iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** IV **Month of publication:** April 2020

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue IV Apr 2020- Available at www.ijraset.com

Comparative Study on Effect of Sex on Haemato-Biochemical Profiles of Indigenous Goat Capra Hircus

Shatabdee Panda[1], Sitaram Swain[2]
[1, 2]*Department of Zoology, School of Applied Sciences, Centurion University of Technology and Management, Odisha, India*

Abstract: ***Animal domestication is a relationship between animals and humans since ancient period. The variations in haematological and biochemical parameters establish a standard physiological values for different animals including livestock to develop management. This livestock management needs the haemato-biochemical profiles to assess the nutrition and health status of Capra hircus. This study has included ten healthy adult goats which include five bucks and five doe to determine the effects of sex on haematological and biochemical indices. Specific vials were used to collect blood samples to study the haematological parameters like total red blood cells, haemoglobin, white blood cells, packed cell volume, mean corpuscular haemoglobin, mean corpuscular haemoglobin concentration, erythrocyte sedimentation rate and platelet count. For serum biochemical analysis, the following parameters are included for this study like glucose, protein and cholesterol. The results showed that Hb, RBC, PCV, MCH, and Glucose were significantly higher in bucks than doe. In biochemical analysis glucose and protein values are showed significantly higher values for bucks than for female goats. Doe have a cholesterol level including high higher number of platelets, total WBC count, and differential leucocyte count (DLC) as compared to bucks. This study shows the comparative analysis of haematological and biochemical parameters in adult goats of the Black Bengal breed could be affected by sex.***
Keywords: Capra hircus, Haematological indices, Biochemicals.

I. INTRODUCTION

There are about five hundred seventy goat breeds in the world (Devendra and Liang, 2012). The total global population of goats is nearly about 1005.6 million and India ranks the fist in the world population of goats. Animal domestication is one of the symbiotic relationships between animals and humans (Zeder, 2015). In the welfare of rural families such as foodstuffs, sources of employment, livelihoods, agriculture, domestic animals play an significant economic and socio-cultural role. Black Bengal goats (*Capra hircus* Linnaeus,1758*)* are generally short height goats which are renowned for their adaptability, fertility, delicious meat, superior skin, extreme disease resistance and wide range of acceptability under adverse conditions. It has been proved by scientists that goat milk content is very similar to that of mother's milk (Belewu and Aiyegbusi, 2002).

Haematological analysis are considered as useful tools for the diagnosis of many diseases as well as in the causes of blood loss (Onyeyili et al., 1992; Togun et al., 2007; Etim et al., 2014). Haematological and serum biochemical indices are used as an important indicator for determining the health status of an animal in a particular environment (Khan and Zafar, 2005; Etim et al., 2014 and Waugh et al., 2001). Blood represents as pathological factor that exposed of animals to toxicants and other factors in toxicants (Olafedehen et al., 2010). Healthy animals with good performance gave better haematological profiles (Issac et al., 2013; Etim et al., 2014). The biochemical analysis act as a tool for determine the vitality of organ or system by different blood tests.This study will provide the basic information about the serum biochemical and haematological analysis of *Capra hircus*, which help in animal husbandry and live stock management.

II. MATERIALS AND METHODS

A. Study Aera

Black Bengal Breed is highly adaptable to Odisha, selected for the investigation of haemato-biochemical parameters between December 2019 and February 2020. A total of 10 goats, consisting of 5 males and 5 females, were selected randomly from the Khordha district of Odisha.

B. Collection Of Sample

Blood samples were collected during the morning time to reduce stress by the physician from the jugular veins of male and female goats. Samples were collected by using 2.5ml of syringe (Manufactured by: Hindustan Syringe and Medical Devices LTD,0.55×25mm). For haematology and biochemical analysis different vials were used during blood collection. All of the samples were transferred into ice box as quick as possible.

