

EFFECTS OF AGE ON MILK YIELD AND ITS COMPOSITION AND SOME BLOOD CONSTITUENTS IN MAGHREBI SHE-CAMELS

By

Amer¹, A.M., M.H. Farouk², E.A.A.Ahmedi¹, Amal, A.O. Ibrahim¹, T.M.M. Mahdy¹,
and A.L.I. Desoky¹

¹Animal Production Research Institute, Dokki, Giza, Egypt.

²Department of Animal Production, Faculty of Agriculture, Al-Azhar University, Cairo, Egypt.

ABSTRACT

Forty Maghrebi she-camels (*Camelus dromedarius*) were used in the present work. Animals were divided into five groups according to their ages (eight each). The age of she-camels in the first, second, third, fourth and fifth groups was <5 to 8, <8 to 11, <11 to 14, <14 to 17 and <17 to 20 years, respectively. The present study aimed to define the effects of udder measurements (cm), teat length (cm), and teat diameter (cm) in both Rear and fore teats and milk vein diameter (cm) before suckling, after suckling and after milking on milk yield (liter). Total and daily milk yield (liter) were determined. Milk composition (Fat (%), Proteins (%), Lactose (%), Total solids (%) and Ash (%)) were estimated. Total protein (gm/dl), albumin (gm/dl), globulin (gm/dl), glucose (mg/dl), total cholesterol (mg/dl) and triglycerides (mg/dl) concentrations in the blood serum were also recorded.

The obtained results revealed that, ages of she-camels were insignificantly effects on daily milk yield (liter), while significantly ($P<0.05$) increased total milk yield (liter) especially of she-camels at <17 to 20 years as compared to other ages. The udder measurements (cm) were significantly ($P<0.05$) higher with the progress of age. The highest value was recorded in she-camel at <17 to 20 years after suckling. However, milk vein diameter (cm) was insignificantly different with the progress of age before suckling, after suckling and after milking. The teat diameter (cm) and teat length (cm) were insignificantly different with the advancement of ages. The highest value of teat diameter and teat length were recorded in Rear teats either before suckling, after suckling and after milking. Milk fat (%), milk lactose (%) and milk ash (%) contents were insignificantly affected with different she-camel ages. Milk protein (%) and milk total solids (%) were significantly ($P<0.05$) higher at <5 to 8 years. The total protein (gm/dl), albumin (gm/dl) and globulin (gm/dl) concentrations were insignificantly different in the blood serum of she-camels at different ages. Glucose (mg/dl) and total cholesterol (mg/dl)

concentrations in the blood serum of she-camels was insignificantly increase at different ages. Triglycerides (mg/dl) concentration in the blood serum of she-camels was insignificantly decreased with different ages. In conclusion, milk yield and udder measurements in Maghrebi she-camels increased with the progress of age. Percentages of milk composition were insignificantly different with various ages of she-camels except milk protein (%) and total solids concentrations. Blood serum constituents were insignificantly different with the progress of age.

Keywords:

Maghrebi she-camel, Udder measurements, Milk Yield, Milk composition, Blood constituents.

INTRODUCTION

The camel is an important species uniquely adapted to hot and arid environments and, therefore, contributes significantly to the food security of the nomadic pastoral households. This unique adaptability makes this species ideal for exportation under the arid and semi-arid land conditions. Dromedary camels (*Camelus dromedarius*) can survive and produce considerable amount of milk during recurrent and prolonged hot and dry environments (**Bekel et al., 2011**).

Increasing human population in the world has raised the issue of food security in order to combat with this issue there is need to explore a new world of resources. Camel can serve the best useful addition to the food supply chain in terms of milk, meat and other products.

Milk yield in Maghrebi she-camel under traditional extensive conditions average 2.0 L/d although under more favorable conditions, it ranges between 6 and 12 L/d (**Ayadi et al., 2009**).

Musaad et al. (2013) reported an average of 2.200L in 12.5 month of lactation (390 to 5, 310 L in 6 to 19 month) in Saudi Arabian camels exploited under intensive conditions although most camel milk is traded informally, a world market worth a ten billion dollars is within the realm of possibility if key improvements are improved (**FAO, 2012**). Any increase in milk production is linked to the increase of camel production rather than to improved animal productivity (**Faye and Bonnt, 2012**). To understand the reasons for this limited improvement, milk productivity needs to be evaluated throughout lactation and productive life of the camel. In practice, little information is available on milk yield or lactation curves of camel and unlike cows, no models have been developed (**Adediran et al., 2012**).

Biochemical determination of serum constituents can provide valuable information as relating to nutrition sex age and physiological status of the animal. Blood biochemical parameters including total protein, triglycerides, free fatty acid and urea were known as important indicators of the metabolic activity in lacking animals (**Karapehlivan et al., 2007**).

The present study aimed to study the effect of age on milk yield and its composition, udder measurements, teats measurements, milk vein diameter and some blood serum constituents in Maghrebi she-Camels.

