

## **Heamatological and Biochemical Characteristics of Yankasa Rams Fed Graded Levels of *Ficus Sycomorus* Leaf Meal in Semi-Arid Zone of Borno State**

**Shettima M., Jibrin T. A., Dantani M.**

Ramat Polytechnic Maiduguri | Email: [jibrintijjani@gmail.com](mailto:jibrintijjani@gmail.com)

**Abstract:** *The study was conducted to investigate the Hematological and Biochemical characteristics of Yankasa Rams fed graded levels of Ficus sycomorus Leaf Meal based diet. Sixteen (16) Yankasa Rams with an average weight of 28kg were allotted to four treatments. The treatments evaluated were 0%, 5%, 10% and 15% inclusion levels of the test ingredient in a complete randomized design (CRD). The result reveal no significance difference ( $P>0.05$ ) in Packed Cell Volume (MCV), Mean Corpuscular Haemoglobin (MCH) and Mean Corpuscular Haemoglobin Concentration (MCHC). However significance difference ( $P>0.05$ ) were obtained in Haemoglobin, Red Blood Cell and Mean Corpuscular Volume. However all the parameters evaluated were within the normal range values of a healthy sheep. It is concluded that inclusion of Ficus sycomorus leaves in the diet of Yankasa rams had no deleterious effect on the haematological and Biochemical parameters evaluated. It is recommended that further study on the feeding potential of Ficus sycomorus be conducted on other species of livestock to ascertain the feeding value of Ficus sycomorus.*

**Keywords:** *Ficus sycomorus, Yankasa Rams, Biochemical, Hematology*

### **Introduction**

#### **Background of the Study**

The cost of feed ingredients has increased tremendously over the years and this has been a source of worry for livestock producers. The contemporary issue in livestock management is the exorbitant cost of feeding stuffs. This is obviously a matter of concern because of the fact that feeds account for about 60-80% of the recurrent expenditure of intensive animal production system (Onifade, 2002). Astronomical increase in population of Nigeria (140,431, 790 million) (NPC, 2006) is not backed by a commensurate increase in the production of grains and other crops that are also consumed by man. In view of the fact that feeding problems constitute the single largest problem of ruminant animal production in Nigeria, it is important to consider the use of alternative feed ingredients in order to reduce cost of production and optimize profit for improved livestock performance enterprise (Boda, 2003).

These feed ingredient. It is obtained from plants, trees, shrubs and animal by-product. The cost of feed ingredient has increased the shortage of feed has increase particularly during dry season, limit the animal output in most part of the country (Kumar, 2003).

The available feed resources cannot meet the nutritional requirement of animals throughout the year in many parts of the country either due to inadequate supply or quality of the feed. This problem is even more aggravated in arid and semiarid areas giving the erratic and unreliable rainfall pattern. (Herson, 2008).

Low and erratic rainfall severally affects the growth of crop residue available for livestock feeding. Livestock feed resources in Nigeria are mainly natural grazing and crop residues, which are low in energy and protein leading to significant limitation in the production of sheep (Okoli et al, 2002).

As the population ahead of the animal supply there is every need to burst animals supply there is every need to burst animal production through intensive and extensive livestock rearing. Ruminant feed scarcity in the dry season lead to reduce growth of animal and reproductive performance. These problem may be directly associated with lower concentration of nutrient in their diet of semidried region of Borno State.

The objectives of the study were to assess the heamatological indices of Yankasa sheep fed graded levels of *Ficus sycomorus* leaf meal in semi-arid zone of Borno State

## **Material and Methods**

### **Study Area**

The experiment was conducted at Teaching and Research Farm of Ramat Polytechnic. Department of Animal Production Technology Maiduguri, Borno State of Nigeria. Maiduguri is located between latitude 11.5<sup>0</sup> and 12<sup>0</sup> north and longitude 13.5<sup>0</sup> and 14<sup>0</sup> east and attitude of 354m above sea level. The mean relative humidity range from 30% to 45% with minimum in February to May when it drops to as low as 10% in August.