C. Haematological Analyses

For haematological analysis, blood samples were collected by using 2ml. of EDTA(Ethylenediaminetetraacetic acid, an anticoagulant) vial. Haematological profile comprised of total count of RBCs, WBCs, Hb%, Platelets, DLC, PCV, MCV, MCH, MCHC and ESR. Total RBCs and WBCs values were recorded by using haemocytometer. Hb% was carried out by Sahil's haemoglobinometer, PCV was measured by using centrifuge machine, MCV by using PCV and RBC values, MCHC was calculated from the measurement of Hb% and PCV values, MCH by using Hb and RBC values and ESR was measured by Westergren pipettes (Campbell,2006).

D. Biochemical Analyses

For another study of serum biochemical assessment, blood samples were collected by 2.5ml. Syringe and the sampls were allowed for clotting for separating serum in a vacutainer tube. After clotting the blood samples were centrifuged with 3000rpm for 15 minutes to separate the serum for further biochemical analysis include total protein, glucose and cholesterol by standard protocol.

During this study the data were collected and verified. These data were then data were interpreted in the data sheet. The haemato-biochemical parameters were expressed as mean ± SE in both male and female goats using the Microsoft Excel-2007 programme. The A descriptive statistics was carried out to know haematological and biochemical parameters according to different breeds of goat. The student t-test: Two samples assuming equal variance was applied to compare the results of different haemato-biochemical parameters between goats.

III. RESULTS

From the above analysis of this present study has showed that in haematological parameters, female goats had lower haemoglobin values than males (8±0.20 Vs 10.92±0.27 respectively), but no significant difference (P>0.05). Male goats had a tendency of higher RBC mean value than females (18.38±0.41 and 8.74±0.20 respectively). WBC mean value was higher female goats than males (11.96±0.30 and 5±0.29 respectively). Female goats had lower PCV than males (23.6±0.74 and 35.6±1.16 respectively), but no significant difference. In male goats, MCV, MCHC and MCH were lower than female goats. ESR had higher values in male goats than females (4and 2 respectively). Neutrophils, eosinophils, basophils, lymphocytes and monocytes were higher in females and their significant differences were: P>0.5, P>0.001, P>0.01, 0.003 and P>0.055 respectively. Neutrophils and monocytes had no statistically significant difference, whereas eosinophil, basophils and lymphocytes had statistically significant difference. Platelets were higher in number in bucks than does (3.38±0.18 and 3.86±0.46 respectively), but significant difference was P>0.005.In biochemical analyses, cholesterol level was higher in does than bucks (93.86±1.01 and 77.36±1.32 respectively), but no statistically significant difference. Does had lower glucose values than bucks (71.6±0.74 and 81.4±0.97 respectively). Male goats had significantly higher serum protein than female goats (P<0.05).

TABLE-1.Comparative haematological parameters of *Capra hircus*

.

Sl No.	Haematological Parameters	Black Bengal Goat	
		Buck	Doe
1	ESR (mm/hr)	4±0	2±0
2	PCV (%)	35.6±1.16	23.6±0.74
3	Hb(g/dl)	10.92±0.27	8±0.20
4	RBC (M/cumm)	18.38±0.41	8.74±0.20
5	MCH (Pg)	5.94±0.13	9.16±0.30
6	MCHC (%)	30.71±0.53	33.93±0.50
7	MCV (Fl)	19.8±0.48	26.63±1.03
8	Platelet (Lakhs/cumm)	3.38±0.18	3.86±0.46
Sl No.	Differential Leucocyte Count (DLC)	Buck	Doe
1	Lymphocytes (%)	58±2.42	67±1.07
2	Neutrophils (%)	34±1.58	46±0.81
3	Eosinophils (%)	4.2±0.58	7.2±0.37
4	Monocytes (%)	0.4±0.24	1.2±0.37
5	Basophils (%)	0	0.6±0.24
6	Total WBC Count (K/mm3)	5±0.29	11.96±0.30