MATERIALS AND METHODS

The current study was jointly planned by the Department of Animal Production, Faculty of Agriculture, Al-Azhar University, Cairo. The experimental work was carried out in Private Camel Farm, Marsa Matrouh Governorate, Egypt.

1. Materials:

1.1. Experimental animals:

Forty Maghrebi she-camels (*Camelus dromedarius*) aging <5-20 years old and 500 to 600 kg live body weight were used in the present study. All camels were in healthy condition and clinically free from external and internal parasites.

Animals were divided into five groups according to their age (eight each). The age of she-camels in the first, second, third, fourth and fifth groups was <5 to 8, <8 to 11, <11 to 14, <14 to 17 and <17 to 20 years, respectively. The age of animals was determined on the basis on dental formula according to **Wilson (1984)** as follow:

1. Temporary or milk teeth: These teeth in the camel are 22 in number, the dental formula is:

$$\frac{1-1}{3-3} \quad \frac{1-1}{1-1} \quad \frac{3-3}{2-2} = 22$$

Incisors Canines Premolars

2. Permanent teeth: The permanent teeth number 34, the dental formula is written as:

$$\frac{1-1}{3-3} \quad \frac{1-1}{1-1} \quad \frac{3-3}{2-2} \quad \frac{3-3}{3-3} = 34$$

Incisors Canines Premolars Molars:

1.2. Feeding and management:

The rations offered to camels were calculated according to **Banerjee (1988)**. Clean fresh water was offered freely to all camels. Camels were housed in a yard which was provided with common feeding trough and a concrete floor provided with common sheltered water trough. The camels could move freely in enclosed area.

1.3. Routine milking:

Twice daily hand milking at 8.00 am and 20.00 pm was initiated at that time calve were penned separately from their dams during the full day and fed alfalfa hay and concentrate *ad libitum*. Camel calves were wanted at sixth month of age and the lactating camels were hand-milked twice daily at 8.00 and 20.00 hrs without calf suckling until drying off at month 12 of lactation

2. Methods:

2.1. Udder measurements (cm):

Each measurements in the present study was taken three times and the average of the three readings was then adopted as the base of calculations before suckling, after suckling and after milking as the method described by **Abdalla et al. (2015)**.

2.2. Teat diameter (cm):

It was measured with a vernier caliper at the middle point of the teat as the method described by **Seioudy (2013)**.

2.3. Teat length (cm):

It was measured as the distance between bases of the teats to the tip of the teat, by stretching the tape along the teat as the method described by **Abdalla et al. (2015)**.

2.4. Milk vein diameter (cm):

Milk vein diameter (cm): It was measured with a vernier caliper as the method described by **Abdalla et al. (2015)**.

2.5. Milk yield (liter):

First of all to be noted here, the calves with their dam during the experimental periods, and the teats of the dams not tied up, the calves are allowed to suckle their dams to stimulate milk secretion until the milk start to flow, then the calves are removed.

For milk yield, two plastic pails in different milkers were used. The milking is done standing. The milkers stands on two legs, hold the pail by his left hand and use the right hand to evacuated the udder half as quickly as possible into the pails. Every udder half milked in different plastic pail and then the milk yield per udder half was estimated using two measuring cylinders (each of 500 ml) according to **Amal (2018)**.

2.6. Milk composition (%):

With regard to milk composition, analysis of milk samples (100 ml) were collected and frozen till analysis of milk total solids (%) and ash contents according to the methods described by Association of Analytical Communities (**A.O.A.C, 1990**). Total nitrogen content of milk was

measured by the Kjeldhale method, International Dairy Federation (IDF, 1993) where a nitrogen convert ion factor of 6.38 was used to calculated total protein content. Milk fat (%) content was determined by the Gerber Methods According to **Ling (1963)**. Milk lactose (%) content was analyzed by an enzymatic assay (lactose>D-Glucose UV-method Bushranger Mannheim>R- Biopharm, Darmstat, Germany) according to **Ling (1963)**.

2.7. Some blood serum components

Blood samples were collected from Jugular vein in the non-heparinized vacationer tube of each she-camel, then centrifuged at 1000g for 15 minutes. Serum samples were harvested and stored at -20°C until assay of total protein (gm/dl), albumin (gm/dl), glucose (mg/dl), total cholesterol (mg/dl) and triglycerides (mg/dl) concentrations.

Total protein was determined by the colorimetric method as the method described by **Gornal et al. (1949)**. Albumin was measured by colorimetric as the method described by **Doumas et al. (1971)**. Globulin concentration was obtained by subtracting the value of albumin from the corresponding value of total protein. Total cholesterol concentration (mg/dl) was determined by enzymatic colorimetric method as described by **Richmond (1973)**. Triglycerides (mg/dl) and Glucose (mg/dl) concentrations were measured by enzymatic colorimetric method as the method described by **Fassati and Prencipe (1982)**.

3. Statistical analysis:

Data were statistically analyzed by two way design (ANOVA) using General Linear Model (GLM) of **SAS (2006)**. The percentage values were transformed to arc-sin values before being statistically analyzed. Duncan's multiple range test (**Duncan, 1955**) was used for the multiple comparisons.

