Choudhary Publishing Media

Indian Journal of Livestock, Veterinary and Animal Sciences
Volume 1 Issue 2
eISSN: 2582 9920

Effect of Season, Gender and Its Interaction on the Haematological Profile of Kosali Cattle of Chhattisgarh

Ashutosh Tiwari[1], G. K. Dutta[1], M. Roy[1], M. Gendley[2], R. Ramteke[2], Deepti K. Barwa[3]
[1]Department of Veterinary Physiology and Biochemistry, [2]Department of Animal Nutrition, [3]Department of Animal Genetics and Breeding, College of Veterinary Science and Animal Husbandry, Anjora Dau Shree Vasudev Chandraker-Chhattisgarh Kamdhenu Vihshwavidyalaya, Durg Chhattisgarh, India

***Author for Correspondence: Email Id: ashu_ndri@rediffmail.com**

ABSTRACT

A study was carried out in 100 Kosali cattle of either sex which were randomly identified from the plain regions of Chhattisgarh following RBC design to assess the effect of sex, season and its interaction on various haematological parameters and its other constituent component of blood in Kosali breed of cattle in Chhattisgarh. 5ml of blood samples were collected from jugular vein into collection tubes (20 IU of heparin /mL of blood) during different seasons (rainy, winter and summer) of year. Each sample was maintained at 4°C for analysis of hamatological profiles. Hematological profiles such as total red blood cells (TRBC), hemoglobin (HB), Hematocrit (Hct), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were estimated with automatic blood analyzer. Seasons significantly affected all the constituent of RBC in Kosali cattle. Similarly, sex also significantly influenced all the constituent of RBC (except HCT). Interaction of sex and season did not differ significantly. It can be concluded that sex and season also affected the hematological parameters in Kosali breed of cattle in Chhattisgarh.

Keywords: *Season, Kosali cattle, Chhattisgarh, hematology, RBC,*

INTRODUCTION

India is blessed with 41 registered diversified genetic groups of cattle which are adopted for different agro-climatic region of the country. Extensive work has been carried out on various aspects of different breeds of cattle under local climatic conditions. However, many other indigenous breeds such as Kosali cattle being reared by the rural population and nomads of Chhattisgarh remain unearthed regarding the manipulation of their productive and reproductive traits, thermo-tolerance and physiological indices. Kosali is the first registered cattle breed of Chhattisgarh. It is unique cattle, well adapted to the existing agroclimatic conditions of the region. They are resistant to many bacterial, viral and parasitic diseases and have good capacity of heat tolerance. They require less care, management and can thrive well under the poor feed stuffs available in the state.

The hematologial profile of an animal provides a reliable diagnostic tool for assessing the level of stress in an animal and its health status [1]. Seasonal variations in these attributes have extensively been studied in various breeds and alterations in them have been attributed to endogenous adaptive mechanisms [2]. Haematological values indicate stress, welfare and also adaptability to adverse environmental conditions [3]. Generally, it helps to develop the baseline information which further helps to assess the physiological, nutritional and managemental status of the animals and also help to diagnose and asses the health condition

[4, 5, 6]. The baseline information requires the establishment of range of reference values of different species of the animals in different regions as well as under existing environmental or climatically conditions and the deviation from the normal reference values defined the pathological values and the pathological condition of animals [4]. The haematological parameters of cattle are influenced by many factors like breed, age, sex, season, health and nutritional status of the animal, physiological conditions like lactation and pregnancy [7].

However, to the best of our knowledge, no such work has been reported for Kosali cattle. Since the Kosali cattle undertaken in the present study were apparently healthy which indicated the innate adaptability of the breed to the harsh climatic condition, therefore the specific objective was to assess the effect of seasonal and gender variations under local climatic conditions as an indicator of their health status. The result or data observed can serve as standard reference values for these animals in future in veterinary science and animal husbandry [8].

MATERIALS AND METHODS

In the present study, total of 100 Kosali Cattles (50 males and 50 females) from different plain regions of Chhattisgarh were selected. 5ml of blood samples were collected from jugular vein into collection tubes (20 IU of heparin /mL of blood) at morning between 7.00 and 9.00 AM during different seasons (rainy, winter and summer) of year. Each sample was maintained at 4ºC for analysis of hematological profiles. Hematological profiles such as total red blood cells (TRBC), haemoglobin (HB), Hematocrit (Hct), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) were estimated with automatic blood analyser.