TABLE-II Biochemical parameters of *Capra hircus* in both buck and doe

Sl no.	Biochemical Parameters	Black Bengal Goat	
		Buck	Doe
1	Cholesterol (mg/dl)	77.36±1.32	93.86±1.01
2	Glucose (mg/dl)	81.4±0.97	71.6±0.74
3	Serum Protein (gm/dl)	7.32±0.13	6.52±0.08

IV. DISCUSSION

Haematological parameters include the differential leucocyte count and different components of blood cells can be used for diagnosis of many diseases related to blood (Togun et al., 2007). Haematological profiles include white blood cells, mean corpuscular volume, mean corpuscular haemoglobin and mean corpuscular haemoglobin concentrations are important for determining the health status of farm animals. Erythrocytes are used as a carrier of haemoglobin and help during respiration. Generally red blood cells are involved in the transport of oxygen and carbon dioxide to the body. Thus, a reduced red tissues as well as the level of carbon dioxide returned to the lungs (Isaac et al., 2013; Etim et al., 2014). According to the study, the number of RBCs is more18.38±0.41 in buck than doe (8.74±0.20).

White blood cells provide the defence mechanism to fight against various infectious agent. Animals with low WBC than normal are susceptible to high risk of infection and more number of WBC count show disease resistance and enhance adaptability to local environmental (Soetan et al., 2013; Etim et al., 2014). It is found that during this study that WBC and its differentials are lower in bucks(5±0.29) than Doe(11.96±0.30).

Blood platelets are involved in blood clotting. During this study, it is found that female goats had a higher number of platelets. Packed Cell Volume (PCV), also known as haematocrit is the percentage of red blood cells in the blood (Purves et al., 2003; Etim et al., 2014). According to Isaac et al., in 2013 Increased PCV shows better transport of oxygen with nutrients. The PCV was higher in buck (35.6±1.16)than doe (23.6±0.74). Haemoglobin has the physiological function of transporting oxygen to the animal tissues for the oxidation of ingested food in order to release energy for the other body functions as well as transporting carbon dioxide from the animal body (Ugwuene, 2011; Soetan et al., 2013; Isaac et al., 2013; Etim et al., 2014).From above finding it is observed that that both the sexes of this species haslower haemoglobin, but buck has mean value 10.92 which is more than the mean value of doe 8.20. According to the previous report stated that PCV, Hb, MCH are major indices for the assessment of circulatory erythrocytes and are significant in the diagnosis of anaemia (peters et al,2011; and Etim et al., 2014). Mean Corpuscular Haemoglobin and Mean Corpuscular Haemoglobin concentration of blood is an indication of anaemia (Aster, 2004; Etim et al., 2014). The study described the lower levels of MCH and MCHC. Erythrocyte Sedimentation Rate (ESR) helps to detect inflammation associated with conditions such as infections, cancers and autoimmune diseases. Table-I described that, doe(2) have less ESR than bucks(4).