RESULTS AND DISCUSSION

1.Udder measurements (cm):

Udder measurements (cm) in Maghrebi she-camels was significantly ($P<0.05$) increased with the advancement of age before suckling, after suckling and after milking (Table 1). The highest ($P<0.05$) value of the udder measurement was recorded of she-camels at 17 to 20 years after suckling, while, the lowest ($P<0.05$) value was recorded at 5 to 8 after milking. These results are in agreement with those of **Amal (2018)** and **Ashour et al. (2019)**. The increase of udder measurement with the advancement of age may be due to the normal growth and development of the mammary glands in udder of she-camels. **Mishra et al. (1978)** reported also that, the

increase of udder measurement after suckling may be due to milk secretion and full of the udder with milk.

Table (1): Effects of different ages in Maghrabi she-camels on the udder measurements (cm) before suckling, after suckling and after milking (Means±SE).

Age (years)	Udder measurements (cm)			Means
	Before suckling	After suckling	After milking	
5-8	56.25 ± 1.23	60.75 ± 1.82	53.50 ± 1.14	56.83 ± 1.26 ^E
8-11	60.75 ± 1.87	65.00 ± 1.97	57.00 ± 1.29	60.91 ± 1.89 ^D
11-14	64.75 ± 1.94	66.50 ± 2.01	60.75 ± 1.91	64.00 ± 2.03 ^C
14-17	71.75 ± 2.13	73.75 ± 2.16	67.25 ± 2.06	70.91 ± 2.04 ^B
17-20	74.50 ± 2.32	79.50 ± 2.38	74.00 ± 2.18	76.00 ± 2.23 ^A
Overall mean	65.60 ± 1.98 ^b	69.10 ± 2.08 ^a	62.50 ± 1.90 ^b	65.73

A-E Values with different superscripts within a column are significantly (P<0.05).

a-b Values with different superscripts within a row are significantly (P<0.05).

2. Teat diameter (cm):

Teat diameter (cm) in the Maghrebi she-camels was insignificantly increase with different ages. It was insignificantly higher in the Rear than fore teats before suckling, after suckling or after milking in different ages (Table 2). The highest value of the teats diameter (cm) was recorded in the Rear teats of she-camels at 17 to 20 years, while the lowest value of the teats diameter (cm) was recorded at 5 to 8 years before suckling, after suckling and after milking. Similar trends were recorded by **Amal (2018)** and **Ashour et al. (2019)**. The increase of teats diameter after milking may be due to the full of the udder by milk secretion from mammary gland. **Zayeed et al. (1991)** reported that, there is great variation in teat size and length in camels, and this was due to some reasons such as camel type, lactation stage, parity number, ability of the she-camel to milking procedure and udder and teat disease. On the other hand, **Eisa and Hassabo (2009)** reported that teat diameter of the Rear teats was also found to be significantly different (P<0.01) greater than Fore teats.

Table 2. Effects of different ages in Maghrabi she-camels on the teat diameter (cm)

Age (years)	Teat diameter (cm)					
	Before suckling		After suckling		After milking	
	Fore teat	Rear teat	Fore teat	Rear teat	Fore teat	Rear teat
5-8	4.12±0.16 ^a	4.75±0.18 ^a	5.00±0.21 ^a	6.00±0.23 ^a	5.50±0.22 ^a	6.00±0.24 ^a
8-11	8.50±0.36 ^a	8.87±0.38 ^a	11.25±0.51 ^a	13.37±0.62 ^a	6.37±0.25 ^a	7.00±0.28 ^a
11-14	9.37±0.42 ^a	10.87±0.50 ^a	11.75±0.52 ^a	13.62±0.64 ^a	7.87±0.32 ^a	7.87±0.29 ^a
14-17	9.62±0.46 ^a	11.37±0.52 ^a	11.75±0.53 ^a	13.62±0.65 ^a	8.37±0.35 ^a	8.75±.39 ^a
17-20	10.12±0.51 ^a	12.37±0.57 ^a	12.87±0.56 ^a	14.62±0.69 ^a	8.50±0.38 ^a	10.03±0.66 ^a
Overall mean	8.34±0.35 ^a	9.64±0.43 ^a	10.52±0.54 ^a	12.24±0.56 ^a	7.32±0.32 ^a	7.93±0.39 ^a

before suckling, after suckling and after milking (Means±SE).

3. Teat length (cm):

Teat length (cm) in the Maghrebi she-camels was insignificantly increased with the advancement of age before suckling, after suckling and after milking (Table 3). The teat length (cm) in Maghrebi she-camels was insignificantly higher in the Rear than Fore teats with different ages either before suckling, after suckling and after milking. The teat length (cm) in Maghrebi she-camels was insignificantly higher of she-camel at <17 to 20 years and lower at <5 to 8 years. The highest value of teat length was recorded after suckling and the lowest value was recorded before suckling. Similar trends were recorded by **Amal (2018)** and **Ashour *et al.* (2019)** in Maghrebi she-camels.

