

SOME PHYSIO-CHEMICAL CHARACTERISTICS OF DROMEDARIES IN SUMMER : INFLUENCES OF SEX, AGE AND LACTATION AND/OR PREGNANCY

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ABSTRACT

Some physio-chemical characteristics of camel were studied in 56 clinically healthy one-humped (*Camelus dromedarius*) camels in summer. Twenty eight of these were males: up to 4, 5 to 6, 6 to 7, and more than 7 years. The remaining 28 animals were heifers, not pregnant dry, pregnant dry, and not pregnant lactating camels. Each of eight subgroup thus contained seven animals. Irrespective of sex and age, 56 camels gave the following means \pm SE values for different parameters:-

Respiration Rate (/min.)	11.00 \pm 0.03	(7 - 16)
Pulse Rate (beats/min.)	43.46 \pm 1.09	(31 - 72)
Rectal Temperature ($^{\circ}$ F)	99.63 \pm 0.14	(97.8 - 101.8)
Coagulation time (Sec.)	317.25 \pm 12.77	(135 - 480)
Blood pH	7.62 \pm 0.03	(7.1 - 8.1)

Males showed significantly ($P < 0.05$) higher pH values than in females. Lowest value of coagulation time (CT) and a highest value of pH were recorded in the youngest group (up to 4 years age). Lactation and/or pregnancy showed no influence on any parameter studied.

INTRODUCTION

Unique physiology of camel is critical in its adaptation to arid environment. The water economy is one important mechanism in camel to survive in deserts which in turn, may be reflected in various physiological parameters. Therefore, normal parameters like respiration rate, pulse rate, rectal temperature, coagulation time and blood pH in summer were recorded. The effects of sex, age, lactation and/or pregnancy were ascertained on these parameters. Needless to emphasize that it is imperative for better understanding of this relatively ignored but valuable animal both in health and disease.

MATERIALS AND METHODS

Fifty six clinically healthy one-humped camels of either sex, 28 males and 28 females, were randomly selected from their natural habitat at Sarai Mohajar, Bhakkar, Pakistan. The four groups of equal size among the males were: up to 4, 5 to 6, 6 to 7, and more than 7 years of age. The four female groups consisted of heifers, not-pregnant dry, pregnant-dry, and not pregnant lactating. Each of these eight groups

comprised seven privately owned work camels. The age was estimated by dentition after the system evolved by Rabagliati (1924). The sampling was done during last week of July to second week of August. Average weather conditions during this period are shown in Table 1.

Respiration rate was recorded by counting the movements of the ribs, pulse rate per minute was recorded by palpating the middle coccygeal artery and rectal temperature was recorded in degrees Fahrenheit ($^{\circ}$ F) with help of a mercury thermometer. All readings were recorded in the morning before feeding.

Coagulation time was taken in seconds until appearance of fibrin threads in Sabraze's capillary tubes as described by Kolmer *et al.* (1959). Blood pH was recorded immediately after sample collection by a battery operated portable pH meter (NEDA (2) I604, Mexico)

The grand and group means \pm SE were calculated along with the range for each parameter, separately. In addition, effects of sex, four age groups of males and four lactation and/or pregnancy states in females were tested by one-way analysis of variance. Significantly different groups were compared by student t-test and Duncon's multiple range test (Steel

and Torrie, 1984). All computations were done with the help of statistics programme SPSS/PC+ 3.1 of SPSS Inc.

RESULTS AND DISCUSSION

The grand means \pm SE of respiration rate, pulse rate and body temperature were 11 ± 0.03 per second, 43.46 ± 1.09 beats/second, and 99.63 ± 0.14 °F, respectively (Table 2). The observed values were comparable to the values reported by Schmidt-Nielson (1964) who studied these parameters under saharan summer conditions but slightly higher than Higgins and Kock (1984) owing to relatively high ambient temperature in the mornings of extremely hot months of July and August in Pakistan.

Pulse rate gradually decreased with increasing age in male camels. In females, pulse rate was higher in non pregnant lactating females (Table 2). It might be the higher basal metabolic rate which effected the pulse rate in both young male and lactating female camels.

The respiration rate did not fluctuate with pulse rate as the main mechanism for heat dissipation in camel is sweating rather than panting (Schmidt-Nielson *et al.*, 1956). However, sex, age and lactation and/or pregnancy did not show any influence on these parameters.

Table 1: Mean weather conditions during sampling season (July-August).

Parameters	Mean reading
Temperature (°C)	
Minimum	24
Maximum	40.8
Relative humidity (%)	
Morning	89
Evening	48
Annual Rain Fall (mm)	0.354

Table 2: Means \pm SE, and ranges of respiration rate (Resp), pulse rate (Puls), rectal temperature (temp), coagulation time (CT) and blood pH (pH) in normal one-humped camels.