The data obtained in the study were analyzed statistically following two-way analysis of variance (ANOVA) and significance difference was determined by Tukey's post hoc test. Effect of season and sex were also analyzed following standard method as per Snedecor and Cochran, 1996 and the interaction of season and gender was observed for the hematological parameter of Kosali cattle.

RESULT AND DISCUSSION

The effect of season, sex and its interaction on haematological parameter has been presented in table 1.

Highly significance ($p<0.01$) due to effect of sex on RBC and MCHC was observed during all the seasons of study. The RBC and MCHC values were recorded significantly ($p<0.01$) higher in male of Kosali cattle than female. MCV value differed significantly ($p<0.01$) during rainy season, however, it was non-significant during winter and summer season. Significantly ($p<0.05$) higher MCV value was recorded in female cattle than male in rainy season, however, it was non-significant in winter and summer season. MCH value shown significant ($p<0.01$) difference during winter season, however, it was non-significant during rainy and summer season. Significantly ($p<0.05$) higher MCH value was recorded in female cattle than male. Hb and HCT value did not differ significantly between genders during all the season of study. Significance ($p<0.01$ or $p<0.05$) difference was recorded due to sex effect for all the RBC parameters except HCT irrespective of season, however season affected significantly ($p<0.01$ or $p<0.05$) to all the haematological parameters in Kosali breed

of cattle irrespective of sex. No interaction effect of sex and season was observed for all the parameters in Kosali breed of cattle.

In the present study the mean erythrocyte count (RBC) of apparently healthy adult Kosali cattle was in the range of 6-8 ($x10^6$/µl) which was in accordance with Khillar cattle [9[(Shripad *et al.*, 2014) and Sahiwal cattle [10] (Kumar *et al.*, 2017). However, the erythrocyte count was higher in males as compare to female which was in agreement of the finding of Ochefu *et al.*, (2020). The hemoglobin concentration was differed non significantly but was higher in summer season the finding was in accordance of the study in Sahiwal cattle [11] (Parmar *et al.*, 2013) and the concentration of Hemoglobin in male cattle is non significantly higher compare to female [12] (Ochefu *et al.*, 2020).

The significant difference in MCV value was observed and was higher in rainy season conversely the higher level of MCV in Sahiwal cattle was reported in summer season [11] (Parmar *et al.*, 2013) and there is insignificant difference in two other seasons. The MCV value in female was higher significantly which was advocated by the findings of Ochefu *et al.*, (2020). The non significant difference was observed in HCT level in gender but the significant difference was due to season. The significant effect on MCH was observed in winter season in different gender however the non significant effect was in all seasons which was in accordance with the finding of Sahiwal cattle in which the non significant effect was observed in winter and summer season [11] (Parmar *et al.*, 2013).

The significant difference in MCHC value was observed in all seasons which was higher in winter season in Sahiwal cattle [11] (Parmar *et. al.*, 2013) and in genders also the value was higher in male as compare to female [12] (Ochefu *et. al.*, 2020).

Table 1. Effect of Season, Gender and its Interaction on Haematological Parameters (RBC) on Kosali Breed of Cattle in Chhattisgarh

Particulars	Rainy Season		Sig.	Winter Season		Sig.	Summer Season		Sig.	P value due to overall effects		
	Female	Male		Female	Male		Female	Male		Gender	Season	GxS
RBC	6.59 ±0.26^{b}	7.65 ±0.26^{a}	0.007**	6.85 ±0.13^{b}	8.04 ±0.15^{a}	0.000*	6.39 ±0.12^{b}	7.30 ±0.21^{a}	0.000**	0.001**	0.013*	0.802
Hb	9.24 ±0.32	9.99 ±0.32	0.112	10.38 ±0.25	10.69 ±0.34	0.479	10.38 ±0.23	11.12 ±0.32	0.074	0.018*	0.001**	0.712
MCV	56.87 ±2.68^{a}	48.67 ±2.09^{b}	0.020*	45.25 ±1.58	40.21 ±2.97	0.141	48.30 ±1.31	45.96 ±2.03	0.061	0.001**	0.001**	0.677
HCT	36.40 ±1.36	36.41 ±1.18	0.995	30.79 ±0.96	31.8 ±2.08	0.664	30.67 ±0.73	31.19 ±1.08	0.695	0.632	0.001**	0.930
MCH	14.62 ±0.81	13.48 ±0.68	0.289	15.27 ±0.45^{a}	13.46 ±0.55^{b}	0.015*	16.37 ±0.45	15.57 ±0.69	0.340	0.015*	0.005**	0.711
MCHC	32.69 ±0.52^{b}	35.55 ±0.49^{a}	0.000**	33.97 ±0.46	36.86 ±0.61	0.000**	33.97 ±0.46^{b}	35.89 ±0.47^{a}	0.006**	0.001**	0.039*	0.551

