

Physicochemical characteristics of Damascus (Shami) Cyprus goats milk in different lactation periods

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Abstract

The research conducted in Government farm. The objective of this work was to study the effect of lactation on composition, physico-chemical properties and some important minerals content (calcium, phosphorous and iron) of Damascus (Shami) Cyprus goats milk during different lactation periods(begin, mid and end). The fresh goats milk samples were collected from three goats in three lactations. The lactation had significant increasing effect on fat, protein, ash, TS, SNF, titratable acidity and viscosity and insignificant in minerals.

الخلاصة

أجري البحث في مزرعة حكومية. وهدف البحث لدراسة تأثير مراحل الادرار على التركيب والخواص الفيزيائية والكيميائية، وبعض المعادن المهمة (الكاسيوم ، الفسفور والحديد) للبن الماعز الدمشق (الشامي) القبرصي في خلال فترات ادرار مختلفة (بداية، ومنتصف ونهاية) حيث تم جمع عينات اللبن الطازج لثلاث من الماعز في ثلاث فترات ادرار. وكان لتأثير الادرار زيادة كبيرة في الفروقات المعنوية للدهون، البروتين، الرماد، الجوامد الكلية، الصلبة اللادهنية، الحموضة والزوجة. و لا توجد فروق معنوية للمعادن.

Introduction:

Sudan goats distributed all over the country, around the Nile basin, Desert areas, rich and poor savannah and in small a big towns, over the country, around the Nile basin, Desert areas, rich and poor savannah and in small a big towns, it is called poor man's cow it can withstand all the adverse climatic conditions. The goat of Sudan divided into four major ecotypes. Nubian goat which is the predominant type represents more than 50% of the goat population in the country its milk breed , weights up to 40/kg were recorded. The Desert goat (17%) with long-legs, raised by the Savannah belt in scarcely of water & depending on the succulent plants, it is a breed for meat. The mountain goats (tagar) have a short legs and ears, 3% of the goat population found in Nuba mountain, Alengasna, and Jabel murra have a very few amount of milk for the kids. Small number of exotic breeds have been imported into the country i.e. Anglo-Nubian, Saanen (temperate breed) males were imported from Holland for cross breeding, Damascus, Toggenburg (Hcenr,2009).

Damascus goats also known as the Shami, is a native breed of Syria and other Near East countries. It was imported into Cyprus some 70 years ago to upgrade the local Cypriot goat population. (Mavrogenis, A.P. *et al* 2006).

Recently about 2.000 of the Damascus from Cyprus goats introduced to Sudan during the year of 2008-2011. The introduced animals are distributed in three big governmental breeding farms in Northern, Khartoum and Kasala States and in some private farms in number of localities. Big numbers are also distributed through Zakat Chamber within the framework of supporting the poor families, Ahmed, K. A. ,personal communication, 2011.

Milk composed of chemical composition (total solids, non-fat solids, fat, protein, lactose and ash), physical (Specific gravity, Titratable acidity, pH, Viscosity, Electrical conductivity, Refractive index and Freezing point), minerals ,vitamins and some enzymes, Moreover, milk is not a commodity with a uniform composition but is more widely influenced by environmental and genetic factors than any other biological fluid (Bylund, 1995).

Martial & Method:

The Damascus(Shami)Cyprus goats, owned by Government and the farm located in north west of Omdurman . The animals kept in a good condition with regard to housing, feeding, health care and general management.

The feeding regime consisted of hay (*Medicago Sativa*) and concentrate of 250 g consist of (sorghum grain, cotton seed cake, wheat bran, salt, and vitamins) per head/day.

After colostrum period, in the first two months of lactation, kids stopped sucking and separated from their mothers. The animals milked manually morning and evening. In the course of the 180 days of lactation period a total of milk samples are collected. Three samples of milk from three goats are taken for analysis. This continues for every two-month intervals during the three lactation periods (Begin, middle and end of lactation).

Milk samples kept in a refrigerator at a temperature of +4°C to the time of laboratory work.

Samples of milk were chemically and physically tested to determine the chemical composition (total solids, non-fat solids, fat, protein, lactose and ash), some important minerals content (calcium, phosphorous and iron) and physical characteristics (Specific gravity, Titratable acidity, pH, Viscosity, Electrical conductivity, Refractive index and Freezing point). The SPSS statistical computer software (SPSS for windows, release 17, 2007) was used to analyze the data. Results are presented mainly in the form of descriptive tabular summaries. Chi-square (c2) or t tests were carried out as appropriate to assess the statistical significance or otherwise of particular comparisons.

Results and Discussion:

Table(1): Chemical properties of Damascus Cyprus goats milk
(Percentage -Means \pm SE)

Lactation No.	Fat	Protein	Lactose	Ash	Total solids
begin	4 ^a \pm 0.0	3.5 ^a \pm 0.1	3.6 ^a \pm 0.0	0.8 ^a \pm 0.0	12 ^a \pm 0.2
Mid	4 ^a \pm 0.0	3.4 ^a \pm 0.1	3.4 ^a \pm 0.0	0.75 ^a \pm 0.0	11.5 ^a \pm 0.2
End	4.1 ^a \pm 0.0	3.4 ^a \pm 0.1	3.4 ^a \pm 0.0	0.78 ^a \pm 0.0	11.3 ^a \pm 0.2

a,b,c means with the same letters were insignificantly ($P < 0.05$) different.

1-Chemical properties of Damascus (Shami) Cyprus goats milk:

As shown in table (1), the total solids content of Damascus(Shami) Cyprus goats milk for begin, mid and end lactation production were 12 %, 11.5 and 11.3. Proteins were 3.5 %, 3.4 and 3.2%. Lactose were 3.6 %, 3.4 and 3.2%. Fat were 4 %, 4 and 4.1% .Ash were 0.8 %, 0.75 and 0.78%.

There no significant differences ($P>0.01$) between chemical composition (total solids, non-fat solids, fat, protein, lactose and ash). The total solids of Damascus/Cyprus goats milk for begin, mid and end lactation production were 12 %, 11.5 and 11.3. These results were agreed with that obtained by Mahmut, (2004), Haeniein, (1992); Haeniein, (1993) and higher than that obtained by Elamin (1992). Protein of Damascus/Cyprus goats milk for begin, mid and end lactation production were 3.5 %, 3.4 and 3.2% respectively. These results were agreed with that obtained by Ghada ,(2005) , Mahmut, (2004) and disagreed with Asif (2010). Lactose content of Damascus/Cyprus goats milk for begin, mid and end lactation production were 3.6 %, 3.4 and 3.2% respectively. The present findings are in agreement with Antunac et al. (2001) and Mahmut, (2004),also these results agreed with Davies (1939) and disagreed with (Posati and Orr I 976; IDF 1986; Saini and Gill (1991) (Jeness .1980 .,Mepham, 1983 and Jensen ,1995) . Fat content of Damascus/Cyprus goats milk for begin, mid and end lactation production were 4 %, 4 and 4.1% respectively. These results were agreed with that obtained by Ghada (2005) , Mahmut, (2004) and higher than that obtained by (Posati and Orr I 976; IDF 1986; Saini and Gill 1991) and disagreed with Asif (2010) .Ash content of Damascus/Cyprus goats milk for begin, mid and end lactation production were 0.8 %, 0.75 and 0.78% respectively. These results were agreed with that obtained by Ghada ,(2005) , Mahmut, (2004) .

Table(2): Physical properties of Damascus/Cyprus goats milk (percentage- Mean \pm SE)

Lactation No.	Specific gravity	Titratable acidity	pH	Viscosity	Electrical conductivity	refractive index	Freezing point
begin	1.032 ^a \pm 0.0	0.15 ^a \pm 0.0	6.6 ^a \pm 0.0	1.66 ^a \pm 0.0	0.010 ^a \pm 0.0	1.352 ^a \pm 0.0	-0.54 ^a \pm 0.0
Mid	1.031 ^a \pm 0.0	0.16 ^a \pm 0.0	6,4 ^b \pm 0.0	1.82 ^a \pm 0.0	0.010 ^a \pm 0.0	1.458 ^a \pm 0.0	-0.54 ^a \pm 0.0
End	1.029 ^a \pm 0.0	0.17 ^a \pm 0.0	6.5 ^c \pm 0.0	1.86 ^a \pm 0.0	0.010 ^a \pm 0.0	1.458 ^a \pm 0.0	-0.55 ^a \pm 0.0

a,b,c means with the same letters were insignificantly ($P > 0.05$) different.

2 - Physical properties Damascus/Cyprus goats milk

As shown table (3) Specific gravity of Damascus/Cyprus goats milk for begin, mid and end lactation production were 1.032 %, 1.031 and 1.029%. Titratable acidity were 0.15 %, 0.16 and 0.17%. pH were 6.6 %, 6,4 % and 6.5 %. Viscosities were 1.66, 1.82 and 1.86. Electrical conductivity were 0.010. Refractive index of were 1,352, 1.458 and 1.458. Freezing point were -0.54, -0.54and -0.55

There no significant differences ($P>0.01$)between physical characteristics (Specific gravity, titratable acidity, pH, viscosity, Electrical conductivity, refractive index and freezing point).Specific gravity of Damascus/Cyprus goats milk for begin, mid and end lactation production were 1.032 %, 1.031 and 1.029% respectively. These results were agreed with that obtained by Asif (2010). Titratable acidity of Damascus/Cyprus goats milk for begin, mid and end lactation production were 0.15 %, 0.16 and 0.17% respectively. These results were agreed with that obtained by Asif (2010) and Mahmut (2004). pH of Damascus/Cyprus goats milk for begin, mid and end lactation production were 6.6 %, 6,4 % and 6.5 % respectively. These results were agreed with that obtained by Asif (2010), Syed and Jalal (2010). Viscosity

of cyprus shami goat milk for begin , mid and end lactation production were 1.66 , 1.82 and 1.86 respectively. These results were agreed with that obtained by Bhosale et al (2009).Electrical conductivity were 0.010. These results were agreed with that obtained by Asif (2010). , Mahmut (2004). Refractive index of were 1,352, 1,458 and 1.458 these results were agreed with that obtained by Asif (2010). The Freezing points were -0.54, -0.54and -0.55, these results were agreed with that obtained by Asif (2010). The physic- chemical properties and characteristics of Damascus/Cyprus goats milk could be use for dairy goat industries as well as for marketing the products .Establishment of a research center for Damascus/Cyprus goats in Khartoum state to improve local Sudanese goats, because goats play an important role in the economics of some population groups in Khartoum state.

**Table (3): Minerals content of Damascus/Cyprus goats milk
(percentage mean \pm SE)**

Lactation No.	Ca%	P %	Fe(g)
begin	0.2 ^a \pm 0.0	0.08 ^a \pm 0.0	0.383 ^a \pm 0.0
Mid	0.2 ^a \pm 0.0	0.1 ^a \pm 0.0	0.547 ^a \pm 0.0
End	0.2 ^a \pm 0.0	0.1 ^a \pm 0.0	0.547 ^a \pm 0.0

a,b,c means with the same letters were insignificantly ($P < 0.05$) different.

3: Minerals content of Damascus/Cyprus goats milk:

As shown Table (2), Calcium of Damascus (Shami) Cyprus goats milk for begin, mid and end lactation production were 0.2%. These results were agreed with that obtained by (Posati and Orr I 976; IDF 1986; Saini and Gill 1991) and disagreed with Asif (2010) . phosphorus of Damascus/Cyprus goats milk for begin , mid and end lactation production were 0.08,0.1 and 0.1 These results were agreed with that obtained by (Posati and Orr I 976; IDF 1986; Saini and Gill 1991) and disagreed Asif (2010) . Iron of Damascus/Cyprus goats milk for begin, mid and end lactation production were 0.383, 0.547 and 0.547 These results were agreed with that obtained by Alwabel (2008).

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