Table (3): Effects of different ages in Maghrabi she-camels on the teat length (cm) before suckling, after suckling and after milking (Means±SE).

Age (years)	Teat length (cm)					
	Before suckling		After suckling		After milking	
	Fore teat	Rear teat	Fore teat	Rear teat	Fore teat	Rear teat
5-8	6.87±0.24 ^a	8.25±0.32 ^a	5.00±0.20 ^a	6.00±0.24 ^a	7.75±0.29 ^a	9.12±0.30 ^a
8-11	7.50±0.28 ^a	9.12±0.38 ^a	11.25±0.48 ^a	13.37±0.60 ^a	9.25±0.41 ^a	10.25±0.52 ^a
11-14	9.12±0.43 ^a	9.37±0.41 ^a	11.75±0.51 ^a	13.62±0.61 ^a	11.37±0.50 ^a	12.12±0.55 ^a
14-17	9.75±0.46 ^a	9.87±0.45 ^a	11.75±0.53 ^a	13.62±0.64 ^a	11.50±0.53 ^a	12.37±0.57 ^a
17-20	9.87±0.48 ^a	11.12±0.48 ^a	12.81±0.57 ^a	13.62±0.63 ^a	13.00±0.61 ^a	13.62±0.63 ^a
Overall mean	8.62±0.34^a	9.54±0.42^a	10.51±0.50^a	12.04±0.53^a	10.57±0.52^a	11.49±0.50^a

4. Milk yield (liter):

Daily milk yield (liter) of the Maghrebi she-camels was insignificantly higher at <8 to 11 years, while total milk yield was significantly ($P<0.05$) increased with the advancement of age (Table 4). The highest ($P<0.05$) value of total milk yield in Maghrebi she-camels was recorded at < 14-17 and <17-20 years, while the lowest ($P<0.05$) value was recorded at <5-8 years. Moreover, total milk yield (liter) was significantly ($P<0.05$) increased in Maghrebi she-camels at <17-20 years as compared to other ages. The highest ($P<0.05$) value of the total milk yield was recorded in she-camels at <17-20 years and the lowest ($P<0.05$) value was recorded at < 5-8 years. Similar results were recorded by **Amal (2018)** and **Ashour *et al.* (2019)** in Maghrebi she-camels. In addition, **Musa *et al.* (2006)** stated that peak of milk yield was reached of she-camels at 9 years of age. In Egypt, **Elbahy (1962)** and **Shalash (1979)** revealed that, daily milk production of camel herds managed under good feeding regimens amounted to a range of 10-15 kg, whereas with poor feeding, daily milk yield declined to only 4 kg. The increase of milk yield with the advancement of age could be a result of the increasing development and size of the udder and the increasing body size over that of the first lactation, which results in a larger digestive system and a larger mammary gland for the secretion of milk. Moreover, metabolic status through the lactation period in the first lactation (primiparous, PP) mammary gland is different from that in more mature animals (multiparous, MP). Because the nutrients in PP animals are prioritized not only for lactation but also for continued growth of the animal.

DETECTION OF HELICOBACTER SPECIES IN COMPANION

Table (4): Effects of different ages in Maghrabi she-camels on daily and total milk yield (liter) (Means±SE).

Age (years)	Daily milk yield (liter)	Total milk yield (liter)
5-8	3.00± 0.16 ^a	708.90±23.60 ^c
8-11	4.50±0.18 ^a	959.50±25.71 ^b
11-14	3.60±0.15 ^a	952.30±25.82 ^b
14-17	3.90±0.19 ^a	991.50±28.11 ^b
17-20	3.90±0.26 ^a	1166.70±30.17 ^a

Within a column, within ages, means with different superscripts letters differ significantly (P<0.05).

5. Milk vein diameter (cm):

Milk vein diameter (cm) in Maghrebi she-camels was not significantly different with different ages before suckling, after suckling and after milking (Table 5). The mean milk vein diameter (cm) in Maghrebi she-camels was insignificantly higher before suckling, after suckling or after milking in different ages. Similar trends were recorded by **Amal (2018)** and **Ashour *et al.* (2019)** in Maghrebi she-camels. The increase of milk vein diameter after milking may be due to the full of the udder by milk secretion from mammary glands

Table 5. Effects of different ages in Maghrebi she-camels on milk vein diameter (cm) before suckling, after suckling and after milking (Means±SE).