### **Collection and Processing of Ficus Sycomorus Leaf**

The leaves of *Ficus sycomorus* were collected within the province of Mohammed Lawan College of Agriculture Maiduguri and its environs. The leaves were air dried on a concrete floor in a well ventilated room and later ground into finely particles until the commencement of the feeding trial.

### **Experimental Animals, Treatment and Design**

Four complete experimental diet A; B, C, and D were formulated, containing 0 (control) 5, 10, and 15% *Ficus sycomorus* leaf were used for this study. The net composition of the experimental diets is shown in table 1. All the ingredients used except *Ficus sycomorus* leaf were purchased from the Maiduguri livestock market. Sixteen Yankasa rams were allotted randomly to the four treatment diets in a complete randomized design (CRD) with four animals per treatment.

### Management of Experimental Animals

Prior to the commencement of the experiment the experimental animals were treated against endo and ecto parasite using ivometic and Albendazole (R) according to the manufacturer's recommendation.

**Table 1 for the Proportion of feed Ingredient Diet (%)**

Ingredients (%)	A control	B	C	D
Ficus leaves	0	5	10	15
Maize	8	8	8	8
Groundnut haulms	15	13	10	8
Cowpea husk	15	15	15	16
Maize Bran	27	27	23	19
Cotton seed cake	18	13	15	15
Rice milling waste	15	17	17	17
Bone meal	1	1	1	1
Salt	1	1	1	1
Total	100	100	100	100

### Data Collection

Blood sample were collected from the jugular vein of apparently 16 healthy sheep of same breed. The blood in the syringe was gently transferred into a plane sample bottles and place in a slanted position at ambient temperature for one (1) hour. Each sample was labeled accordingly. The blood sample was pack and transported to Federal University of Maiduguri for laboratory analysis.

### Data Analysis

The data generated was subject to analysis of variance (ANOVA) using general linear model with statistix 10. Least significant difference (LSD) at 5% probability level was used to separate means that showed significance difference between treatments.

### Result and Discussion

The result of Haematological characteristic of Yankasa rams fed with graded levels of *Ficus sycomor* leaf meals is presented in Table 2 below.

**Table 2: Heamatological Characteristic of Yankasa Rams Fed Graded Levels of *Ficus Sycomorus***

	A	B	C	D	SEM
Packed cell volume (%)	0.0029 <sup>a</sup>	0.0031 <sup>a</sup>	0.0024 <sup>a</sup>	0.003 <sup>a</sup>	0.0289
Haemoglobin (g/d)	9.600 <sup>b</sup>	10.300 <sup>a</sup>	8.267 <sup>c</sup>	10.000 <sup>ab</sup>	0.1364
White blood cell (10 <sup>3</sup> /mm <sup>3</sup> )	8.2100 <sup>d</sup>	8.6000 <sup>c</sup>	9.000 <sup>a</sup>	8.8000 <sup>b</sup>	0.0271
Red blood cell (10 <sup>6</sup> /mm <sup>3</sup> )	9.4000 <sup>c</sup>	9.2000 <sup>d</sup>	9.8000 <sup>a</sup>	9.6000 <sup>b</sup>	0.0289
Mean corpuscular volume (F <sup>1</sup> )	0.3100 <sup>a</sup>	0.3367 <sup>a</sup>	0.2200 <sup>b</sup>	0.3033 <sup>ab</sup>	0.0256
Mean corpuscular Haemoglobin (g/di)	337.57 <sup>a</sup>	371.33 <sup>a</sup>	343.17 <sup>a</sup>	339.47 <sup>a</sup>	32.388
Mean corpuscular Haemoglobin concentration (G/D1)	3375.9 <sup>a</sup>	3380.0 <sup>a</sup>	3431.1 <sup>a</sup>	2394.9 <sup>a</sup>	620.07

a, b, c, & d means within the same row bearing difference superscript differs significantly (P<0.05)

#### **Packed cell volume (%)**

The result reveals that the packed cell volume (PCV) showed there were no significant (P>0.05) difference among the treatment means. T<sub>2</sub> (0.031) recorded the highest value and T<sub>3</sub> (0.003) recorded the lowest value. The PCV values were within the range of (0.04-0.08) as reported by (Taway, 2004) which is also in line with the range values of (26.04±32.01) reported by (Latime, *et al*, 2004) who Fed Ensiled maize stover and concentrate supplements without any health hazard as regard.