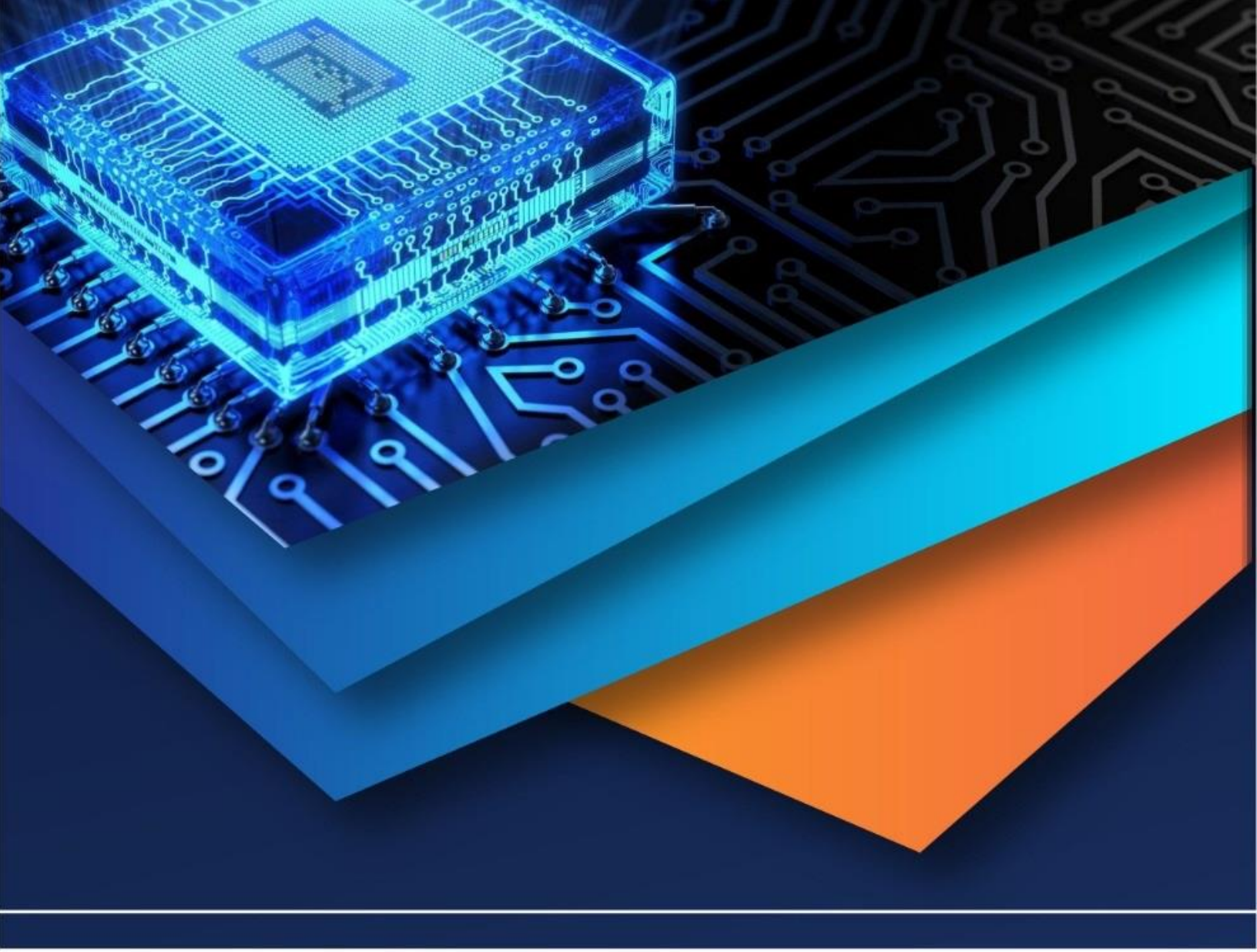
In this study, serum biochemical analysis has included cholesterol, glucose and protein of both the sexes of this sapecies.. Cholesterol level is directly proportional to the oestrogen level and indirectly proportional to the level of haemoglobin. Women generally have higher levels of HDL cholesterol than men because the female sex hormone oestrogen increases good cholesterol. In the experiment, females showed a non-significant higher level of cholesterol than male goats. Glucose is called an instant energy source. The glucose requirement is higher in males than females because males have a higher metabolic rate than females. Here, male goats showed higher glucose levels compared to female goats. Proteins are building blocks of life. According to the above study, Black Bengal male goats had higher protein levels than females, but a significant difference was $P>0.001$.

V. CONCLUSION

The study examined the effects of sex on the haematological and biochemical parameters of goats. Haemoglobin, RBC, PCV, MCH, Glucose were significantly higher in male goats (Buck), while MCV, MCHC and proteins were significantly higher. Platelets, WBC and its differentials were higher than bucks. The haemato-biochemical profiles of these species provide basic nutritional as well as the pathophysiological status in the emerging field of animal science. This will give a better pathway for animal research for the betterment of livestock.