Age (years)	Milk vein diameter (cm)					
	Before suckling		After suckling		After milking	
	Left	Right	Left	Right	Left	Right
5-8	1.52±0.10 ^a	1.52±0.10 ^a	1.90±0.15 ^a	1.87±0.16 ^a	1.75±0.13 ^a	1.57±0.12 ^a
8-11	1.53±0.11 ^a	1.52±0.09 ^a	1.92±0.16 ^a	1.92±0.17 ^a	1.78±0.13 ^a	1.73±0.14 ^a
11-14	1.67±0.12 ^a	1.57±0.13 ^a	2.20±0.23 ^a	2.00±0.24 ^a	1.80±0.16 ^a	1.75±0.15 ^a
14-17	1.69±0.14 ^a	1.60±0.15 ^a	2.34±0.25 ^a	2.07±0.26 ^a	1.83±0.19 ^a	1.79±.17 ^a
17-20	2.19±0.27 ^a	1.97±0.19 ^a	2.48±0.29 ^a	2.31±0.28 ^a	2.36±0.29 ^a	1.81±0.20 ^a
Overall mean	1.72±0.12 ^a	1.63±0.10 ^a	2.16±0.15 ^a	2.03±0.29 ^a	1.90±0.19 ^a	1.73±0.14 ^a

6. Milk composition (%):

Data presented in Table 6 indicated that, camel milk fat (%) and milk ash (%) contents were insignificantly increase, while lactose (%) content was insignificantly decreased with the progress of age. The highest values of milk fat (%) and ash (%) were recorded of she-camels at <17 to 20 and the lowest value was recorded of she-camels at 5 to 8 years (Table 6). The highest value of lactose content was recorded at 5 to 8 years and the lowest value was recorded at <17 to 20 years. Protein contents (%) and total solids (%) contents were significantly ($P<0.05$) decrease with the progress of age. **Ashour et al. (2019)** found that, Fat (%) and ash contents (%) in Maghrebi she-camels milk were significantly ($P<0.05$) increase with the progress of age. **Khaskheil et al. (2005)** reported that milk fat content (%) of she-camel ranged between 1.8 to 5.0 % with an average of $2.3 \pm 0.40\%$. **Konuspayeva et al. (2009)** noted also that the milk fat content of the dromedary she-camel was between 1.2 to 6.4 %. **Yagil and Etzion (1980)** reported that Plentiful drinking water, the camels milk composition was 4.3% fat, 14.3% solid not fat (%), 4.6% protein and 4.6% lactose. In India, **Ohri and Joshi (1961)** reported that the values of camel milk composition was 3.87% fat, 9.59% solids not fat 4.0% protein, 4.9% lactose. **Khan et al. (2003)** reported that camel milk containing 3.08 %, 9.92%, 3.8%, 5.4% and 0.7% for fat, solids not fat, protein, lactose, and ash, respectively. In North Kenya, **Nawito et al. (1967)** reported that, the fat, protein, and lactose in dromedary she-camel milk were, 3.8%, 3.5% and 3.9%, respectively. This could be explained as a result of dietary difference reflecting the desert nature. In Libya, **Gnam and Shereha (1986)** reported, 3.3 to 3.6% fat, 13% dry matter, 87% water, and 3.3 to 3.6 % for protein of camels milk, respectively. These variations in milk composition results might be due to the variations of feed concentration which due to variable according to season as affected by availability of the grasses (**Shuiep et al., 2008**).

Table (6): Effects of different ages in Maghrabi she-camels on milk composition (%) (Means±SE).

Age (years)	Milk composition				
	Fat (%)	Protein (%)	Lactose (%)	Total solids (%)	Ash (%)
5-8	3.50±0.06 ^a	3.73±0.04 ^a	5.10±0.23 ^a	12.70±0.18 ^a	0.64±0.01 ^a
8-11	3.86±0.07 ^a	2.80±0.06 ^b	5.18±0.21 ^a	11.81±0.15 ^b	0.65±0.02 ^a
11-14	3.80±0.08 ^a	2.70±0.05 ^b	4.90±0.19 ^a	11.78±0.14 ^b	0.68±0.02 ^a
14-17	3.84±0.11 ^a	2.78±0.04 ^b	4.91±0.16 ^a	11.20±0.13 ^b	0.70±0.04 ^a
17-20	4.16±0.16 ^a	2.30±0.02 ^b	4.39±0.12 ^a	11.16±0.10 ^b	0.76±0.05 ^a

Within a column, within ages, means with different superscripts letters differ significantly (P<0.05).

7. Blood components:

7.1. Total protein, albumin and globulin concentrations (gm/dl)

Total protein (gm/dl), albumin (gm/dl) and globulin (gm/dl) concentrations in the blood serum of Maghrebi she-camels were insignificantly decreased with the progress of age (Table 7). The highest values of total protein (gm/dl), albumin (gm/dl) and globulin (gm/dl) concentrations were recorded of she-camels at 5 to 8 years and the lowest values were recorded of she-camels at 17 to 20 years. **AboKouider *et al.* (2001)** reported that there were an increase in serum total protein level during the season in camels kept under natural conditions. Similar trend was recorded by **Amal (2018)** and **Ashour *et al.* (2019)** in Maghrebi she-camels. **Ahmed (2013)** found also that total protein was ranged from 6.79 to 8.86 g/dl with average 8.08 g/dl in Lactating Maghrebi she-camel. **Patodkar *et al.* (2010)** found that analysis of blood serum sample of healthy nomadic female camel were 7.57±0.389 (g/dl). **Elkhair and Hartmann (2012)** found that serum protein in the lactating female was 63.7 g/l and 50-62 g/l in the young female.

