COMPARATIVE STUDY ON THE COMPOSITION OF MILK FROM DIFFERENT GOAT BREEDS

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Abstract

Samples of goat 's milk were collected from Sakha Animal Production Research Station from three breeds : 1 Baladi (91 samples) 2 Damascus (110 samples) and 3 Alpine (121 samples). Mean values for the three samples of milk were: Acidity 0.157 , 0. 133 % 0. 147 and fat content 3. 55 , 2. 764 and 3.315 , protein 2.92, 2.43 and 2.64, respectively % and total solids were 12. 27, 10. 49 % and 11.18 . Variations in milk constituents during lactatin period were the fat and protein which were the highest in milk from Baldi, particularly at the beginning of lactation while Alpine goat's milk contained the least nutrients and lasted, for a short lactaion period (22 weeks). Statistical analysis of the data showed that the differences in the milk yield and its comopsition among the three breeds were significant. It was also clear in milk yield and T. S. % in the various stages of lactation.

INTRODUCTION

Recently , the improtance of goat's milk has been recognized in Egypt due to its potentialities in the organized sector. The composition of goat's milk varies according to several factors such as breed, stage of lactation , season of the year etc. This knowledge is of great interest due to the variety of derived products particularly

cheese. Parkash and Jenness (1966) published a review , in which they compiled very thoroughly the availble data on goat's milk . The paper of Jenness and Sloan (1970) is a comparative study on composition of milk from different species . Jenness (1980) studied the characteristics and the composition of goat's milk affected by different factors (feeding , breed , milk yield etc.) on the fat and nitrogen components. The major components in the goat's milk and how they were influenced by the stage of lactaion were investigated by Akinsoyinu *et al.* (1977), O' Conner and Fox (1977), Janness (1980) . Mashaly *et al.* (1984) and Gnan *et al.* (1985) El-Alamy *et al.* (1990) studied the chemical composition of Egyptian goat's milk.

This research was planned to study the variation in the chemical composition of goat milk produced by three breeds.

MATERIALS AND METHODS

Milk samples :

Studies have been conducted on the composition of goat's milk samples from Sakha Animal Production Research Station. Three dairy goat herds were chosen: herd A contioned 13 goats of Baladi breed, herd B consisted of 15 goats of Damascus breed and herd C composed of 15 goats of Apline breed . The three herds were of different ages . Milking was done by milking machine and milk samples were taken every two weeks.

Chemical analysis :

The chemical analysis for acidity , fat protein (Kjeldahl method), and total solid contents of the samples were done according to Ling 1963.

Data obtained were statistically analysed according to Snedecor (1961).

RESULTS AND DISCUSSION

Effect of breed :

Rsults obtained in Table 1 revealed that the average of daily milk yield of Alpine breed was higher (0.455±0. 277 / kg) than Damascus (0.357±0.193 / kg) and

Balaki breeds (O.261 + 0.100 / kg) throughout the lactation period . The Baladi breed produced the richest milk fat protein and total solids which gave (3.86, 2.92 and 12 . 27) , respectively, while the lowest results were obtained for Damascus breed (2.26 , 2.43 and 10 . 49 %). These results agreed with those obtained by Parkash and Jenness (1968). Recent studies have been performed in tropical countries on the milk composition of native and imported breeds . Devendra (1972), Moa *et al.*, (1975) and Akinsoyinu *et al.*, (1977) concluded that goats imported in the tropical countries showed a milk comopsition poorer than the same breeds of local temperature climates, possibly because of inadequte nutrition . On the other hand, Weldy *et al.*, (1964) had demonstrated that high temperature depressed acetic acid production in the rumen and the fat content of the milk.

Also, it can be stated that, in general, the protein content showed small variation than the fat content as a result of breed

Table 1. Average of daily milk yield and its composition in the three breeds.

Components	Dialy milk yield/ kg		
	Baladi *	Damascus **	Alpine ***
Acidity %	0.261± 0.100	0.357± 0.193	0.455±0.797
Fat %	0.157±0.009	0.133±0.012	0.147±0.015
Protein %	3.855± 0.504	2.764±0.480	3.315±0.600
Total Solids %	2.919±0.278	2.431± 0.308	2.636± 0.290
	12.265±0.874	10.494±0.696	11.176±1.014

* Average of 91 samples

** Average of 121 samples

*** Average of 110 samples

Effect of stage of lactation :

Milk Yield: Table 2 shows the average of daily milk yield of the three breeds of goats throughout lactation period (22 weeks).

Table 2. Effect of stage of lactation on the average of milk yield from diffrent breeds of goats .

