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Haematological variations in blood infected by Trypanosomiasis evansi of Cattle and Buffaloes At Nagar Palika Nigam Indore Resham Kendra Gaushala Khajuriya, Hatod (M.P)

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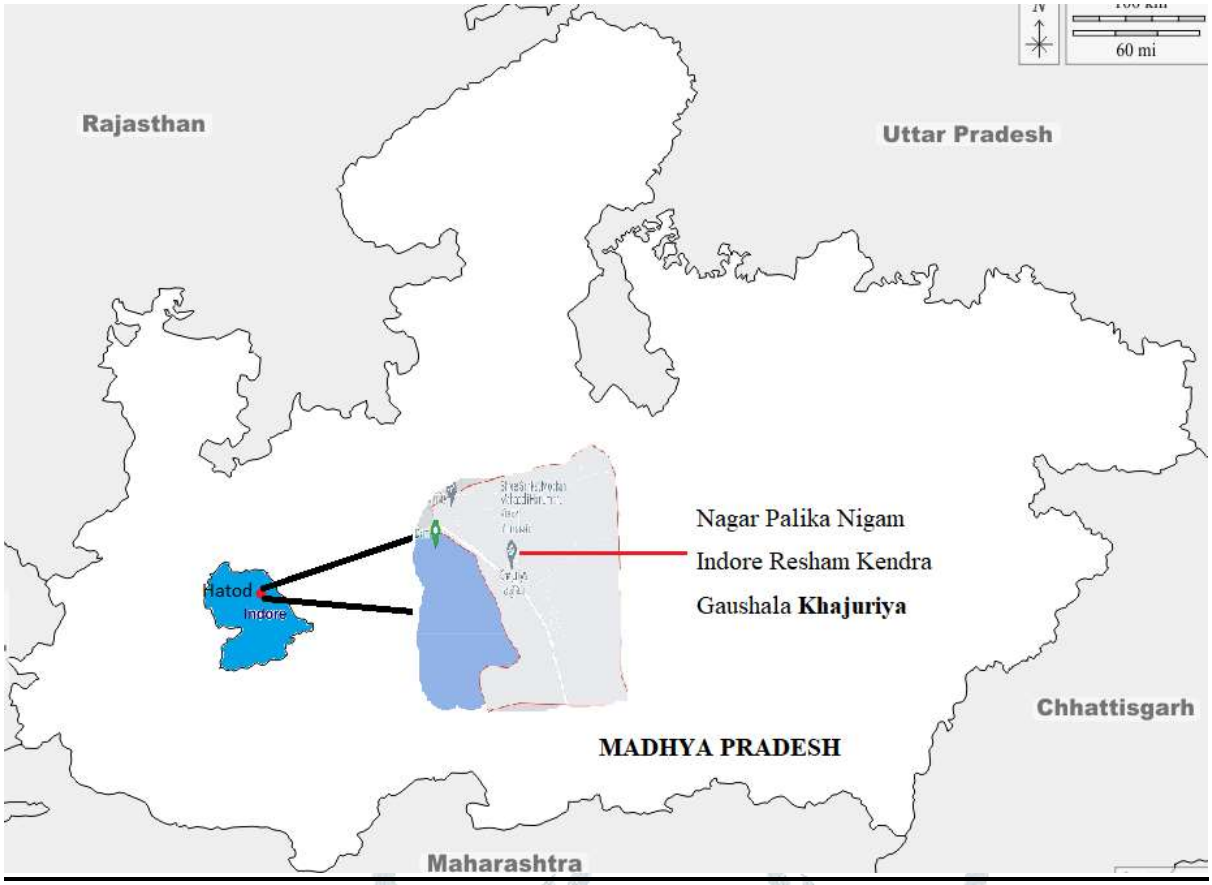
ABSTRACT

The Study was performed to assess the alteration in Haematological parameters in *Trypanosoma evansi* infected cattle and buffaloes in Nagar Palika Nigam Indore Resham Kendra Gaushala Khajuriya, Hatod (M.P). Total number of 105 animal were observed at this Gaushala (2014-2017) in winter, summer, rainy season; 21 cattle and 36 buffaloes were tested positive for *Trypanosomiasis*. The mean value of RBC, WBC, Hb, PCV, MCHC were found significantly decreased in both cattle and buffaloes compared to infected ones. All the values are significant at P<.01. MCV and MCH were found increased at this gaushala. Results indicates changes in Haematological parameters alteration in cattle and buffaloes due to which many types of dysfunctions are suspected in animals thus causing significant loss tolerated by farmers in Malwa region.

Keywords- Trypanosomiasis, RBC, WBC ,MCV, MCH, MCHC, Hb, PCV, Heamatology, Cattle, buffaloes.



Topographical Depiction: Location of Nagar Palika Nigam Indore Resham Kendra Gaushala Khajuriya, Hatod (M.P).

BACKGROUND

Trypanosomiasis (Surra) caused by the haemo-flagellate endo protozoan parasite *Trypanosoma evansi*, known as ('Surra') The Hindi word meaning is "rotten." as it is found the first pathogenic trypanosome *T. evansi* which was identified by Griffith Evanelisas, a British veterinary physician at dera ismail khan in erstwhile Punjab (now in Pakistan)in 1880 from the blood of Indian horses and camels. It is found that domestic and wild animals (**Pandya** *et al*., 2018). It is caused by vector born from (flies, leech, ticks, and insects) as haemoprotozoan disease. It is a major problem of health and productivity of domestic animals throughout the tropics and subtropics. It is mostly spread by mechanical transmission tabanid and tabanus flies. It was found that, more than 80% of the world cattle population is infected with ticks and flies (FAO, 1984), which is harmful to animals. It causes blood loss, damages to hide limbs, general stress and irritation, depression of immune function (**Ghosh** *et al*., 2007).

Parasite belongs to family Trypanosomatidae and are obligate hematophagous endoparasites of humans and livestock population which causes reduced milk production, reduced weight and transmission of pathogens like parasitic protozoa - *Babesia*, *Theileria*, *Anaplasma*, Rickettsia bacteria like *Ehrlichia* and arboviruses thus acting as an impediment to the growth of the livestock population (**Chhabra**, 1992 **Oliver**, 2004, **Barker and Murrell**,2004).

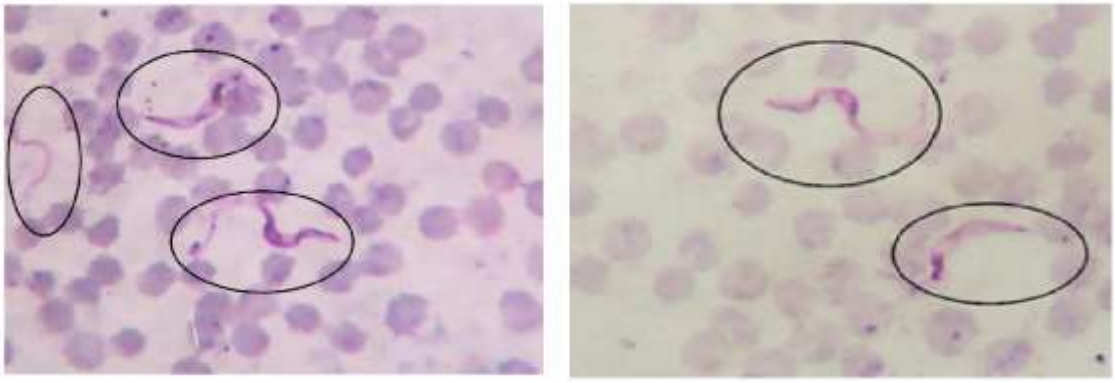


Photo: 1-2 Sample found positive for *Trypanosomiasis* infection

Trypanosomiasis (Surra) caused by the haem-flagellate protozoan *Trypanosoma evansi*, known as ('Surra') in domestic and wild animals (Pandya,2018). In rainy season tabanus flies infestation is very active due to favourable atmosphere for breeding. These disease has various effects on livestock, however, it is found in other mammals to like camels, cattle, buffaloes, sheep, mice, rabbit, also lion: from region to region. (Gill,1991).Surra is usually found across Asia, it affects livestock throughout Indian continent and ocean. (Singh 1989, Singh and Raisinghani 1990, Pathak 1999, Juyal et al. 2005). *Trypanosoma evansi* is prevalent disease that has symptoms such as emaciation, anaemia, oedema, pyrexia, reduced weight gains, lowered milk and meat yields, discharge flow from eyes, swelling on lymph nodes abortion mortality nervous complications head pricing, Clinical signs such as hyperthermia (105O F-107O F) was observed on cattle and bovine (Muraleedharan et al., 2008). Present study was conduct to study on bovine trypanosomiasis at Nagar Palika Nigam Indore Resham Kendra Gaushala Khajuriya, Hatod (M.P).

REVIEW OF LITERATURE

Related to this topic, the various literature has been published on *Trypanosomiasis evansi* infection in different parts of world and India has been particularly cited by previous researchers –

Mandal *et al*. (1977) observed the surra on bovines from Andhra Pradesh. These areas have more occupied cases of *T. evansi*. There are 183 bovines are infected, out of which, 12 cattle and 171 buffaloes were diagnosed through blood smear by Giemsa staining.

Lohr *et al*. (1985) Studied on buffaloes in Thailand were based on blood examination in these cases during the rainy season reported 20 percent infection in cattle.

Raina *et al*. (1985) sera samples collected from six buffalo calves and observed it approximately 70 days *T. evansi* analysed by indirect haemagglutination test and capillary tube agglutination test. Before seven days sera were negative but after seven days onwards sera were positive indirect haemagglutination test than after observation from 21 to 56 days was got 50% positive.

Padmaja et al. (2012) *Trypanosomiasis* incidence recorded cases are 69.23% temperature ($P<0.01$) and TEC decrease While TLC increase ($P<0.05$). Significant ($p<0.05$) blood glucose decreases.

MATERIAL AND METHODS

The proposed study work is based upon surveyed on cattle and buffalos in Nagar Palika Nigam Indore Resham Kendra Gaushala Khajuriya, Hatod Indore and were carried out in Deptt.of zoology, Holker science Govt PG collage (Indore).

Parasite identification and sample collection

Classification of *T. evansi* – According to **Linnaeus** (1758)

. Domain: Eukarya

. Kingdom: Protista

. Phylum: Sarcomastigophora

. Class: Zoomastogophorea

. Order: Kinetoplastida

. Family: Trypanosomatidae

. Genus: Trypanosoma

. Species: *T. evansi*

Blood sample (5 ml) was obtained from ear vain and jugular vein from suspect cattle's and buffaloes. The same age group was selected here for the observation. Stained blood smear fixed with methanol and stained with diluted Giemsa stain then after 30 min blood smear slide washing with tap water. The stained slides were examined under oil immersion lenses at 1000 x magnification. For microscopic test use light microscopic detect to parasite (Bevear and jung 1985).approximately 5ml blood stored in -20°c further biochemical investigation in to serum clot activator vacutainer tubes.

Parameter studied

The Haematological parameters were observed are blood Red blood cell(Rbc), White blood cell(wbc), Haemoglobin(Hb), Haematocrit/Pocket cell volume(PCV), Mean corpuscular volume(MCV), Mean corpuscular haemoglobin(MCH), Mean corpuscular concentration(MCHC) and were estimated by using hematology analyzer of collected samples.

haematological studied of the samples collected from cattle and buffaloes done by using semiautomatic analyser manufactured by, Erba company with the help of this Analyser found accuracy in results .

Parameters	Method	Formula
Red blood cells	Standard method by Haemocytometer	$\frac{\text{Number of cells counted x dilution factor x 5}}{\text{Volume (0.1)}}$

	and calculated by formula-	
White blood cell	Standard method by Haemocytometer and calculated by formula	No. of cells in 1 large square x Dilution factor Volume factor (0.1)
Haemoglobin	Sahil's Haemoglobinometer	Hb content (in grams) X 100 14.5
Haematocrit/Pocket Cell Volume	Standard method by Haemocytometer and calculated by formula	Column of packed red cell (X mm) X 100 Total column of blood (100 mm)
Mean Corpuscular Volume	Standard method by Haemocytometer and calculated by formula	MCV =10 X Haematocrit (%) RBC Count (millions/µL)
Mean Corpuscular Haemoglobin	Standard method by Haemocytometer and calculated by formula	MCH= 10 X Haemoglobin (g/dl) RBC Count (millions/µL)
Mean Corpuscular Concentration	Standard method by Haemocytometer and calculated by formula	MCH=100 X Haemoglobin Haematocrit (%) It reporting units is g/dL.

Table-1: Details about studied haematological parameters.

STATICAL ANALYSIS

The data obtained in present investigation were taken as triplicate and expressed as mean ±SD.Student's t-test was also used to compare the mean data between normal and T. evansy infected cattles and buffaloes(GraphPad Software Instat, 2003).

Haematological Parameters	Normal Cattle Mean ± S.D	Infected Cattle Mean ± S.D	T Values	Normal Buffaloes Mean ± S.D	Infected Buffaloes Mean ± S.D	T Values
RBC($x10^6/\mu L$)	6.24 ± 0.0361	4.18±0.0200	**77.86**	7.64±0.0100	4.56±0.0458	**106.69**
WBC($10^3/\mu L$)	8.26±0.0361	4.22±0.0529	**40.94**	10.62±0.0200	5.78±0.0400	**159.34**
Hb(g/dl)	11.26±0.2517	8.4±0.4000	**32.50**	12.40±0.2646	7.84±0.0200	**32.13**
PCV(in%)	28.20±0.200	21.40±0.346	**58.88**	29.46±0.0503	22.56±0.0400	**237.21**
MCV(FL)	45.20±0.0600	51.20±0.0404	**69.61**	38.56±0.0529	49.48±0.0601	**221.70**
MCH(pg)	18.04±0.040	20.08±0.0346	**145.49**	16.23±0.0520	17.20±0.1102	**56.36**
MCHC(g/dl)	39.92±0.0693	39.26±0.0551	**149.29**	42.08±0.0529	34.75±0.0500	**380.46**

All values are significant at P<.01

Table-2: Showing average values of studied haematogical parameters in normal and T. evansy infected Cattles and Buffaloes Nagar Palika Nigam Indore Resham Kendra Gaushala Khajuriya, Hatod Indore.

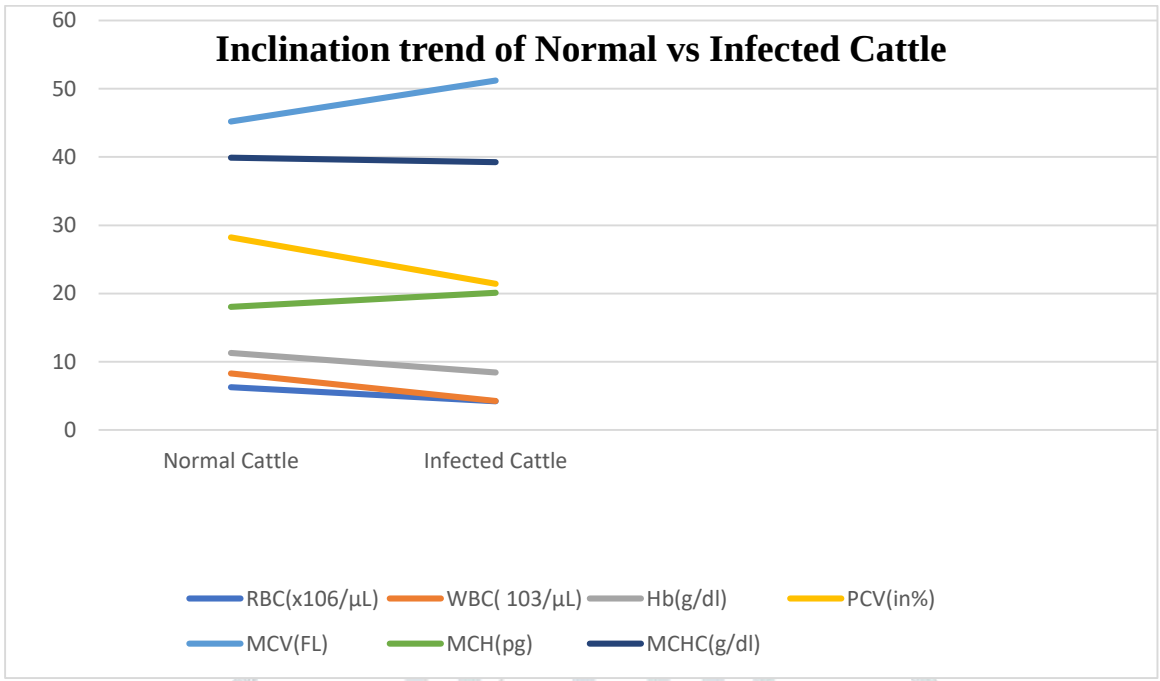


Fig 1. Haematological Parameters(ascend/descend) in Normal and *T. evansi* Infected Cattle

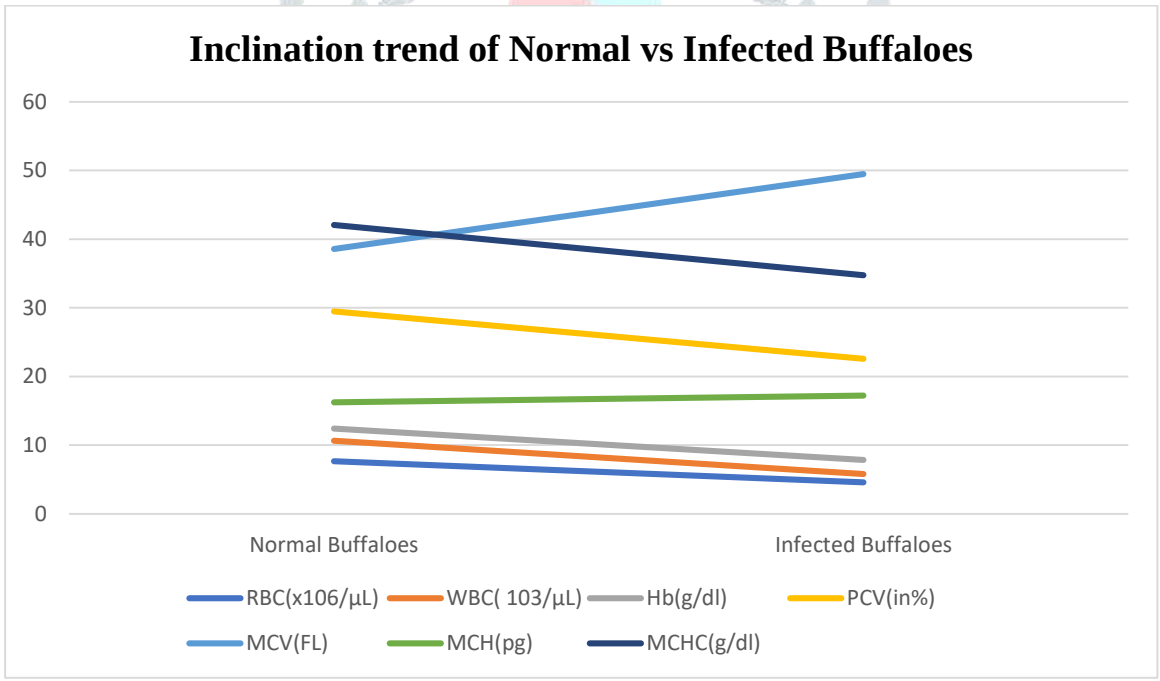


Fig 2. Haematological Parameters(ascend/descend) in Normal and *T. evansi* Infected Buffaloes

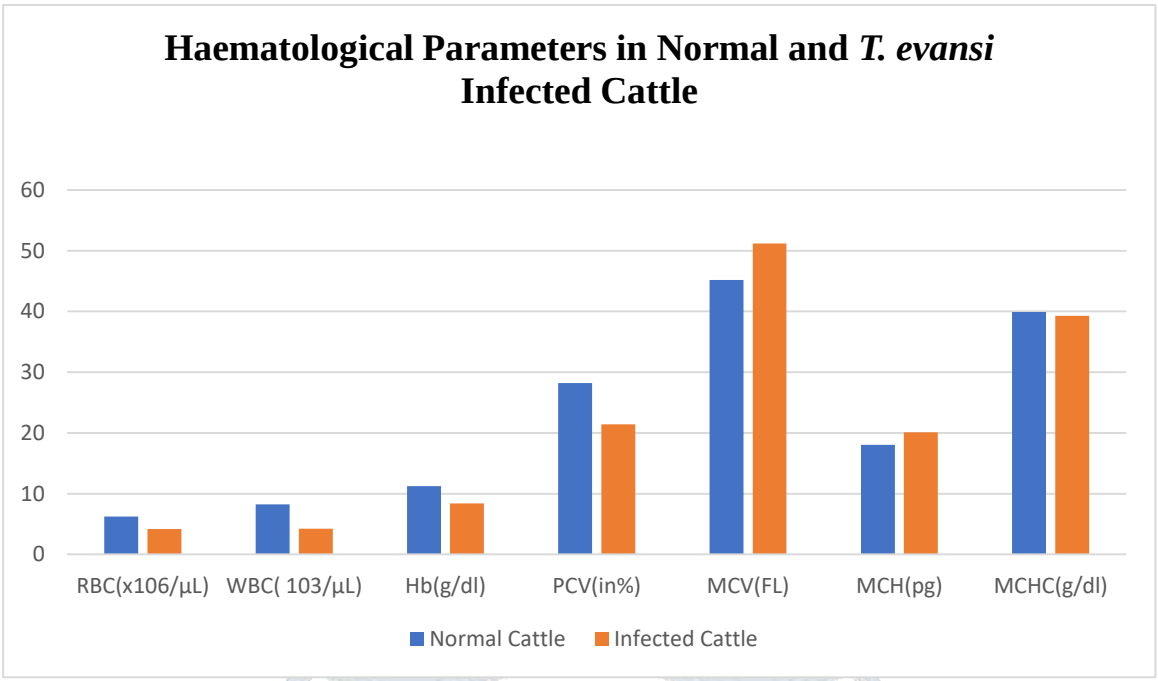


Fig 3. Showing Average Values respectively of parameters

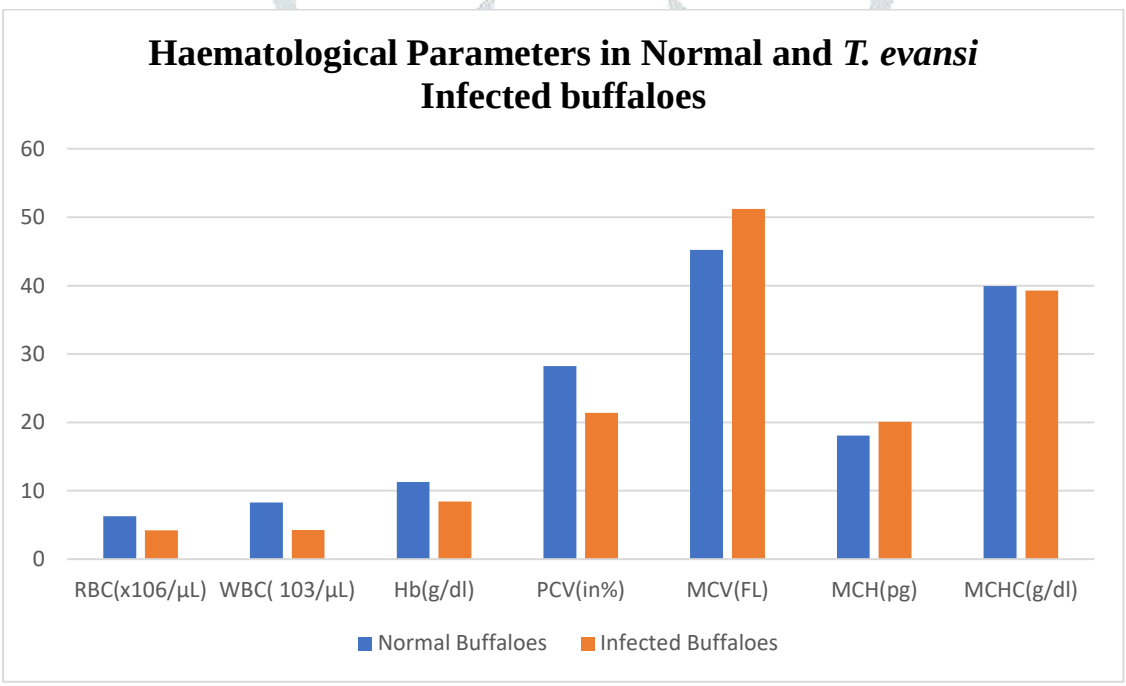


Fig 4. Showing Average Values respectively of parameters

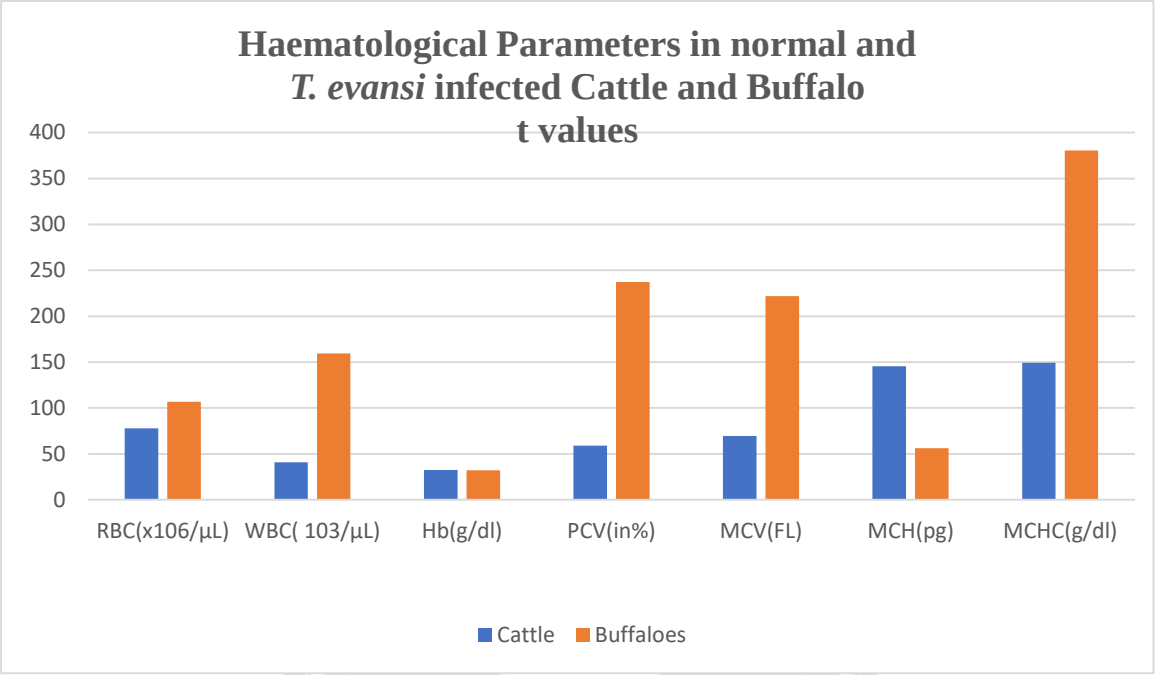


Fig 5. Showing Average Values of t values respectively parameters

RESULT AND CONCLUSION

In present investigation RBC, WBC, Hb, PCV, MCV, MCHC has been estimated. The MCV and MCH blood parameter was found to be increased (P<0.01) and other blood parameters as RBC, WBC, Hb, PCV, MCH, MCHC were found to be decreased in both. *T. evansi* infected cattle and buffaloes as compared to normal cattle and buffaloes in, Indore Nagar Palika Nigam Indore Resham Kendra Gaushala Khajuriya, Hatod.

However, the value of MCH, MCHC, content was found to be significantly decreased in *T. evansi*-infected animal as compared to healthy ones (P < 0.05) and also these values decreased continuously on progression of parasitaemia**(D.K Sharma et al,.2000)**. A significant decreased RBC, WBC, Hb, PCV, decreased (P<0.05) **Choudhari et al (2000).** Similar results were reported by **(Naessens et al (2005)** and **Hillali et al (2006).** Further, a reduction TLC, PCV, Hb, and total erythrocytes (P<0.01) were counts noticed in *T. evansi* infected cattle as compared to the healthy **(Sivajyoti et al,.2015).** Performed that blood sample label of haemoglobin(Hb) ,(PCV) pocket cell volume decreased significantly **Panday *et al* (2015).** Haematology values significant reduced in infected groups RBC, WBC, PCV, Hgb, significantly lower (P<0.001) MCV was higher in all infected also body weight was falling down as compared to non-infected significantly (P<0.001). **Dagnachew *et al* (2015**).

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