#### **Haemoglobin (g/d)**

The values for the heamaglobin (HB) showed that there were significant (P<0.05) difference among the treatment means. The T<sub>2</sub> (10.300) recorded the highest value, and T<sub>3</sub> (8.267) recorded the lowest value. The HB values range (8.267-10.300) fall within the range value (5.6±0.62) in sheep as reported by (Egbeniyyi, 2000). The HB is good indicator of the physiological status of the animals.

#### **White blood cell (10<sup>3</sup>/mm<sup>3</sup>)**

The values for the white blood cell (WBC) showed that there were significant (P<0.05) difference among the treatment means. The T<sub>3</sub> recorded the highest value (9.00) and T<sub>1</sub> recorded the lowest value (8.21). However all the treatments were fall above the normal range value of (5.80±0.29) as reported by (Yakub, 2001). The values reported in this study were lower than (20.3-0.93) reported by (Isidahomen *et al*, 2011) who Fed Yankasa rams with sorghum stover supplement with graded levels of poultry dropping. White blood cell (WBC) is an indicator of immune response to infections in animals.

### Red blood cell ( $10^6/\text{mm}^3$ )

The values for the Red Blood Cell (RBC) showed that there were significant ( $P < 0.05$ ) difference among the treatment means. The  $T_3$  (9.8000) recorded the highest value and  $T_2$  (9.2000) recorded the lowest value, the RBC fall within the range of  $(7.80 \pm 0.62)$  in sheep. The values were similar with  $(5.07-9.01)$  reported by (Coles, 2004) who Fed chicken with the difference processed of soya bean waste. The red blood cell (RBC) is an indication that the feed was not toxic to the animals.

### Mean corpuscular volume ( $T_1$ )

The values for the mean corpuscular volume (MCV) showed that there were significant ( $P < 0.05$ ) difference among the treatment means. The  $T_2$  0.3367 recorded the highest value and  $T_3$  (0.2200) recorded the lowest value. All the treatment means are below to the range value  $(38.00 \pm 3.21)$  as reported by (Compbell, *et al*, 2003). Mean corpuscular volume (MCV) is an indication of the average volume of blood cells.

### Mean Corpuscular Haemoglobin (MCHg/di)

The values for the mean corpuscular haemoglobin (MCH) showed that there were no significant ( $P > 0.05$ ) difference among the treatment mean. The  $T_2$  (371.33) recorded the highest value  $T_1$  (337.57) recorded the lowest value. The MCH range values recorded were higher than the range values of  $(13.2 \pm 1.04)$  and  $(28.8-31.3)$  reported by (Tambuwal, *et al.*, 2002) and (Isidatimen *et al.*, 2011) respectively. The differences could be due to the environmental factors.

### Mean Corpuscular Haemoglobin Concentration (MCHC)

The values for the MCHC showed that there were no significant ( $P > 0.05$ ) difference among the treatment means. The  $T_3$  recorded the highest value and  $T_4$  recorded the lowest value. The MCHC values range  $(239.9-343.1)$  were higher than the range value of  $(2.8 \pm 0.44)$  reported by (Awodi *et al.*, 2005) who Fed sheep with sorghum supplemented with sun-dried poultry dropping diet. MCHC are very important in the diagnosis of anemia.

The result for the biochemical characteristic of Yankasa rams fed graded levels of *Ficus syncomorus* leaf meal is presented in Table 3.