RBC= Red blood corpuscles, Hb= Haemoglobin, MCV= Mean Corpuscular Volume, HCT=Hematocrit, MCH= Mean Corpuscular Haemoglobin, MCHC= Mean Corpuscular Haemoglobin Concentration

*Note: Means $^{a\ b\ c}$ having different superscript in a row differ significantly **(P<0.01), *(P<0.05)*

CONCLUSION

It was observed in the present study that sex and season affected erythrocyte indices in Kosali cattle; however, interaction of sex and season did not differ significantly. It can be concluded that most of the analyzed hematological attributes were in normal range, which clearly indicates sound health of Kosali cattle populations in Chhattisgarh region of country.

REFERENCES

1) Fadare AO, Peters SO, Yakubu A, Sonibare AO, Adeleke MA, Ozoje MO, Imumorin IG. Physiological and haematological indices suggest superior heat tolerance of white-coloured West African Dwarf sheep in the hot humid tropics. Trop Anim Health Prod. 2012; 45:157–165.
2) Zecchini M, Barbieri S, Crimella C, Boureima K. Heat stress parameters in Azawak cattle (Bos indicus): four seasons of data collection. Ital J Anim Sci. 2009; 2:142–144.
3) Shil, SK, Shaikat, A H, Nath, BK, Khan, M FH and Khan, SA. Hemato-biochemical profile in lactating cows and their calves. Journal of Bangladesh Society of Agriculture Science and Technology. 2012; 9(1&2): 41-44.
4) Radostits O M, Gay C C, Hinchciliff K W and Constable P D. Veterinary Medicine. 2006. 10th Edn., Elsevier Science Ltd., USA.
5) Jezek J, Klopcic M and Klinkon M. Influence of age on biochemical parameters in calves. Bulletin of Veterinary Research Institute in Pulawy.2006; **50**: 211–14.
6) Mir M R, Pampori Z A, Iqbal S, Bhat Z I A, Pal M A and Kirmani M A. Hemato-biochemical indices of crossbred cows during different stages of pregnancy. International Journal of Dairy Science.2008; 3: 154–59.
7) Sattar A and Mirza RH. Haematological parameters in exotic cows during gestation and lactation under subtropical conditions. Pakistan Veterinary Journal. 2009; 29 (3): 129-132.
8) Kaneko J J, Harvey J W and Bruss M L (Eds). Clinical Biochemistry of Domestic Animals. 1997; Academic Press, New York.
9) Sripad K., Kowalli S. and Metri R., Hematological profile of Khillar breed of cattle in Karnataka. Veterinary World. 2014; Vol.7.pg 8
10) Kumar D, Kumar S, Gera S & Yadav J. Age wise comparison of hematological, biochemical and hormonal parameters of Sahiwal. International journal of agricultural science and research. 2017; vol. 7, issue 2, apr, 171-176
11) Parmar M. S., Madan A.K., Rastogi S.K. and Huozha R., Comparative Study of Seasonal Variations on Hematological Profile in Sahiwal Cows (Bos Indicus) and Murrah Buffalo (Bubalus Bubalis). Journal of Animal Research. 2013; v.3 n.2 p.167-171. December,
12) Ochefu, J., Ladokun, A. O., Smith, O. F., Iposu, S. O., Okwelum, N. and Omire, O. Breed and gender effects on blood profile of Muturu and Bunaji cattle in Benue and Ogun State, Nigeria. Nigerian J. Anim. Sci. 2020; Vol 22 (2):32-39.