Comparative study of some haematological and biochemical characterizes of camels (*Camelus dromedarius*) in south region of Iraq

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Comparative study of some haematological and biochemical characterizes of camels (*Camelus dromedarius*) in south region of Iraq

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Abstract. This study aimed to establishment database and baseline of hemato-biochemicals values of male and female camels in three governorate south Iraq (Basrah, Dhi qar, and Muthana). Forty eight adult male and female dromedary camels (6 males and 10 females for each governorate) aged over 3 years old were used. Peripheral blood samples were collected from the jugular vein during February – April 2018 and then as soon as transported to the laboratory for haematology (RBC, Hgb, HCT, MCV, MCH, MCHC, ESR, PLT,and total and differential WBC) and biochemical analysis(ALT, AST, Glucose, Creatinine, Urea, and total protein). The results of haematological and biochemical parameters appeared compatible with the previous studies on normal hemato-biochemical values and found significant effect of sex on some haematological parameters of camel especially for RBCs count, Hgb, PCV, MCV, and PLT, and also among the camels of different governorate in south of Iraq for both sexes regarding to haematological parameters especially in Basrah governorate compared with Dhi qar and Muthana. Whereas, no effect were recorded for sex of camels on total and differential leukocytes in all location studied. Rather than significant differences ($p<0.05$) showed among the governorates in values of total and differential leukocytes for both sexes compared with their counterparts in the other governorates. The serum biochemical study of camels' revealed no effect for sex on most of biochemical parameters except in some situation for AST activity level and glucose concentration. In contrast, the results revealed significant variation for both sexes compared with their counterparts in other studied governorates especially in AST, ALT, and glucose values. Therefore, the present study concluded that the results compatible with the previous studies and the sex had effect on some blood indices and the hemato- biochemical parameters different in their value depend on location in south region of Iraq.
Keyword: Camels, haematology, biochemical parameters, south Iraq

1.Introduction:

Camels in the southern region of Iraq constitute more than 60% of the total number of camels in Iraq [1], they still neglected at government support or by researchers in studying the properties and physiology of camels under different circumstances, although the importance of camel as a national economic wealth, in addition to its importance in therapeutic and medical terms [2]. The physiological status had more impact on hematological and biochemical indices in camel rose under traditional conditions [3].

The blood picture of an animal can provide valuable benefit and indication about the general health of animals [4] and provides an opportunity to clinically investigate a deviation of certain blood parameters from their normal limits and it plays a vital role in the assessment of physiological, nutritional and pathological status of an organism [5].The haematological and biochemical values have been well-documented in various domestic species including sheep, goats, horses, cattle and buffalo globally [6; 7]but is less well understood and limited in the camel [8]. Information on the normal haematological and biochemical values in indigenous camels is largely inadequate.The present pilot study was hence conducted to have a base line data on normal reference range of haematological and biochemical parameters for both male and female camels reared in south region of Iraq.

2.Materials and Methods

Forty eight of adult male and female camels were obtained from three governorates in the south of Iraq (Basrah, Dhi Qar, and Muthana; n=10 female and 6 male for each) aged over 3 years, all studied animals feed on dry shrubs grazing and supply with wheat bran, water supply from the same area of grazing with total dissolved salt ranged (1000-2000 ppm). They were clinically healthy and proved to be free from diseases.

Blood(10 ml) was aspirated from jugular vein of each animals, then separated into two parts, 2ml put into tube containing anti-coagulant (EDTA) for hematological analysis (RBCs, PCV, Hgb, PLT,MCV,MCH, MCHC, total WBCs and differential WBCs)by using a standard hematology analyzer (Abbott Laboratories, Abbott Park, Illinois, U.S.A.), and the other 7ml into test tube containing Gel/clot Activator (without anti-coagulant) which was immediately centrifuged serum collected to subsequent biochemical analysis (ALT,AST, Creatinine, Urea, Glucose, total protein) by using chemistry auto analyzer Mandary ,German. Statistical analysis was done by using analysis of variance (two ways ANOVA) through SPSS computer package version 21. The differences are considered to be significant at ($p<0.05$), and the differences between means were done by LSD [9].

3.Results and discussion

The present study revealed the hematological and biochemical values for the two sexes in three governorates of south Iraq (Basra, Dhi qar, and Muthana). The RBC count, HGB, HCT, MCV, MCH, MCHC, ESR, and PLT values are shown in table (1) between male and female of camels in all studied locations, in side. On the other side, these values compared each sex alone with their counterparts in other governorates of south Iraq.

Table (1) Erythrocytes indices in adult male and female camels of different governorates in south Iraq

	Basra		Dhi-qar		Muthana		Mean of all
Indices	Male	Female	Male	Female	Male	Female	
RBCs (x106/mm3)	9.52 ± 1.50A	8.27± 0.30B	9.17± 1.33 A	8.29± 1.50B	9.42± 0.64A	8.09± 0.66B	8.65± 0.99
HG B g/dl	12.87± 2.37A	11.09± 0.83B	12.40± 2.03 A	10.98± 1.28B	12.47± 1.12A	10.59± 0.93B	11.52± 1.58
HCT %	46.124± 4.96Aa	43.95± 4.28 Ba	39.23± 9.26Ab	33.39± 6.65Bb	36.95± 6.67Ab	32.66± 4.47Bb	38.20± 7.69
MCV fL	48.83± 3.95Ba	52.09± 2.92Aa	41.48± 6.25Bb	49.87± 6.28 Ab	41.52± 5.52Bb	49.69± 4.99 Ab	48.07± 6.23
MCH pg	13.48± 0.69	13.38± 0.73	13.52± 0.39	13.99± 1.43	13.38± 0.66B	14.98± 1.34A	13.85± 1.13
MCHC g/dl	27.85± 3.49b	25.74± 1.60b	30.10± 4.23ab	31.98± 5.75a	32.564± 4.44a	33.85± 3.89a	30.65± 4.93
ESR(mm/1h)	7.05± 0.75	6.77± 0.94	6.73± 1.02	7.07± 1.07	6.81± 0.60	7.60± 0.92	2.70± 0.83
PLTs(x103/mm3)	422.17± 116.32A	279.50± 49.30Bb	372.17± 108.59	322.50± 69.02ab	392.67± 53.24	363.50± 57.13a	346.82± 55.23

Capital letters refer to a significant value ($p<0.05$) between sex in the same location
Small letter refer to a significant value ($p<0.05$) among the locations for the same sex
Values are M±SD

The present study revealed that RBC, HGB, and HCT higher significantly ($p<0.05$) in male camel than female camel, while MCV appeared significantly lower in male camel than female camel for the three governorates of south Iraq. The current study was not compatible with [10] and [11] when they recoded no significant effect for the gender on the hematological indices in Pakistan and Suadi Arabia

respectively. However, Al-Rammahi *et al*., [12] showed that there was significant differences in HGB, MCH, and MCHC male than female of camels in Alnajaf city of Iraq, the author attributed the disagreed of results with other studies in different countries to the variation in geographical zone, nutritional requirements, genetic factors and sampling methods. The comparison of erythrocyte indices values for each sex among different area of south Iraq (Basra, Dhi-qar, and Muthana) revealed no significant effect for location in the values of RBC, HGB, MCH, ESR and PLT. Whereas, values of HCT, MCV, MCHC appeared significant elevated in Basra governorates when compared with other studied governorates. these investigated previously in different species of animals that sex had effect on the RBCs count and indices when compared between male and female [13].These may be belonging to the physiological state of the animals although there were several factors may affect also on the blood indices values. Whereas other indices mean values occur variable among locations, these include MCH and PLT appeared significant in places than others studied places.

Table (2) Total WBC and differential in adult male and female camels of different governorates in south Iraq

	Basra		Dhi-qar		Muthana		Mean of all
Indices	Male	Female	Male	Female	Male	Female	
WBCx10^3/ul	16.91± 2.00a	11.15± 0.91b	12.15± 1.40b	14.04± 2.26a	12.25± 1.04b	13.94± 1.35a	13.31± 2.32
Neu%	63.32± 4.12a	62.88± 1.72a	60.07± 4.44b	59.98± 3.91b	60.53± 2.17b	61.50± 2.46a	63.04± 4.71
Mon%	5.00± 0.63B	6.00± 1.24A	4.77± 2.61B	6.18± 1.53A	4.78± 1.70B	5.89± 1.26A	5.58± 1.57
Lym%	22.68± 3.55b	23.00± 1.21c	27.58± 6.33a	36.30± 3.63a	26.20± 4.13a	28.68± 2.69b	26.12± 4.33
Eos%	2.50± 0.54b	2.48± 0.53b	4.82± 1.17a	4.33± 0.66a	4.70± 0.86a	4.53± 0.86a	3.86± 1.23
Bas%	0.45± 0.12c	0.34± 0.10b	0.81± 0.14b	0.97± 0.09a	1.02± 0.10a	0.85± 0.23a	0.75± 0.30

Capital letter refer to significant value ($p<0.05$) between sex in the same location
Small letter refer to significant value ($p<0.05$) among the locations for the same sex
Values are M±SD

Total and differential leucocytes count of male and female camels showed no significant differences ($p<0.05$) between the two sexes for all leucocytes indices, except monocyte that appeared significantly higher in female than male for all the locations studied (table 2). These results were comparable in values with previous studies done in different countries [14; 15; 16].

On the other hand, the results revealed significant differences($p<0.05$) in total and differential WBC count among male and female with their counterparts in other governorates of south Iraq, especially in Basrah governorate that showed elevation in total WBC count and neutrophils for male and female compared with Dhiqar and Muthana studied animals. While, lymphocyte, eosinophil and basophil showed a significant decrease ($p<0.05$) in their values for Basrah governorate compared with animals of Dhiqar and Muthana. Neutrophils were representing the predominant of differential leucocytes for all studied locations (table 2). The results above agreed with [17, 18, 19 and 20] when they investigated the effect of seasons, diet and physiological state on total and differential WBC count.

The biochemical analysis of camel's serum for both sexes (male and female) and in three south Iraq governorates (Basrah, Dhi qar, and Muthana) represented by measurement the aminotransferase activities enzymes as indicator for liver functions (ALT and AST), creatinine and urea values for renal functions assessment. Glucose and total protein levels also measured to evaluate the glucose and protein metabolism in these animals (table 3). Although the ALT activity enzyme values appeared

non-significant ($p<0.05$) between male and female camels for the three governorates studied, but AST activity enzyme showed variable significant values ($p<0.05$) between sexes in Basrah and Dhi qar rather than Muthana animals that showed no significant enzyme activity values ($p<0.05$). On the other hand, the ALT enzyme activity values in male and female of Basrah governorate significantly higher ($p<0.05$) than values of ALT enzyme activities in camels of Dhi qar and Muthana. Contrarily, AST enzyme activity values of Basra camels for male and female decreased significantly ($p<0.05$) when compared with male and female of Dhi qar camels, while camels of Muthana recorded non-significant marks ($p<0.05$) compared with both sexes animals of Basra and Dhi qar. Renal function assessment was done by measurement of serum creatinine and urea levels (table 3). Creatinine appeared no significant ($p<0.05$) relationship between sexes in the same governorate and among locations in three governorates of south Iraq. While urea levels were appeared significantly decreased ($p<0.05$) in Basrah camels for both sexes compared with Dhi qar and Muthana male and female camels although there was no significant relationship ($p<0.05$) between sexes of the same studied governorates.

Table (3) Some biochemical parameters in adult male and female camels of different governorates in south Iraq

	Basra		Dhi-qar		Muthana		Mean of all
parameters	Male	Female	Male	Female	Male	Female	
ALT U/L	27.33± 7.76a	27.90± 3.44a	5.83± 1.16b	11.30± 3.19b	7.83± 3.06b	10.30± 2.40b	22.32± 6.94
AST U/L	80.16± 13.93Ab	61.30± 23.69 Bb	93.33± 5.39Aa	76.00± 8.91 Ba	84.66± 6.97ab	77.60± 6.58a	77.75± 23.44
GLUCOSE mg/dl	78.5± 16.15A	67.0± 4.49Bb	82.8± 7.3	78.5± 9.9 a	83.2± 6.9A	77.3± 6.0 Ba	76.71± 9.97
CREATININ E mg/dl	0.93± 0.15	1.33± 0.84	0.69± 0.03	0.78± 0.11	0.75± 0.073	0.75± 0.067	0.99± 1.04
Urea mg/dl	40.80± 19.51b	48.46± 16.94b	57.60± 6.13a	61.46± 9.80a	58.11± 4.77a	60.50± 7.88a	55.06± 13.58
PROTEIN g/dl	7.65± 0.20	12.98± 1.63	7.41± 0.38	7.61± 0.35	7.70± 0.37	7.54± 0.65	8.70± 0.45

Capital letter refer to significant value ($p<0.05$) between sex in the same location
Small letter refer to significant value ($p<0.05$) among the locations for the same sex
Values are M±SD

The same manner of creatinine and urea levels were recorded for protein and glucose concentrations that appeared total protein concentration non- significant between sexes in the same governorate and among locations in three governorates of south Iraq. Rather than, glucose concentration were recorded higher significant in male than female in Basrah and Muthana. Although that glucose concentration of male showed no significant relationship compared with the three studied governorates, whereas, female of Basrah camels decreased significantly compared with females of Dhi qar and Muthana camels. This finding is in agreement with [11] in which that there was no statistical differences between either breeds or sexes in blood urea level, creatinine, aminotransferase enzymes and total protein for Saudi Arabia camels. The influence of sex on some biochemical parameters in the Sudanese dromedary camels had no significant effect ($P>0.05$) on the concentration of Total Protein, Albumin, Uric acid, Creatinine, GOT, GPT except glucose that showed a significant difference between the two sexes [18]. The obtained values for biochemical parameters were similar to those

reported by [21] and [22] when measured total protein and glucose concentration in camels. [23] also referred non- significant effect in glucose, urea, creatinine, ALT,AST and total protein values among three breeds of camels in Alegeria. The variations in results of biochemical parameters among governorate of south Iraq may be belong to the effect of pollution that recorded in Basra due to the petroleum industry or other factors like seasons, diet, physiological status that effect on values of biochemical parameters as investigated by [24 ; 25; 19;26; 20].

4.References

[1] Atlas of Agricultural Statistics (2015). Prepared by livestock's department / planning directory/ Ministry of Agriculture.

[2] Aleme, A., D.,(2013). A Review of Camel Meat as a Precious Source of Nutrition in some part of Ethiopia. Agricultural Science, Engineering and Technology Research. Vol. 1, No.(4, December 2013), PP: 40–43. Available online at "Archived copy". Archived from the original on (2016-12-03). Retrieved(2016-12-03).

[3] Muhammad, B. F., D. Aliyu, A. A. Njidda and I. L. Madigawa. (2011).Some haematological, biochemfical and hormonal profile of pregnant and non-pregnant she-camels (*Camelus dromedarius*) rose in a Sudan savanna zone of Nigeria. *J. Camel Prac. Res*. 18: 73-77.

[4] Al-Bashan,M.M.(2011). *In vitro* assessment of the antimicrobial activity and biochemical properties of camels urine against some human pathogenic microbs. Middle East J.Sci.Res., 7:947-958.

[5] Doyle, D. (2006). William Hewson (1739-1774): The father of hematology. Br. J. Haematol. 133: 375-381.

[6] Tschuor, A. C., Riond, B. Braun, U. and Lutz, H. (2008).Haematological and clinical biochemical reference values for adult goats and sheep. Schweiz. Arch. Tierh. 150 (287-295).

[7] Aengwanich, W., Chantiratikul, A. and Pamok, S. (2009).Effect of seasonal variations on hematological values and health monitor of cross bred beef cattle at slaughterhouse in northeastern part of Thailand. American-Eurasian *J. Agric. & Environ. Sci* 5 (5): 644-648.

[8] Ayoub, M.A.; El Khouly, A.A. Mohamed, T.M. (2003). Some haematological and biochemical parameters and steroid hormone levels in the one-humped camel during different physiological conditions. Emirates Journal of Agricultural Sciences. 15 (1): 44-55.

[9] SPSS Statistical Packages for the Social Sciences.(2016). Statistical software for windows version 22.0 Microsoft. SPSS, Chicago, IL, USA.

[10] Farooq, U.; Samad, H. A. ;Khurshid, A. And Sajjad, S.(2011). Normal reference hematological values of one-humped camels (camelus dromedarius) kept in cholistan desert. *The Journal of Animal & Plant Sciences*, 21(2): (2011), Page: 157-160.

[11]AL-Busadah, Khaled A. and Homeida, Abdel Gadir Musa. (2007). Some Biochemical and Hematological Indices in Different Breeds of Camels in Saudi Arabia .*Sci J. King Faisal Univ*. 8(1):131–142 .

[12]Al-Rammahi , Hayder M.; Al-Jebory , Hamed A. ; Abed Al-Sattar, Huda.(2016). Some normal hematological values of Arabian camels reared in western desert of Al-Najaf governorate/ Iraq. 5 (Special issue), 34-38.1st Iraqi colloquium on camel diseases and management. Mirror of Research in Veterinary Sciences and Animals.

[13] Thrall, Mary Anna; Baker,Dale C.; Campbell, Terry W;De Nicola,Dennis;Fattman,Martin J.;Lassen,E. Duzne; Rebar, Alan; and Weiser Glade.(2006) Veterinary haematology and clinical Chemistry. Blackwell publishing.

[14] Sarwar, A. and Majeed, M.A. (1997). Interrelationship between 30 parameters of blood in normal one-humped camel in summer. J. Camel pract. Res. 4: 35 – 39.

[15] Al-ani,F. K. (2004). Camel management and diseases. First edition, Alsharq printing press and Dar ammar book publisher.p:6

[16] Al-Busadaha K A, and Osman T E A. (2000). Haematological parameter of adult dry, lactating and camel calves in Saudi Arabia. *Pakistan journal of biological sciences*. 3 (10):1749-1751.

[17] Elrayah H.A., M.E.S. Barri, and S.H. Abdelrahman. (2012). Preliminary Information of Some Biochemical Parameters in Sudanese Camel (Camelus Dromedarius). *Journal of Animal Science*,1: 5-7.
[18] Babeker, Esam Ali and Suleem , Afaf Eltyb.(2013). Observation of Certain Hematological and Biochemical Parameters in Nomadic Camels (*Camelus dromedarius*) in the Sudan. University of Bakht Alruda Scientific Journal Issue No. 6 May 2013.
[19] Alharbi, Mohammad Salim (2012). Some hematologic values and serum biochemical parameters in male camels(Camelus dromidarus) before and during rut. *Asian Journal of Animal and Veterinary Advances*, 7: 1219-1226.
[20] Poonia, Rakesh; Srivastava, Aakash; Sena, Suchitra ; Srivastava, Meera.(2016). Study on Certain Blood and Serum Parameters of Camel Camelus dromedarius Maintained on Different Diets. UK *Journal of Pharmaceutical and Biosciences* Vol. 4(6), (12-18, 2016).
[21] Amin A.S., Abdoun, K.A. and Abdelatif, A.M. (2007). Seasonal variation in blood constituents of one- humped camel (Camelus dromedaries). *Pakistan J. Biological Sci*.,10: 1250-1256.
[22]Patodkar V.R., Somkuwar, A.P. ; Sushant Parekar and Nilesh Khade. (2010). Influence of Sex on certain biochemical parameters in Nomadic Camels (Camelus dromedariu) nearby Pune, in Maharashtra. *Veterinary World* Vol.3(3):115-117.
[23] Aichouni A., Jeblawi R., Dellal A., Hammou H., Aggad H.(2010). Breed variation in blood constituents of the one-humped camel (Camelus dromedaries) in Algeria. *Journal of Camelid Science* 3 (2010) 19-25.
[24] Mohammed, A. K.; Sackey, A. K. B.; Tekdek, L. B. and Gefu, J. O. (2007). Serum biochemical values of healthy adult one humped camel (Camelus dromedaries) introduced into a sub-humid climate in Shika-zaria, Nigeria. J. Anim. Vet. Adv., 6 (5): 597- 600.
[25] Badawy, M. T.; Gawish, H. S.; Khalifa, M. A.; El-Nouty, F. D. and Hassan, G. A. (2008). Seasonal variations in hemato-biochemical parameters in mature one humped she-camels in the north-western coast of Egypt. Egyptian J. Anim. Prod., 45 (2): 155- 164.
[26] Abdul-Rahaman, Yassen Taha; Shahooth, Mohammed Ali; and Abid, Saba Khamiss (2015). Effect of months on levels of some biochemical parameters in blood of Iraqi female one-humped camel (Camelus dromedarius). Kufa j. Vet. Med. Sci. Vol.(6). No.(2). 2015.