**Table 3 Biochemical characteristic Yankasa Rams fed graded levels of *Ficus syncomorus***

	A	B	C	D	SEM
Direct Dilirubin (md/dl)	0.8000 <sup>d</sup>	0.9000 <sup>c</sup>	1.3000 <sup>b</sup>	2.0000 <sup>a</sup>	0.0289
Congygbilirubin	2.2000 <sup>d</sup>	3.2000 <sup>c</sup>	4.000 <sup>b</sup>	4.2000 <sup>a</sup>	0.0289
Total bilirubin (Mol/L)	59.000 <sup>d</sup>	60.000 <sup>c</sup>	64.000 <sup>b</sup>	68.000 <sup>a</sup>	0.0289

Albumin (g/l)	29.000 <sup>d</sup>	30.000 <sup>c</sup>	35.000 <sup>a</sup>	34.000 <sup>b</sup>	0.0289
Globulin (g/l)	30.000 <sup>b</sup>	30.000 <sup>b</sup>	29.000 <sup>c</sup>	34.000 <sup>a</sup>	0.0289
Aspenate aminotransferase (lu/l)	77.000 <sup>a</sup>	42.000 <sup>d</sup>	52.000 <sup>b</sup>	51.000 <sup>c</sup>	0.0289
Alamineaminotranscferase (lu/l)	17.000 <sup>b</sup>	12.000 <sup>d</sup>	18.000 <sup>a</sup>	15.000 <sup>c</sup>	0.0289
Glucose (mmol/L)	2.3000 <sup>b</sup>	2.1000 <sup>c</sup>	2.7000 <sup>a</sup>	2.3000 <sup>b</sup>	0.0289
Cholesterol (mmol/L)	1.4000 <sup>d</sup>	2.000 <sup>b</sup>	2.2000 <sup>a</sup>	1.6000 <sup>c</sup>	0.0289

a, b, c, & d means within the same row bearing difference superscript differs significantly (P<0.05)

### **Direct Dilirubin(Md/d;)**

The result for the Direct dilirubin (DB) showed that there were significant (P<0.05) difference among the treatment means. The T<sub>4</sub> (2.000) recorded the highest value and T<sub>1</sub> (0.800) recorded the lowest value. The direct dilirubin DB values were fall within the range of (1.50±0.1) and (1.200-3.00) reported by (Ganong, 2005) and (Ramos, *et al*, 2003) respectively.

The values for the conjugated (CT) shows that there were significant (P<0.05) difference among the treatment means. The T<sub>4</sub> recorded the highest value and T<sub>1</sub> recorded the lowest value. The conjugated range values are from (2.2000-4.2000) and are slightly lower than the range values of (5.01±0.2) and (4.02-5.06) reported by (Thukwumere *et. al*, 2012) and (Sowande, *et al*, 2008) respectively.

### **Total bilirubin**

The values for the total bilirubin (TB) showed that there were significant (P<0.05) difference among the treatment means. T<sub>4</sub> (68.00) recorded the highest value and T<sub>1</sub> (59.00) recorded lowest value. However all the treatment means are statistically difference. The total bilirubin range from (59.000-68.000) were fall within the range value (93.0±0.26) reported by (Merck, 2010) who fed sheep with graded level of rumen content. The values suggested that there is adequate or sufficient protein or good quality protein in the diet.

### **Albumin (g/l)**

The values for the Albumin (ALB) showed that there were significant (P<0.05) difference among the treatment means. The T<sub>3</sub> (35.000) recorded the highest value and T<sub>1</sub> (29.000) recorded the lowest value. The albumin values range from (29.000-35.000) were fall within the range value (33.0±1.12) as reported by (Banerjee, 2007) which come in line with work of (Oluremi and Gridhar, 2004) who fed differently processed pearl millet on finishing broilers.

### **Globulin (g/L)**

The values for the globulin (GLB) showed that there were significant ( $P<0.05$ ) difference among the treatment means. The T<sub>4</sub> (34,000) recorded the highest value and T<sub>3</sub> (29,000) recorded the lowest value. The values obtained in this study were fall within the range value of  $(26.00\pm 0.56)$  as reported by (Borege, 2003). The values indicated that there is no any toxic effect on the *ficus sycomorus* leaves.

#### **Asperate aminotransferase (lu/L)**

The values for the Asperate aminotransferase (AST) showed that there were significant ( $P<0.05$ ) difference among the treatment means. T<sub>1</sub> (77.00) recorded the highest value and T<sub>2</sub> (42.00) recorded the lowest value. The values were fall within the range value of  $(47.0\pm 1.33)$  as reported by (Ologun, et al, 2006) who Fed sheep with fore-stomach Digesta and poultry litter waste.

#### **Alamine aminotransferase (lu/L)**

The values for the Alamine aminotransferase (ALT) showed that there were significant ( $P<0.05$ ) difference among the treatment means. T<sub>3</sub> recorded the highest value and T<sub>2</sub> recorded the lowest value. The ALT range values of (12.00-18.00) were slightly lower than the range value of  $(22.0\pm 0.74)$  as reported by (Lakpini, et al, 2002). The variation could be attributed to the differences in species.

#### **Glucose (Mmol/L)**

The values for the Glucose (GC) showed that there were significant ( $P<0.05$ ) difference among the treatment means. The T<sub>3</sub> (2.7000) recorded the highest value and T<sub>2</sub> (2.1000) recorded the lowest value, while T<sub>1</sub> and T<sub>4</sub> are statistically similarly. The result obtained in this study were fall within the range value  $(30\pm 1.05)$  as reported by (Tibbo, et al, 2004).

#### **Cholesterol (Mmol/L)**

The values for the cholesterol (CHL) showed that there were significant ( $P<0.05$ ) difference among the treatment means. The T<sub>3</sub> (2.000) recorded the highest value and T<sub>1</sub> (1.4000) recorded the lowest value. The values were similar to the range values of (1.400-2.2000) reported by (Chees brough, 2004) who tested the Effect of Gonadotrophin (Pergona) on haematological, immune leucocyte status and serum metabolites of mature yankasa rams treated for sperm production. The values suggested that there is no any health hazard on the animals.

#### **Conclusion**

In conclusion, the results obtained in this study for haematological and biochemical characteristic at the end of the experiment were within the recommended levels, therefore, the test diets did not adversely affect the animals and as such fit for growing rams consumption.

## References

- Awodi, S. Ayo, J.O., Atodo, A.D., and Dzende, T., (2005). Some Haematological Parameters and the Rhythocyte Osmotic Fragility in the Laughing, Dove (*Streptopella Senegalensis*) IniChineke, C.A. Pp. 481-494.
- Banerjee, G.C (2007) A Text Book of Animal Husbandry 8<sup>th</sup>Edn Published by RajuPrimlani for Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi. Pp. 1079.
- Boda, A.S. (2003). *Moracca Flora Malesiava* (17). 2.4
- Borege, A.M. (2003) The Complete Blood Cell Count A Powerful Diagnostic Tool: *Vet: Clin, North and Small Animal* Pp 3:1207-1222.
- Chees Brough M. (2004) *District Laboratory Practice in Tropical Countries Part 2* University Press Cambridge United Kingdom, 266-342.
- Coles W.F. (2004) *Veterinary Clinician Pathology 3<sup>rd</sup>Edn*. WB Standers Company Harcourt Brace Jovarinch Inc. Pp. 556.
- Compbell, J.R. Kenealy, M.D. Compbell K.L. (2003) *Animal Science. The Biology, Care and Production of Domestic Animals* McGraw Hill. USA Pp. 510.
- Egbeniyyi, T.N., Nwaosu, S.S. and Salami, H.A. (2002). Haematological Value of Apparently Healthy Sheep and Goats as Influenced by age and sex in Arid Zone of Nigeria *Afr. J. Biomed, Res.* 3:109.115.
- Ganong, W.F. (2005) *Review of Medical Physiology 22<sup>nd</sup> Edition* McGraw Hill Medical Publication Asias Pp. 439-516-532.
- Herson, M.H. (2008). Sheep production and Ruminant Digestion for leaves on Rumen small animal by *Animal Science* Pp. 624-632.
- Isidahamen, E.C. (2011) Haematological Parameters and blood Chemistry of Difference Species of Ruminant Animals in Humid tropical environment the Nigeria *Journal of Agriculture and Forestry* 3 (1) 85-90Pp.
- Isidahamen, E.C. Ikhimioya, I; Niidda, A.A. and Okoruwa, M.I. (2011) Haematological Parameters and Blood Chemistry of Different Species of Ruminant Animals in Humid Tropical Environment. *The Nigeria Journal of Agriculture and Forestry* 3 (1): 85-90.
- Kumar, A.M. Kishawi (2003). Nutritive value of ficus sycomorus leaf on small ruminant digestion in sheep production in *Animal Science Research* 9 (12) 106-110-115Pp.
- Lakpini C.A.M. Adamu (2002) *Manual for small ruminant production nation animal production research institute* 175-185.
- Lakpini, C.A.M. Adamu, A.M. Ehoche, O.W. and Gefu, J.O (2002). *Manual for Small Ruminant Production National Animal Production Research Institute*. vi-ix Pp.106-175.



Latime, K.S. (2004) Clinical Pathology Veterinary Laboratory Medicine 4<sup>th</sup>Edn. Iowa State University Press Ames Iowa USA 433-237.

Latime, K.S. Mahaffey E.A. and Prasse, K.W (2004) Clinical Pathology. Veterinary Laboratory Medicine 4<sup>th</sup> Ed. Iowa State University Press Ames, Iowa USA. Pp 124-152.

Merck, L.O. (2010) The Indigenous Sheep of Nigeria, *World Review of Animal Production* 15:51-61.

National Population Commission (census) 2006

Okoli, E.T. Kashawli – Lovento M. (2002) Chemical Composition of Ficus Leaf and Fruit have Sufficient How roughages and has satisfactory energy value. *By Animal Science UK* (11) 24-11-26.

Ologun, A.G, (2006) Heamatological parameters in sheep breeds and crosses in humid tropics *Pakistani Journal of Animal Science* 9 (11) 2012-2016. *JSSN: 1028-8880*.

Ologun, A.G. and Ikeobi, C.O.N. (2006) Haematological Parameters in Rabbit Breeds and Crosses in Humid Tropics *Pakistani Journal of Biological Sciences* 9(11): 2102-2106. *ISSN: 1028-8880*.

Oluremi and Gridhar, (2004) Physiology of Domestic Animals 8<sup>th</sup>Edn. Theca and London Cornstock Publishing Associate A Division of Nornell University Press. Theca and London Pp. 23-61.

Onifade, M.K. Solomon (2002) Agricultural Institute by Feed Analysis or Small Ruminant Animal Science Research 147-149PP.

Ramos, H.A Rodwell V.W. and Maye, P.A. (2002) Review of Physiological Chemistry 6<sup>th</sup>Edn. California Lanqe Medical Publisher Pp. 559-598 Retrieved from <http://en.wikipedia.org/wiki/cholesterol> on 23/10/2012.

Sowande, R.O. Szmunes W. Mosley JW. (2008) Avian Clinical Pathology Radiology, Parasitic and Infections Disease in Proceedings of America Animals Hospitals Association, South Bend, In. Pp. 144-185.

Tambuwal, F.M. Agale, B.M and Bangana, A. (2002) Haematological and Biochemical Values of Apparently, Healthy Red Sokoto Goats. In Proceeding of 27<sup>th</sup> Annual Conference Nigerian Society of Animal Production (NSAP), March, 17-21, 2012 FUTA Akure, Nigeria.

Taway, R.H. (2004). The Production of Cardiac and Renal Lesions in Rats by a Diet Extremely Deficient in Potassium *Animal J. Pathology* 18:29-39.

Thukwumere, O.A. Ewuda, E.O. and Lawal, T.T. (2012) Intake and Blood Metabolites in Red Sokoto Goats Fed Elephant Grass and Cassava Peel Silage *Journal of Production Advances* 2 (9) 420-428 *ISSN: 2251-7677*.

Tibbo M. Aragaw, K. Jibril, Y. Woldemeskel, M. Dawo F. Rege J.E.O (2004). Factors Affecting Haematological Profiles in three Ethiopian Indigenous Goat Breeds, Intern J. Appl Res. Vet. Med. 2 (4): 297-309.

Yakub, A. (2001) Haematological-Biochemical Findings of Indigenous Goats in Mubi Adamawa State Nigeria J. Agric. Sco, Sci, 6:14-16.

Yakub, A.M. (2001) Veterinary Hematology 3 edition Lea and Fediger, Philadelphia U.S.A. Portugal 16-21.

**Sponsored by TETFund**