REFERENCES

[1] Aster JC (2004) Anaemia of Diminished Erythropoiesis. Robbins and Cotran Pathologic Basis of Disease ,7th Edition, Saunders Co. Philadelphia,638-649.
[2] Belewu MA and Aiyegbusi OF (2002) Comparison of the Mineral Content and apparent biological value of milk from human, cow and goat. The Journal of Food Technology in Africa, 7(1) 9-11.
[3] Campbell T (2006) Clinical Chemistry of Mammals: Laboratory Animals and Miscellaneous Species. In: Veterinary Haematology and Clinical Chemistry.464-468.
[4] Devendra C and Liang JB(2012)Conference summary of diary goats in Asia: Current status, multifunctional contribution to food security and potential improvements. Small Ruminant Research,108(1-3),1-11.
[5] Etim NN, Williams ME, Akpabio U and Offiong EEA (2014) Haematological Parameters and Factors Affecting their Values. Agricultural Science. 2(1): 37-47.
[6] Isaac LJ, Abah G, Akpan B and Ekaette IU (2013) Haematological Properties of Different Breeds and Sexes of Rabbits. Proceeding of the 18th Annual Conference of Animal Science Association of Nigeria.24-27.
[7] Khan TA, and Zafar F (2005) Haematological Study in Response to Varying Doses of Estrogen in Broiler Chicken. International Journal of Poultry Science. 4(10): 748-751.
[8] Olafeden OC, Obun MA, Adewumi OO, Oladefedehan OA, Awofolaji OA and Adeniji AA (2010) Effects of Residual Cyanide in Proseed Cassava Peal Meals on Haematological and Biochemical Indices of Growing Rabbits.Proceeding of 35th Annual Conference of Nigerian Society for Animal Production.212.
[9] Onyeyili PA, Egwu GO, Jibike GI, Pepple DJ and Ohaegbulam JO (1992) Seasonal Variation in Haematological Indices in the Grey-breasted Guinea Fowl (*Numida mealagris gallata pallas*). Nigerian Journal of Animal Production. 18(2): 108-110.
[10] Peters SO, Gunn HH, Imumorin IG., Agaviezor BO and Ikeobi CO (2011). Haematological Studies on Frizzled and Naked Neck Genotypes of Nigerian Native Chickens. Tropical Animal Health Production. 43(3):631-638.
[11] Purves WK, Sadava D, Orians GH and Heller HC (2003) Life: The Science of Biology,7th Edition, Sinauer Associates and W.H. Freeman.
[12] Soetan KO, Akinrinde AS and Ajibade TO (2013) Preliminary Studies on the Haematological Parameters of Cockerels Fed Raw and Processed Guinea Corn (*Sorghum biocolor*): 49-52. Proceedings of 38th Annual Conference of Nigerian Society for Animal Production.
[13] Togun VA, Oseni BSA, Ogundipe JA, Arewa TR, Hammed AA, Ajonijebu DC, Mustapha F (2007). Effects of Chronic Lead Administration on the Haematological Parameters of Rabbit- A Preliminary Study. Proceedings of the 41st Conferences of the Agricultural Society of the Nigeria.341.
[14] Ugwuene MC (2011) Effect of Dietary Plam Kernel Meal for Maize on the Haematological and Serum Chemistry of Broiler Turkey. Nigerian Journal of Animal Science,13:93-103.
[15] Waugh A, Grant AW and Ross RJS (2001) Ross and Wilson Anatomy and Physiology in Health and Illness. Churchill Livingston, an imprint of Elsevier Science Limited.59-71.
[16] Zeder MA (2015) Core Questions in Domestication Research. Proceeding of the National Academy of Science of the United States of America. 112 (11): 3191-3198.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY