feller teaching and research farm, University of Ibadan (Forest- savannah transition zone in south-western Nigeria, at 7° 27'N and 3°45'E at an altitude of between 200 and 300 meters above sea level and the climate is modified sub-humid type).
Pen Management: The pens and metabolism cages were swept and dusted and werelater fumigated with Dettol (Chloroxylenol®, a strong antiseptic/disinfectant) manufactured by Reckilt Benckiser Ogun state, Nigeria at the rate of 27ml to 1 liter of water and also with Diazintol {Diazinon Dimpylate® a strong and broad-spectrum insecticide (acaricides and larvicides) manufactured by Alfasan International B.V.Holland,at the rate of 2ml to 1litre of water}. A mixture of used automobile engine oil (1liter) and sieved wooden ash (250 grams) was basally applied on the floor to repel soldier ants,*dorylus spp*). Wood shaven were later spread on the floor of pens fortnightly applied and changed respectively until the end of the trial.
Feed Materials: *Tephrosia bracteolata* shoots were cut 50cm above the ground from Pasture and Range section of the farm and sorted into leaves (leaves plus fine stem up to 6mm in diameter,(Tarawali *et al*., 1995) and

Leaves were allowed to wilt over night before feeding.

Animals and Management: 10 Bucks and 10 Does of West African Dwarf Goats breed and aged between 4 and 7 months with an average initial live weight of 5.79±0.60kg were used in this intake, digestibility, growth and Nitrogen-balance experiment. The goats which were sourced from home steads and local markets within and outside the station's environs were on arrival lairaged in the adaptation pen where they were, prior to the commencement of the experiment, dewormed with Levaject (Levamisole® by SKM PHARMA PVT LTD, Bangolere India) Intramuscularly at the rate of 1ml/20kg bw, Ivomec (Ivermectin® by SKM PHARMAPVT LTD.India) subcutaneously at 1ml/40kg bw around the shoulder blade.Terroxy L.A®. (Oxytetracyclin long Acting by SKM PVT Ltd, India) at therate of 1ml/10kg was applied intramuscularly; they were also dipped in diazintol solution and finally vaccinated against *Pest-de-Petite Ruminante* using tissue culture Rinderpest vaccine (TCRV) at the rate of 1ml/animal subcutaneously (P.P.R) (Reynold,*et al.,* 1988) after which Tanvit (Multivitamin and anti stress bySKM Pharma Pvt Ltd India) was administered intramuscularly at the rate of 3ml/animal. During the 84 daylong growth trials, animals were housed in individual pens and they were adjusted for 14 days before the commencement of feed offered and leftovers recordings. During the last 2 weeks of the experiment, the animals were transferred to modified metabolism cages in preparedness for digestibility and the balance aspect of the experiment.

Experimental Design And Treatments:

The animals were divided into 5 groups (4 each) after balancing for age and weight .each group was randomly assigned to one of the five treatments and individual animals were completely randomised within the pens. Each animal was fed twice daily at 0800hrs GMT with both forages (4 % body weight of forage allowance) and at 1600 hours with concentrate (1% body weight of concentrate allowance). Both allowances constitute the feed allowance which was 5% body weight of the animal as shown in table 2. This feed allowance was constantly adjusted as animal weight changes. Each component was served in separate containers and fresh drinking was available daily *ad libitum*.

The live weight of goats were measured at the beginning of the trial and subsequently at weekly interval earth in the morning before feed was offered. Records of performance and criteria for this include feed intake weight change and mortality. To calculate daily feed intake, amount of *T bracteolata, Panicum maximum* and concentrated offered to, and refused by each animal were recorded daily and samples of feed offered collected three times per week. Samples for storing were even dry at 65^0c for 48 hours while that for dm determination was oven dried at between 100-105^0c for 48hours in forced draught oven at the beginning of the trial and subsequently at weekly interval early in the morning before feed was offered interval. Record of performance and criteria for this include feed intake, weight change and mortality; to calculate daily feed intake, amount of *T bracteolata, Panicum maximum* and concentrate offered to, refused by, each animal here recorded daily and samples of feed offered were collected three times per week. After the growth trial (1^{st} 72days) the goats were transferred to metabolism cages in the last 12days. This was made of welded wire mesh fitted with removable feeders and arranged for quantitative collection of faeces and urine separately but feeding and management remained the same as during the growth trial. The animals were left to adjust" in the cages for 5 days after which total faces and urine produced by individual animals were collected for 7days after. The amount of fed offered and refused were recorded daily and samples bulked separately for each animal for the entire collection period. Total faecal output and urine were collected in the morning before feeding and watering. The faeces were weighed fresh and 10% aliquots of each days collection for each animal were taken and prepared for storage and dm determination as mentioned earlier. Feeds and faceal samples were separately and thoroughly mixed and milled to pass through a 0.60mm sieve and stored in hermetically sealed containers prior laboratory analysis. The urine was collected in a plastic tray placed under each cage, 10ml of 10% concentrated H_2s0_4 was added to the tray daily to prevent microbial colonisation and prevent nh_4 volatilisation from the urine. The total output of urine for animal was measured and 10% aliquots were saved in stoppered numbered plastic bottles and stored at -5^0c until needed for chemical analysis.

Chemical/ Laboratory Analysis

Samples of feed components (*Tephrosia bracteolata, Panicum maximum,* Concentrate), feacal samples were oven dried for 48 hours at 65^0 C for DM determination and sub-samples were ground through 1mm sieve and stored in airtight containers. These sub samples, urine samples, faecal samples were digested using the wet method, digested with Concentrated Nitric acid (HNO_3) and Perchloric acid ($HClO_3$) at ratio of 5:1. the Concentration of Ca, Mg, Na, and k were estimated with atomic absorption spectrophotometer (model 490 Gallenkamp London) while phosphorus was measured colorimetrically according to Harris and Popati (1954), as described by the Association of Official Analytical Chemist (A.O.A.C., 2000.)

Statistical analysis

The resultant data were further subjected to analyses using one way Anova / completely randomized design using individual goats as replicates. Model sums of square were partitioned to test the linear and quadratic trend of inclusion/supplementation using the General linear models (GLM) procedures as package due S.A.S (2000) and significantly different means were separated using least significance difference at 0.5 level of probability in the same package , the general linear model is us defined thus

Xy= μ+αi+ eij

Xy= individual data generated from the fixed treatment (Tb 20- Tb80) effects

μ= grand population mean

Ai = the fixed treatments effects

Eij= the error (replicate) term within each treatment.

Table 1 Dietary Treatment Allocation

MATERAL	Tb20	Tb 40	T b 60	Tb 80
Tephrosia bracteolata (Tb)	20	40	60	80
Panicum maximum (Pm)	60	40	20	-
Gs +Ag (forage allowance)	4	4	4	4
4% body weight				
Concentrate 20%				
(1% body weight)	1	1	1	1
Forage + concentrate				
(feed allowance)				
5% body weight	5	5	5	5

Table 2 Concentrate Composition

Ingredients	Percentage
Sorghum brewery's waste (*DUSA)*	40.00
Corn offal	40.00
Palm Kernel cake	14.00
Borne Meal	2.00
Oyster shell	2.00
Salt	2.00

Result and discussion

Table 3 Ingredients Chemo-Metric

Nutrients (%DM)	*Tephrosia bracteolata*	Guinea grass	Concentrate (conce.)
Calcium	1.42	0.72	1.84
Phosphorus	0.29	0.35	0.79
Magnesium	0.68	0.49	0.77
Ca:p	4.90	2.06	2.33
Sodium	0.10	0.39	0.73
Potassium	1.25	1.36	0.62
Ca:Mg	2.09	1.47	2.39
P:Mg	0.43	0.71	1.03
Na:K	0.08	0.29	1.17
k/Ca+Mg	0.60	1.12	0.24

The values (%DM) of Mg (0.49:Pm-0.77: conce) Ca(0.72: Pm to 1.84conce) and P(0.29: Tb to 0.79: conce) were all sufficiently within the range required (Mg: 0.04-1.00, Ca: 0.18-1.04 and P:0.16-0.37) by goat. Similarly, k (%DM) and Na (%DM) values observed were 0.62 (conce)-1.36 (Pm) and 0.10 (Tb) as well as 0.73 (conce) respectively. They were also within or more than goat requirement range of 0.50-0.80 and 0.04 – 0.10 respectively (Ogungbesan *et al*, 2011[b])

Table 4: Calcium Balance By WAD Goats Fed Guinea Grass And Concentrate Supplemented With Increasing Levels Of *Tephrosia bracteolata*

	Supplementation level				SEM	probablity		
Parameters	Tb20	Tb 4	Tb60	Tb 80		L		Q
Calcium intake Gday $^{-1}$	0.89	1.18	2.57	2.05	0.67	x	-	xx
Calcium excretion Feacal(gd^{-1})	0.25	0.39	1.00	0.76	0.14	xxx	-	Ns
Urine (gd $^{-1}$)	0.02	0.06	0.01	0.03	0.00	xxx	-	Ns
Total (gd^{-1})	0.27	0.45	1.01	0.79	0.21	xxx	-	Ns
% of intake (Facial)	28.09	33.05	38.91	37.07	2.47	xx	-	x
(Urine)	2.25	5.08	0.39	1.46	1.15	xxx	-	Ns
Calcium absorbed Gd^{-1}	0.64	0.79	1.57	1.29	0.24	x	-	x
% of intake	71.91	66.95	61.09	62.93	5.16	x	-	x
Calcium refgined Gd $^{-1}$	0.62	0.73	1.57	1.29	0.31	x	-	x
% of intake	69.66	61.86	61.09	62.93	3.78	x	-	x
% of absorbed	96.88	92.41	100	100	4.83	Ns	-	Ns

abcd: means of the same row with different superscripts are significantly different ($P < 0.05$)
SEM: Standard Error of Mean
+: Level of inclusion calculated as percentage of total daily feed allowance of 50g DM kg -1 body weight.
#: Probability for Linear (L) and Quadratic (Q) trends
X: $p<0.05$; XX $P<0.01$; XXX $P<0.001$

Calcium Absorption and Retention: Absorption (g/day) of calcium showed ($P<0.05$) that Tb60 > Tb 80 (1.29) > Tb 40 (0.79) and Tb 20 (0.64) and Retention (%) of the same above trend ranged from Tb. 20 (0.62) to Tb 60 (1.56). Intake (g/day) of calcium was highest ($P<0.05$) in Tb 60 (2.57) followed by Tb 80 (2.09), and lowest was observed in T.b 20 (0.89). Highest apparent calcium observed in Tb20 reflects the advantages among others of legume which is efficient utilization of ion, although with smallest intake, this was also observed by Ogungbesan, *et al.*, 2011, Apparent retention was contrarily highest in T.b 60, which means more absorption takes place after digestion and also corroborates the findings of Reid, *et al*, (1987) and Robertson, *et al*, (1996) Who reported that higher intake lead to higher faecal and urinary excretion of minerals, though the T.b increment did not influence linearly the balance but no negative was recorded (Ogungbesan, *et al.*, 2011[a]). Various factors affect calcium (mineral) utilization, VIZ: plant factors; animal factors and fate of nutrient in-vivo (Hacker and Ternouth, 1987). In addition, vitamin D role in Ca. utilization cannot be ignored, calcium homeostasis is also regulated in a complex manner by parathyroid (PTH) and calcitonin by increasing and decreasing the serum level of calcium through a 'Push-pull feed back system' (Ogungbesan 2004).

Table 5 Phosphorus Balance In WAD Goats Fed Guinea Grass And Concentrate Supplemented With Increasing Levels Of *Tephrosia Bracteolata*

	Level of inclusion				SEM	Probability	
Parameters	Tb20	Tb40	Tb 60	Tb 80		L	Q
Phosphorus intake							
Gday $^{-1}$	0.28^{c}	0.31^{bc}	0.34^{b}	0.48^{a}	3.41	xxx -	Ns
Phosphorus excretion							
Faecal(gd^{-1})	0.01	0.01	0.01	0.01	0.00	Ns -	Ns
Urine (gd $^{-1}$)	0.00	0.00	0.00	0.00	0.00	Ns -	Ns
Total (gd $^{-1}$)	0.01	0.01	0.01	0.01	0.00	Ns -	Ns
% of intake (Faecal)	3.57^{a}	3.22^{a}	2.94^{b}	2.08^{c}	0.52	xxx -	Ns
(Urine)	0.00	0.00	0.00	0.00	0.00	Ns -	Ns
Phosphorus absorbed							
Gd^{-1}	0.27^{c}	0.30^{ab}	0.33^{ab}	0.47^{a}	0.10	xxx -	Ns
% of intake	96.43	96.77	97.06	97.92	0.38	xxx -	Ns
Phosphorus retained							
Gd $^{-1}$	0.27^{b}	0.30^{ab}	0.33^{ab}	0.47^{a}	0.07	xxx -	Ns
% of intake	96.43	96.77	97.06	97.92	1.83	xxx -	Ns
% of absorbed	100	100	100	100	0.00	Ns -	Ns

abcd: means on the same row with different superscripts are significantly different (P<0.05)
SEM: Standard Error of Mean
+: Level of inclusion calculated as percentage of total daily feed allowance of 50g DM kg -1 body weight.
#: Probability for Linear (L) and Quadratic (Q) trends
X: p<0.05; XX P<0.01; XXX P<0.001

Phosphorus: There was market (p<0. 05) linear increase in intake Tb20 (0.28) Tb80 (0.48). Similarly, absorption (g/day) and retention (g/day) followed the same trend that is Tb20 (0.27) to Tb20 (0.47) and (0.27) as well as (0.47) respectively. contrary to what was obtained in calcium utilization, there was increment in intake, absorption and retention in P utilization in relation to Tb levels (zero presence of elements in urine of all treatments). This is in accordance with the submission of N.R.C 1980 who established that phosphorus is absorbed in small intestine and that it is only when in excess that urinary excretion can occur. Also, sources ,intestinal pH, lactose intake, iron, aluminum, manganese, potassium, magnesium, fat etc. can (NRC 1980) affect phosphorus utilization/metabolism

Table 6 Magnesium Balance In WAD Goats Fed Guinea Grass And Concentrate Supplemented With Increasing Levels Of *Tephrosia Bracteolata*

	Level of inclusion				SEM	Probability	
Parameters	Tb20	Tb40	Tb 60	Tb 80		L	Q
Magnesium intake							
Gday $^{-1}$	0.64^{c}	0.62^{c}	1.77^{a}	0.90^{b}	0.18	x -	x
Magnesium excretion							
Feacal(gd^{-1})	0.23^{c}	0.22	0.64^{a}	0.33^{b}	0.09	x -	x
Urine (gd $^{-1}$)	0.01^{b}	0.03^{a}	0.03^{a}	0.02^{b}	0.00	x -	x
Total (gd $^{-1}$)	0.24^{c}	0.25^{c}	0.67^{a}	0.35^{b}	0.11	x -	x
% of intake (Faecal)	35.93^{ab}	35.48^{ab}	36.15^{a}	36.66^{a}	1.86	x -	x
(Urine)	1.56^{c}	4.83^{a}	1.69	2.22^{b}	0.34	x -	x
Magnesium absorbed							
Gd^{-1}	0.41^{c}	0.40^{c}	1.13^{a}	0.66^{b}	0.12	x -	x
% of intake	64.06^{b}	64.51^{b}	63.84^{bc}	73.33^{a}	1.94	x -	x
Magnesium retained							
Gd $^{-1}$	0.40^{c}	0.37^{cd}	1.10^{a}	0.55^{b}	0.16	x -	x
% of intake	62.5^{a}	59.67^{ab}	62.14^{a}	61.11^{a}	2.18	x -	x
% of absorbed	97.56^{a}	92.50^{b}	97.34^{a}	83.33^{c}	1.49	x -	x

abcd: means on the same row with different superscripts are significantly different (P<0.05)
SEM: Standard Error of Mean
+: Level of inclusion calculated as percentage of total daily feed allowance of 50g DM kg -1 body weight.
#: Probability for Linear (L) and Quadratic (Q) trends
X: p<0.05; XX P<0.01; XXX P<0.001

Magnesium: There was slight linear and quadratic effect of Tb inclusion on its intake (g/day) Tb40 (0.62) to Tb to (1.77)There was similar trend of intake reflecting on the pattern (g/day) of absorption Tb40 (0.40)to Tb60 (1.13)and retention (0.37)and (1.10) respectively. Irregular pattern was reported in terms of Tb increment in magnesium absorption and retention but was in line with the assertion of N.R.C 1980 that urinary excretion is almost usually a reflection of quantity of magnesium absorption and urinary excretion.

More so, its absorption could also be impaired by K, Ca, Mg, fat, sulphate, citrate and trans-aconitate (Church 1988) Specifically Mg metabolism can also be influenced by k/(Ca + Mg) factor which implies that abnormally high potassium content in the diet can interfere with absorption of Mg along the brush border of intenstine, its high ruminal solubility, hence rapid absorption in the rumen and the G.I.T. relative to others have been confirmed and catalogued by Van Eys and Reid, (1987) Master and white (1996) also indicated interaction of N.,P.,K., and Na on Mg absorption and Mg movement through the peritoneal cavity by " dialysis" against Ca free medium without necessarily reflecting on the serum chemistry of the animal

Table 7 Sodium Balance In WAD Goats Fed Guinea Grass And Concentrate Supplemented With Increasing Levels Of *Tephrosia Bracteolata*

	Level of inclusion				SEM	Probability		
Parameters	Tb20	Tb40	Tb 60	Tb 80		L		Q
Sodium intake								
Gday $^{-1}$	0.10^{bc}	0.14^{ab}	0.12^{b}	0.16^{a}	0.04	x	-	x
Sodium excretion								
Feacal(gd^{-1})	0.02^{a}	0.03^{a}	0.02^{a}	0.02^{a}	0.00	Ns	-	x
Urine (gd $^{-1}$)	0.00^{a}	0.00^{a}	0.00^{a}	0.00^{a}	0.0	Ns	-	Ns
Total (gd^{-1})	0.02^{a}	0.03^{a}	0.02^{a}	0.02^{a}	0.00	Ns	-	x
% of intake (Faecal)	20.00^{a}	21.42^{a}	16.66^{b}	12.50^{c}	1.52	xx	-	x
(Urine)	0.00^{a}	0.00^{a}	0.00^{a}	0.00^{a}	0.00	Ns	-	Ns
Sodium absorbed								
Gd-1	0.08^{c}	0.11^{b}	0.11^{b}	0.14^{a}	0.01	xx	-	Ns
% of intake	80^{c}	78.57^{d}	83.33^{b}	87.50^{a}	2.46	x	-	x
Sodium retained								
Gd -1	0.08^{c}	0.11^{b}	0.10^{bc}	0.14^{a}	0.01	x	-	x
% of intake	80^{c}	78.57^{d}	83.33^{b}	87.50^{a}	2.65	x	-	x
% of absorbed	100^{a}	100^{a}	100^{a}	100^{a}	0.00	Ns	-	Ns

abcd: means on the same row with different superscripts are significantly different ($P<0.05$)
SEM: Standard Error of Mean
+: Level of inclusion calculated as percentage of total daily feed allowance of 50g DM kg -1 body weight.
#: Probability for Linear (L) and Quadratic (Q) trends
X: $p<0.05$; XX $P<0.01$; XXX $P<0.001$

like in magnesium utilization, increment in *T.bractecolata* produced slight quadratic ($p<0.05$) response in term of intake (g/day)Tb 20(0.10)to Tb80 (0.16), absorbed Tb 20(0.08)to Tb80(0.14)and retained Tb20(0.08) to Tb 80(0.14). Trend observed in both quadratic and linear concerning Na absorption and retention from inclusion level stand point. The zero absence of this element in urine confirms the report of church (1988) that it is nearly completely reabsorbed from colon (Large intestine) of ruminants. He also stated that it's up take from small intestine is influenced by the presence of sugars and amino acids. (Church, 1988). Similarly, the ratio of Na:k is also vital in the absorption of both element, which should not be less than 0.1 .Na deficiency, although leads to "geophagia" which indirectly increases the iron intake, its functions in maintenance of the acid base balance and buffering system as well as its role in the absorption of nutrients especially protein cannot be over looked (Master and White, 1996).

Table 8 Potasium Balance In WAD Goats Fed Guinea Grass And Concentrate Supplemented With Increasing Levels Of *Tephrosia Bracteolata*

	Level of inclusion				SEM	Probability	
Parameters	Tb20	Tb40	Tb 60	Tb 80		L	Q
Potasium intake							
Gday $^{-1}$	0.63^{c}	0.84^{b}	1.54^{a}	1.65^{a}	0.18	xxx	- Ns
Potasium excretion							
Feacal(gd^{-1})	0.19^{c}	0.38^{a}	0.32^{b}	0.40^{a}	0.07	xx	- x
Urine (gd $^{-1}$)	0.04^{c}	0.11^{b}	0.23^{a}	0.06^{c}	0.01	x	- x
Total (gd $^{-1}$)	0.23^{c}	0.49^{b}	0.55^{a}	0.46^{b}	0.12	x	- x
% of intake (Faecal)	30.15^{b}	45.23^{a}	20.79^{d}	24.24^{c}	2.16	x	- x
(Urine)	6.34^{b}	13.09^{a}	14.93^{a}	3.63^{c}	1.04	x	- xx
Potasium absorbed							
Gd-^{1}	0.44^{b}	0.46^{b}	1.22^{a}	1.25^{a}	0.18	xxx	- Ns
% of intake	69.84^{b}	54.76^{c}	79.22^{a}	75.75^{a}	2.61	xx	- x
Potasium retained							
Gd $^{-1}$	0.40^{c}	0.35^{d}	0.99^{b}	1.19^{a}	0.07	xx	- x
% of intake	63.49^{b}	41.66^{c}	64.28^{b}	72.12^{a}	2.86	xx	- x
% of absorbed	90.90^{b}	76.08^{d}	81.14^{c}	95.20^{a}	1.64	x	- x

abcd: means on the same row with different superscripts are significantly different ($P<0.05$)
SEM: Standard Error of Mean
+: Level of inclusion calculated as percentage of total daily feed allowance of 50g DM kg -1 body weight.
#: Probability for Linear (L) and Quadratic (Q) trends
X: p<0.05; XX P<0.01; XXX P<0.001

Marked and pronounce effect (P<o.05) of level was observed in intake (g/day) Which was from Tb20 (0.63)to Tb80(1.65) and absorption (g/day),(P<o.05) Tb20(0.44) to Tb80 (1.25) while in terms of retention (g/day),but for the fact that Tb40 (0.35)was lower (P<0.05)than Tb20(0.40)and Tb60(0.99)linear trend would also have been exhibited The last electrolyte to be considered as indicated in Table is potassium, whose intake and absorption were linearly affected by supplementation levels of Tb, which is in line with the higher intake, faecal and urinary pattern (Ogungbsan 2004) in addition substantial urinary has been confirmed by Ammerman *et al.*, (1995). On a general note, mineral utilization can be affected by :

A Plant factors which involve i)mineral concentration ,ii) Mineral availability which cam be influenced by firm of whether organic or inorganic of bio crystallization. Because inorganic form is relatively difficult to be absorbed by the animal especially Ca and P (hydroxylapatite and whitlockite respectively) which is processes that occurred during the deposition or inorganic constituent and also a basic phenomenon of plant growth (McManus *et al.,*1979). Bio availability, also influences availability which is the amount and distribution within the various cell wall fraction in that if high mineral content is present in non- degradable fraction, like lingo-cellulosic portion, it will not be easily solubilised or released for absorption Serra, et al (1996) III, Digistibility of feed matrix and IV, Antagonistis and synergistis, like presence of phytates and oxalates which interfere with Mg, Ca, P. and Zn utilization (Ogungbesan *et al*., 2004).B, Animal factors Viz apetite, ruminal microbial population dynamics, genotypic/ phenotypic differences, age, sex, absorbability, physiological states. Production and reproduction demand, production type that influences activity and storage capacity which determine the "True absorptive coefficient" (T.A.C) that dictates retention, excretion and storage/functional pool nutrient mobilization in the entire animal system. (Jarrige, 1999).

Recommendation And Conclusion.

It can be recommended that since almost all nutrient utilization (retention) increased linearly with levels, other trials like carcass analysis, reproductive performance (fertility, gestation, lactation) be carried out on goats and other ruminants after in-vitro evaluation must have been done to ascertain volatile fatty acid production proportion. The advantages of legumes(High production of propionate, greater particle breakdown which lead to high ruminal out flow, low rumen fill and more time spent in eating and ruminating; Restriction of legumes lignifications to a ring of xylem, phloem cap and interbundular cells, minimises the physical restriction of all wall digestion in legumes:; High quantity of readily fermentable substrate available for microbial use after mastication with high stored starch that might increase the numbers of both holotrichs and entodiniomorphs; Posses dietary characteristics that promote relatively high numbers of protozoa many indirectly yield high ruminal fibrolytic activity by causing opposite bacterial shift through a process called "defaunation, consequently, high and fast digestibility lead to higher feed intake; Presence of estrogenic substance that leads increase demand and utilization of nutrient absorption, metabolism and utilization at tissues organ and cell levels.

Presence of Tannin (Hydrolysable and condensed) that increases the rumen –by- pass value of nutrients and lastly, antihelminthic property that eliminates endoparasites (especially round worms) that impair nutrient utilization and causes unthriftness in animals due to the presence of terpenoids in the forage legumes) were once again exhibited in the results, also as confirmed by some workers, *T.bracteolata* can be sole fed to goats where ever the situation arises without any adverse or, side or ill effects on the well being of animals feeding them

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