Groups	Resp. (/min)	Puls (beats/min)	Temperature (°F)	CT (second)	pH
Grand Means (n = 56)					
Mean \pm SE	11 ± 2.0	43.46 ± 1.08	99.63 ± 0.14	317 ± 12.8	7.62 ± 0.03
Range	7-16	31-72	97.8-100.8	135-480	7.11-8.11
Effect of Sex (n = 28)					
Male	9 ± 1.0	42.89 ± 1.48	99.79 ± 0.22	336 ± 18.3	7.75 ± 0.03
Female	10 ± 2.0	44.03 ± 1.61	99.47 ± 0.48	297 ± 17.4	7.48 ± 0.04
Effect of Age in Males (n = 7)					
< 4 years	12.1 ± 1.0	44.57 ± 4.03	99.34 ± 0.24	$267 \pm 43.7a$	$7.88 \pm 0.06a$
5 - 6 year	11.0 ± 2.0	44.00 ± 2.68	99.23 ± 0.27	$399 \pm 33.7b$	$7.81 \pm 0.04ab$
6 - 7 years	11.7 ± 2.0	43.23 ± 3.06	100.31 ± 0.35	$340 \pm 29.3b$	$7.64 \pm 0.03b$
> 7 years	10.1 ± 0.9	39.57 ± 2.05	100.29 ± 0.69	$338 \pm 25.9b$	$7.67 \pm 0.07ab$
Effect of Lactation and/or Pregnancy in Females (n = 7)					
Heifers	12.1 ± 0.6	44.43 ± 2.40	99.37 ± 0.32	287 ± 19.3	7.52 ± 0.40
Not-Pregnant Dry	11.2 ± 1.7	43.71 ± 1.20	100.11 ± 0.37	252 ± 27.9	7.42 ± 0.70
Pregnant Dry	10.3 ± 2.0	40.85 ± 2.26	99.11 ± 0.25	313 ± 42.5	7.47 ± 0.70
Not-Pregnant Lactating	13.0 ± 2.7	47.14 ± 5.52	99.28 ± 0.44	338 ± 42.3	7.52 ± 0.10

Different letters in a column indicate significant differences between the means listed therein: at the 5 percent level.

On an average, camel blood took 317.25 ± 12.78 seconds to coagulate which ranged from 135 to 480 seconds (Table 2). This mean is lower than the mean of 372 seconds (Soliman and Shaker, 1967) but higher than the reported mean of 255 ± 2.0 seconds for 20 adult camels of either sex in summer (Majeed *et al.*, 1980). Sex made no significant effect on coagulation time as was reported by Soliman and Shaker (1967). Age had a significant ($P < 0.05$) effect on coagulation time among male camels (Table 2). The shortest CT was found in the youngest camels under study (up to 4 years). Hematochemical parameters of these animals revealed some solitary findings like the blood of 3 camels aged less than 30 months took only 150 to 180 seconds to coagulate. In addition, these individuals showed unusually higher globulin values which ultimately constituted profoundly exaggerated total proteins. Concurrently glucose level did not exceed 18 mg/dl in these individuals (Personal observations). Neither lactation nor pregnancy in females showed any influence on coagulation time in the present study (Table 2).

The grand mean pH of camel blood recorded in the present study was 7.62 ± 0.03 ranged between 7.10 to 8.11 (Table 2) which was slightly higher than the previously reported mean of 7.45 ± 0.008 ranging from 7.10 to 7.60 in Egypt (Barakat and Abdul-Fattah, 1971). Geonatical influences that is geographical differences on genetics manifested by variations in physiological and biochemical parameters when compared with foreign counterparts (Nawaz 1988; Nawaz, *et al.*, 1993) as well as ration may be strong reasons for this difference. However, a mean of 7.60 ± 0.03 (Soliman and Shaker, 1967) was in good agreement with the present observation. Comparatively higher mean values of pH 7.75 ± 0.03 ($P < 0.01$) were observed in the blood of male than female camels (7.48 ± 0.04) as reported by Barakat and Abdul-Fattah (1971). Age affected pH significantly ($P < 0.05$) among male camels (Table 2). The mean value was the highest in youngest age-group studied (up to 4 years). As mentioned earlier these animals have unusually higher globulins. This might be related to relatively higher pH values in this age-group. Lactation and/or pregnancy

did not show any influence on pH (Table 2). Generally, the available literature on the camel does not exploit and evaluate the impact of lactation and/or pregnancy on the parameters studied here.

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