

HAEMATOLOGICAL STUDIES IN APPARENTLY NORMAL ADULT CAMELS (*Camelus dromedarius*) OF NORTH EAST SAHEL REGION OF NIGERIA

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ABSTRACT

Haematological values of apparently healthy camels presented for slaughter at the Maiduguri abattoir were determined. The values for red blood cell count, haemoglobin concentration, packed cell volume and erythrocyte indices were similar to those obtained from camels in Sokoto (North West Region) Nigeria; and also in accord with values published in the literature for Indian camels. Total leucocyte counts were relatively higher but within the normal ranges reported for Indian camels. Differential leucocyte counts showed higher values for monocytes and basophils, and lower values for neutrophils when compared to Indian data. The differences observed have been attributed to stress, excitement or environmental factors. The ESR values obtained by the Wintrobe and Landsberg method were in close agreement with reference values. The 45° angle method gave ESR values much faster (about seven times) than the Wintrobe and Landsberg method.

Key words: Haematology, Camels, North East Region.

INTRODUCTION

Camels are regarded as the ship of the desert, being used as beasts of burden for transporting humans and their goods. They are also raised for milk, meat, hides and wool. In Nigeria, the trend is an upward increase in their contribution to human protein supply (Wilson, 1984; Zakari et al., 1988). Since desertification has continued to reduce the productivity of cattle and crops in the Sahel region, Ghaji and Adegwa (1986) have called for a scientific and profitable camel production in the country. This is going to require husbandry and animal health studies.

Although some studies on the biology and health of the camel are available in literature (Schmidt-Nelson, 1964; Hafez, 1968; Wilson, 1984; Yagil, 1985; Allen et al., 1992) there is not much information on the Nigerian camel. Reference haematological values for camels (Schalm et al., 1975) were obtained from Indian studies (Soni and Aggarwala, 1961; Banerjee et al., 1962). It is widely recognized that

geographical variations in haematological values exist. Such variations are attributed to environmental factors especially dietary habits (Ezeilo, 1972; Saror et al., 1975; Enyikwola and Ghoshal, 1989). This study was prompted by the scarcity of information in literature pertaining to the haematological values of the Nigerian camel. It is expected to provide reference values on the haematology of the Nigerian camels for use in monitoring their health.

MATERIALS AND METHOD

Haematological values were derived from 17 apparently healthy adult single-humped camels (*Camelus dromedaries*) presented for slaughter at the Maiduguri Municipal abattoir during the months of November and December. Based on the ante-mortem and post-mortem examinations, the animals were not suffering from any disease.

Blood samples were collected from the jugular vein at the point of ex-sanguinations

during slaughter into bijoux bottles containing 0.1ml of 10% ethylenediaminetetra acetate (EDTA) as anti-coagulant. All samples were collected 6 and 7 a.m and determination made within 4hrs of collection. The parameters measured were erythrocyte sedimentation rate (ESR), red blood cell count (RBC), packed cell volume (PCV), haemoglobin concentration (Hb), total white blood cell count (WBC) and differential leucocytes count. From the RBC, PCV and Hb data obtained, RBC indices, mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentration (MCHC) were calculated using established formulae (Schalm et al., 1975). The total RBC and WBC counts were obtained using haemocytometer. PVC was determined by the microhaematocrit method using Hawksley centrifuge and 11b determined by the cyanmethemoglobin reagent method. Differential leucocyte counts were obtained after blood smears had been stained with Wrights stain and 200 cells counted. The counts were expressed in percentages of total number of cells counted. Details of these methods are reported in Schalm et al. (1975).

ESR was determined by two methods; the conventional Wintrobe and Landsberg method (Brown, 1976) and the 45° angle method (Washburn and Meyers, 1975),

Means and standard errors of all parameters were calculated according to the usual method and the mean ESR values from the two methods compared by the student "t" test (Steel and Torrie, 1980).

RESULTS

Erythrocyte series: The range, mean and standard error for RBC, Hb concentration PCV, MCV, MCH and MCHC are shown in Table 1. The means for these parameters were $9.18 \times 10^6/\text{mm}^3$, 12.04g/dl, 28.79%, 32.98n, 14.06pg and 43.48g/dl respectively. **Leucocyte series:** Values for total and differential leucocyte counts are summarized in Table 1. The means were WBC- $25.16 \times 10^3/\text{mm}^3$; neutrophils-21.16%; lymphocytes-45.00%; monocytes-12.56%, eosinophils-6.85%; and basophils-5.06%.

Erythrocyte sedimentation rate: The two methods yielded strikingly different erythrocyte sedimentation rates, with the 45° angle method being faster than the Wintrobe and Landsberg method (10.29mm/hr versus 1.42mm/hr). The difference between the two means was statistically significant ($p < 0.01$).

Table I: Mean, standard error and range of haematological parameters in apparently healthy camels.

Parameters	Mean	Standard error(±)	Range
Erythrocyte series			
RBC ($\times 10^6/\text{mm}^3$)	9.18	0.69	5.63-13.95
Hb (g/dl)	12.04	0.61	7.00-15.60
PCV (%)	28.79	1.65	20.0-40.5
MCV (f)	32.98	2.21	21.62-57.95
MCH (Pg)	14.06	1.09	7.08-24.19
MCHC (g/dl)	43.48	2.82	22.37-65.0
Leucocyte series			
Total WBC ($\times 10^3/\text{mm}^3$)	25.16	1.45	18.71-38.00
Neutrophils. %	21.16	1.72	20.0-40.9
Lymphocytes. %	45.00	1.76	29.0-56.0
Monocytes. %	12.56	1.50	7.0-28.0
Eosinophils.	6.85	0.62	3.0-12.0
Basophils. %	5.06	1.03	1.5-18.0

Table II: Mean, standard error and range of the erythrocyte sedimentation rate for camel blood.

Method	Mean	S.E	Range
Wintrobe and Landsberg 9mm in 1 hr)	1.43	0.37	0.25-2.0
Whashburn and Meyer's (45° angle) (mm in 1 hr)	10.29	2.03	4.0-37.5

DISCUSSION

The values for RBC, Hb concentration, PCV, MCV, MCH and MCHC obtained in this study are similar to those published for camels in Sokoto, Nigeria (Fatihu et al., 1997) and also in accord with values obtained in India (Soni and Aggarwala, 1961; Banerjee et al., 1962).

The total leucocyte count of $25.10 \times 10^3/\text{mm}^3$ obtained from the present study is higher than the value of $15.18 \times 10^3/\text{mm}^3$ (1962) the percentages of lymphocytes and eosinophils were found to agree with our results; but at variance with respect to the other leucocytes. The present study recorded higher values for monocytes and basophils, and lower values for neutrophils.

Apart from disease, age and stress, environmental factors are also known to affect differential leucocyte counts. Present monocytes and basophils increase with age (Brown and Cross, 1969; Schalm et al., 1975) while percent lymphocytes and monocytes tend to be high under stress conditions (Boddie, 1969; Schalm et al., 1975). Since the camels were slaughter animals, stress may have contributed to the picture seen. It is also possible that neutropenia observed may have been of environmental, especially, of nutritional origin (Ezeilo, 1972).

The ESR mean value of 1.43mm/hr obtained in this study by the Wintrobe and Landsberg method is close to the value of 1.0mm/hr obtained by Banerjee et al. (1962). It confirms that camel has a slightly faster ESR than cattle. The ESR for cattle has been reported as 0.0mm for the first hour (Schalm et al., 1975). We could not find in literature any camel ESR value obtained by Fatihu et al. (1997) in Sokoto, but is within the normal ranges reported in India by Soni and Aggarwala (1961) and Banerjee et al., (1962). Since these were animals presented for slaughter, fear or excitement may have been

responsible for the higher values (Schalm et al., 1975). No local data on differential leucocyte counts could be found for comparing with our result. However, when compared to Indian data (Soni and Aggarwala, 1961; Banerjee et al., obtained by the 45° angle method. Our ESR value of 10.29mm/hr obtained by this method demonstrates its advantage in the study of ESR in ruminants, which naturally have slow sedimentation rates (Schalm et al., 1975 Swenson, 1993).

In conclusion, the haematological values obtained in this study are in agreement with values reported in Sokoto, Nigeria (Faithu et al., 1997) and India (Soni and Aggarwala, 1961; Banerjee et al., 1962) though slight differences were observed in the differential counts for neutrophils, monocytes and basophils. The present study has thus provided the basic values, which hitherto were not available in the locality. More work needs to be done to further confirm the results.

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