Table (7): Effects of different ages in Maghrabi she-camels on total protein, albumin and globulin concentrations (gm/dl) in blood serum (Means±SE).

Age (years)	Blood components		
	Total protein (gm/dl)	Albumin (gm/dl)	Globulin (gm/dl)
5-8	7.96±0.21 ^a	4.62±0.16 ^a	3.34±0.13 ^a
8-11	7.94±0.19 ^a	4.58±0.12 ^a	3.36±0.17 ^a
11-14	7.66±0.16 ^a	4.49±0.11 ^a	3.17±0.11 ^a
14-17	7.42±0.15 ^a	4.38±0.08 ^a	3.04±0.09 ^a
17-20	7.40±0.11 ^a	4.27±0.04 ^a	3.13±0.10 ^a

7.2. Glucose, total cholesterol and triglycerides concentrations (mg/dl)

Glucose and total cholesterol concentrations (mg/dl) in the blood serum of Maghrebi she-camel were insignificantly increased with the progress of age. The highest values of Glucose and total cholesterol concentrations (mg/dl) in the blood serum were recorded of she-camels at <17 to 20 years, while the lowest values were recorded of she-camels at <5 to 8 years (Table 8). However, triglycerides concentration (mg/dl) was insignificantly decreased with the advancement of age. The highest value of triglycerides concentration (mg/dl) in Maghrebi was recorded of she camels at <5 to 8 year and the lowest value was recorded at <17 to 20 year.

These results indicated that the age of she-camel play an important and vital role on the concentrations of serum total cholesterol (TC) and triglycerides (TG). Moreover, milk yield plays a role in increasing TC and TG concentrations with the progress of age. Similar trend was recorded by **Amal (2018)** and **Ashour *et al.* (2019)** in Maghrebi she-camels.

DETECTION OF *HELICOBACTER* SPECIES IN COMPANION

Table (8): Effects of different ages in Maghrebi she-camels on glucose, total cholesterol and triglycerides concentrations (mg/dl) in blood serum (Means±SE).

Age (years)	Blood components		
	Glucose (mg/dl)	Total cholesterol (mg/dl)	Triglycerides (mg/dl)
5-8	80.87±2.19 ^a	51.56±1.48 ^a	91.18±3.16 ^a
8-11	81.20±2.28 ^a	52.07±4.61 ^a	90.72±3.07 ^a
11-14	81.60±2.37 ^a	52.20±1.68 ^a	89.33±3.86 ^a
14-17	82.70±2.46 ^a	53.72±1.81 ^a	89.11±3.82 ^a
17-20	83.11±2.54 ^a	54.86±1.87 ^a	89.07±3.18 ^a

In conclusion, milk yield (Liter), udder and teat measurements (cm), milk vien diameter (cm), milk composition (%) and blood serum constituent concentrations were significantly better with the advancement of age in Maghrebi she-camels.

REFERENCES

- Abdalla, E.B.; A.A. Ashmawy; M.H. Farouk; O.A. Salama, F.A.; Khalil and A.F. Seiouly (2015).** Milk production potential in Maghrebi she-camel. *Small Rumin. Res.*, 123:129-135.
- Abokouider, S.N.; N. Dabbag and F. Schenkel (2001).** Studies on the camels blood parameters in relation to season in Syria. 6th Annual Conf. on Anim. Prod. Under Arid Condition. Alain, United Arab Emirates.
- Adediran, S.A.; D.A. Ratkowsky; D.J. Donaghy and A.E.O. Malau-Auli (2012).** Comparative evaluation of new lactation curve model for pasture-based Holstein-Friesian dairy cows, *J. Dairy Sci.*, 95 (9): 5344-5356.
- Ahmed, F.H.S. (2013).** Some productive traits in Maghrebi she-camel. M.Sc. Thesis, Fac. Ain-Shams Univ., Egypt.
- Amal, A.O. Ibrahim, (2018).** Effect of plan of nutrition for dromedary female camel and camel calves on maternal behavior and productive and reproductive performance. Ph.D. Thesis, Faculty of Agriculture, Ain Shams University, Egypt.
- A.O.A.C. (1990).** Association of Analytical Communities Official Methods Analysis. 15 th Ed., Washington, DC., USA., pp200-210.

- Ashour, A.M.; A.E.B. Zeidan; M.I. Badr, A.A. Abd El-Hamid and M.T.A. Aboul-Rayat (2019).** Milk yield and its composition of the Maghrebi she-camel in the different parities. Egypt. J. Sci., 34: pp30-43.
- Ayadi, M.; M. Hammadi, T.; Khorehani, A.; Barmat, M. Atigui, and G. Caja (2009).** Effects of milking interval and cisternal udder evaluation in Tunisian Maghrebi dairy dromedaries (*Camelus dromedarius*). J. Dairy Sci., 92: 1452-1459.
- Banerjee, G.C. (1988).** "Feeds and Principles of Animal Nutrition". Mohan Primalani of Oxford and IBH Publishing Co. 66. Janpath New Delhi, India.
- Bekel, T.; N. Lunderheim and K. Dahlborn (2011).** Milk feeding and feeding behavior in the camel (*Camelus dromedarius*) during 4 watering regimens. J. Dairy Sci., 94 : 1310-1317.
- Doumas B.T. (1971).** Clin. Chim.Acta, pp. 31-87.
- Duncan, D.B. (1955).** Multiple range and multiple F-Test. Biometrics, 11: 1-42.
- Eisa, M.O. and Hassabo, A.A (2009)** Variation in milk yield and composition between fore and rear udder halves in she camel (*Camelus dromedarius*). Pakistan J. Nutr., 8 (12): 1868-1872.
- El-Bahy, G.M. (1962).** Normal contents of Egyptian camel milk. Vet. Med. J., 8: 7-17.
- Elkhair, A:M: and S. Hartmann (2012).** Serum protein capillary patterns in camels. The Third Conf. of Intern. Society of Camelid Res. and Dev. Held in Muscat, of Oman, 29 January-1 February.
- FAO, (2012).** [http:// www.AG/ AGAINFO/ themes/ en/ dair/ camel. html](http://www.AG/AGAINFO/themes/en/dair/camel.html).
- Fassati P. and Prencipe. L (1982).** Clin. Chem., 28: 2077.
- Faye. B. and P. Bonnet (2012).** Camel sciences and economy in the world: current situation and perspectives. Proc. Of the 3rd ISOCARD Con., 1. Kadin (Ed). Muscat, 2012, Sultan Qaboos Univ. Pub., Muscat, Sultanate of Oman.
- Gnam, S.O. and Shereha, A.M. (1986).** Composition of Libyan camel' milk. Austral. J. Dairy. Tech., pp. 33-36.
- Gornal A.C; Bardawill C.J. and David M.M. (1949).** J. Biol. Chem., pp. 177:751
- IDF. (1993).** Milk determination of nitrogen content (Kjeldahl method) international Dairy Federation (IDF). Standard 20 B, Brusels, Belgium.
- Karapehliyan, M.; E. Atakisi, O. Atakisi; R. Yucart and S.M. Pancarci (2007).** Blood biochemical parameters during the lactation and dry period in Tuj eves. Smell Rum. Res., 73: 267- 271.
- Khan, B.B., A. Iqbal and M. Riaz (2003).** Production and Management of Camels. Pakistan. T. M. Printers, Al-Rahman Plaza, Amimpur Bazar, Faisalabad, Pakistan.
- Khaskheil, M.; M.A. Arian; S. Chaudhary; A.H. Sommro and T.A. Quresbi (2005).** Physico-chemical quality of camel milk J. Agric. Soc. Sci., 1 : 164-166.
- Konuspayeva, G.; Faye, B. and Loiseau, G. (2009).** The composition of camel milk: a meta- analysis of the literature data. J. Food Comp. Analysis, 22: 95 - 101.

- Ling, E.R. (1963).** Textbook of Dairy Chemistry. Vol. 11. Practical Chapman and Hall, LTD, London 4th ed. 140 p.
- Mishra, P.K, K. Mishra and J.B. Nayak (1978).** Relation of mammary measurements with milk yield in dairy cows. Indian J. Dairy Sci., 3(3): 214-219.
- Musa, H.H.; E.S. Shuiep; E.M. Ibtisam and El-Zubier (2006).** Camel husbandry among pastoralists in Darfur in western Sudan. Nomadic Peoples, Vol. 10 Issue 1, 101p.
- Musaad, A.; B. Faye and A.A. Nikhela (2013).** Lactation curves of dairy camels in an intensive system. Trop. Anim. Health. Prod., 45: 1039-1046.
- Nawito, M.F., Shalash, M.R., Hoppe, R. and Rakha, A.M. (1967).** Reproduction in the Female camel. Bull. Anim. Sci. Res. Ins. Cairo, No. 2.
- Ohri, S.P. and Joshi, B.K. (1961).** Composition of camel milk. Indian Vet. J. 38 (a): 514-516, 38(b): 604-606.
- Patodkar; V.R.; A.P. Somkuwar; S. Parekar and N. Khade (2010).** Influence of sex on certain biochemical parameters in nomadic camels (*Camelus dromedarius*) nearby pune, in Maharashtra Veterinary World, Vol., 3 (3): 115- 117.
- Richmond, W., (1973).** Clin. Chem., 19, 1350.
- SAS (2006).** SAS Users Guide : Statistical Analysis System. Inc. Cary, NC, USA.
- Seioudy, A.F.H. (2013).** Some productive traits in Magrebi she-camels. M.Sc. Thesis, Fac. of Agric., Ain Shams Univ., Egypt.
- Shalash, M.R., (1979).** Utilization of camel meat and milk in human nourishment. In: camels IFS Symposium, Sudan, pp. 285-306.
- Shuiep, E.S.; I.E.M. El-Zubeir; O.A.O. El Owai and H.H. Musa (2008).** Influence of season and management on composition of new camel (*Camelus dromedarius*) milk in Khartoum State, Sudan. Trop. Subtrop. Agroecosys., 8: 101- 106.
- Wilson, R.T. (1984).** The camel. London, Longman (publ.). Third Addition London. New York, pp. 25-50.
- Yagil R, Etzion Z., (1980).** Effect of drought condition on the quality of camel milk. J. Dairy Res., 47: 159-166.
- Zayeed, A.A.; A.B. Magdub; A.M. Shareha; A. El-Sheikh and M. Maazally (1991).** Camels in the Arab World. University of Omar El-Mukhar, Libya. 1ST ed. (Arabic).

تأثير العمر على انتاج اللبن ومكوناته ومكونات الدم في النوق المغربي

احمد موسى عامر¹ ، محمد فاروق² ، السيد احمد ابو الفتوح¹ ، أمل عبدالكريم عثمان¹ ، أمل الدرديري¹ ، طارق مسلم مهدي¹ ، أحمد لولي دسوقي¹

1- معهد بحوث الانتاج الحيواني- الدقى- الحيزة -مصر.

3- قسم الإنتاج الحيواني – كلية الزراعة بالقاهرة – جامعة الأزهر - مصر.

الملخص العربى

أجريت هذه الدراسة على عدد 40 ناقة مغربى والتي قسمت الى خمسة مجموعات على حسب عمرها (8 نوق فى كل مجموعة) وكانت الأعمار هى اكبر من 8-5 و اكبر من 11-8 و اكبر من 14-11 و اكبر من 17-14 و اكبر من 20-17 سنة على الترتيب. وتهدف هذه الدراسة الى معرفة تأثير قياسات الضرع (سم)، طول الحلمات (سم) و قطر الحلمات (سم) سواء الامامية أو الخلفية و قطر وريد اللبن (سم) وذلك قبل الرضاعة وبعدها وبعد الحلابة على إنتاج اللبن (لتر). كذلك تم تقدير إنتاج اللبن اليومي والكلبي (لتر). أيضا تم تقدير كل من نسبة الدهن (%) والبروتين (%) واللاكتوز (%) والمكونات الصلبة (%) والرماد (%) فى اللبن. وأيضا تم تقدير كل من تركيزات البروتين الكلى (gm/dl) والاليومين (gm/dl) والجلوبيولين (gm/dl) والجلوكوز (mg/dl) والكوليسترول الكلى (mg/dl) والجلسريدات الثلاثية (mg/dl) فى سيرم الدم. وقد أظهرت النتائج أنه لم يكن هناك تأثير معنوى لعمر النوق على الانتاج اليومي للبن (لتر) بينما كان هناك تأثير معنوى (على مستوى 0.05) على الإنتاج الكلى للبن (لتر) وخاصة فى النوق عند عمر اكبر من 17 الى 20 سنة مقارنة بباقى الاعمار. كان هناك زيادة معنوية (على مستوى 0.05) فى قياسات ضرع النوق (سم) وذلك مع التقدم فى العمر وكانت أعلى قيمة مسجلة فى النوق عند عمر اكبر من 17 الى 20 سنة بعد الرضاعة. بينما لم يختلف قطر وريد اللبن (سم) معنويا مع التقدم فى العمر سواء قبل الرضاعة وبعدها او بعد الحلابة. لم يختلف قطر الحلمة (سم) وطول الحلمة (سم) معنويا مع التقدم فى العمر وكانت أعلى قيمة لكل من قطر وطول الحلمة مسجلة فى الحلمات الخلفية سواء قبل الرضاعة وبعدها او بعد الحلابة. لم تتأثر مكونات نسبة الدهن (%) واللاكتوز (%) والرماد (%) فى اللبن بدرجة معنوية مع تقدم النوق فى الاعمار المختلفة، فى حين زادت نسبة البروتين (%) والمكونات الصلبة معنويا (على مستوى 0.05) فى النوق عند عمر اكبر من 5-8 سنوات. لم تختلف تركيزات كل من البروتين الكلى (gm/dl) والاليومين (gm/dl) والجلوبيولين (gm/dl) فى سيرم الدم باختلاف عمر النوق. زيادة تركيز الجلوكوز (mg/dl) والكوليسترول الكلى (mg/dl) بدرجة غير معنوية فى سيرم الدم فى النوق باختلاف أعمارها. كذلك انخفض تركيز الجلسريدات الثلاثية (mg/dl) فى سيرم الدم بدرجة غير معنوية باختلاف اعمار النوق. الموجز : زيادة إنتاج اللبن وقياسات الضرع فى النوق المغربي مع التقدم فى العمر. لم تتأثر مكونات اللبن ما عدا البروتين والمواد الصلبة الكلية فى الأعمار المختلفة للنوق. كذلك لم يتأثر تركيز سيرم الدم معنويا مع التقدم فى عمر النوق.