Stage of lactation (WKS)	Baladi	Damascus	Alpine
4	0.500	0.700	1.200
6	0.450	0.500	1.000
8	0.400	0.450	0.800
10	0.350	0.450	0.700
12	0.300	0.420	0.550
14	0.275	0.350	0.450
16	0.250	0.300	0.450
18	0.200	0.300	0.400
20	0.150	0.250	0.400
22	0.120	0.200	0.300
24	0.100	0.150	--

The highest daily milk yield was obtained in early lactaion period during the 4th week of lactation for the three breeds , then the milk yield gradually decreased reaching the lowest value at the end of lactation period.

Fat Content : The tendency observed for fat content is that there was a gradual increase up to the 12th week for Baladi and Damascus breeds , and a later decrease towardse the lactation period , while there was only a decrease towards the end of lactation period for Alpine breed (Table 3 and Fig . 1) . These results agreeed with those obtained by Parkash and Jenness (1986), Mahieu *et al.* (1977), Jenness (1980) , Mashaly *et al.* (1984) and Gnan *et al.* (1985).

Protein content : Table 3 and Fig. 1 show that protein content decreased up to the end of lactation period for Baladi and Damascus breeds which reached the lowest values (2.58 and 2.47 % , respectively) at 24th week , while Alpine breeds milk was the lowest at 18th week (2.30 %) then increased again towards the end of lactation period . Devendra (1972), Moa *et al.* (1975) and Akinsoyinu *et al.* (1977), observed that the protein content decreased up to the end of lactaion period.

Total solids content : The results obtained indicated that total solids decreased gradually for Baladi , Damascus and Alpine breeds to reach 12.02 , 10 .67 and 9.98 % respectively at the 12th , 14th and the 16th week at the same sequence (Table 3 and Fig. 1), then the total solids contents incresased again towards the end of lactaion period for all the investigated breeds. Jenness (1980) and Mashaly *et al.* (1984) found that the total solids content gradually decreased up to the fourth month of lactation, while Moa *et al.* (1975) and Akinsoyinu *et al.* (1977) observed that total soilds content gradually decreased up to the end of the investigated period (18 weeks).

Titratable acidity : Titratable acidity values increased at first giving the highest acidity at the 12th week (0.163, 0.148 and 0.144 %) for Baladi, Damascus and Alpine breeds respectively, and then it began to decrease giving the lowest acidity at the 20th, the 18th and the 20th week (0.150 , 0.138 and 0.126) in the same order and had an increase at the end of lactation period.

Statistical analysis of the data showed that the differences noted in the average of milk yield among breeds and the various stages of lactation were highly significant (Table 3) .

Also , the differences in the average acidity, fat protein and total solids among the three breeds were significant (Table 4) . The effect of stage of lactation on the average of acidity, fat and protein content for the 3 breeds of goats was insignificant, except the T. S. % which was statistically significant at 5 % level.

From these results it can be concluded that the average of milk yield is affected by the breed of animals and stage of lactation. Meanwhile, acidity, fat protein and total solid contents are affected by the breed of animal only.

Table 3. Effect of stage of lactation on the chemical composition of goat's milk from different breeds .

Stage of lact. (Weeks)	Mean acidity %			Mean fat %			Mean acidity %			Mean total solids %		
	Baladi	Damasucs	Alpine	Baladi	Damasucs	Alpine	Baladi	Damasucs	Alpine	Baladi	Damasucs	Alpine
4	0.150	0.140	0.140	3.32	2.82	2.80	3.42	3.40	2.80	12.91	12.19	11.34
6	0.153	0.142	0.141	3.44	2.96	2.84	3.26	2.96	2.74	12.84	12.07	11.07
8	0.156	0.142	1.141	3.50	3.01	2.90	3.24	2.84	2.69	12.64	11.36	11.00
10	0.158	0.144	0.142	3.50	3.01	2.90	3.17	2.81	2.64	12.09	11.31	10.84
12	0.163	0.148	0.144	3061	3.17	3.00	3.17	2.76	2.49	12.02	10.99	10.48
14	0.151	0.140	0.137	4.29	3.23	2.66	3.17	2.68	2.40	12.54	10.67	10.12
16	0.153	0.140	0.131	0.24	3.21	2.64	3.13	2.66	2.30	12.28	11.17	9.98
18	0.151	0.138	0.133	3.98	3.64	2.38	3.03	2.58	2.30	12.18	11.25	10.47
20	0.150	0.145	0.126	3.60	2.85	2.90	2.86	2.55	2.40	11.33	11.23	11.10
22	0.155	0.146	0.127	3.79	3.13	2.93	2.80	2.51	2.60	11.84	11.60	11.45
24	0.159	0.148	-	3.82	3.43	-	2.58	2.47	-	12.01	11.69	-

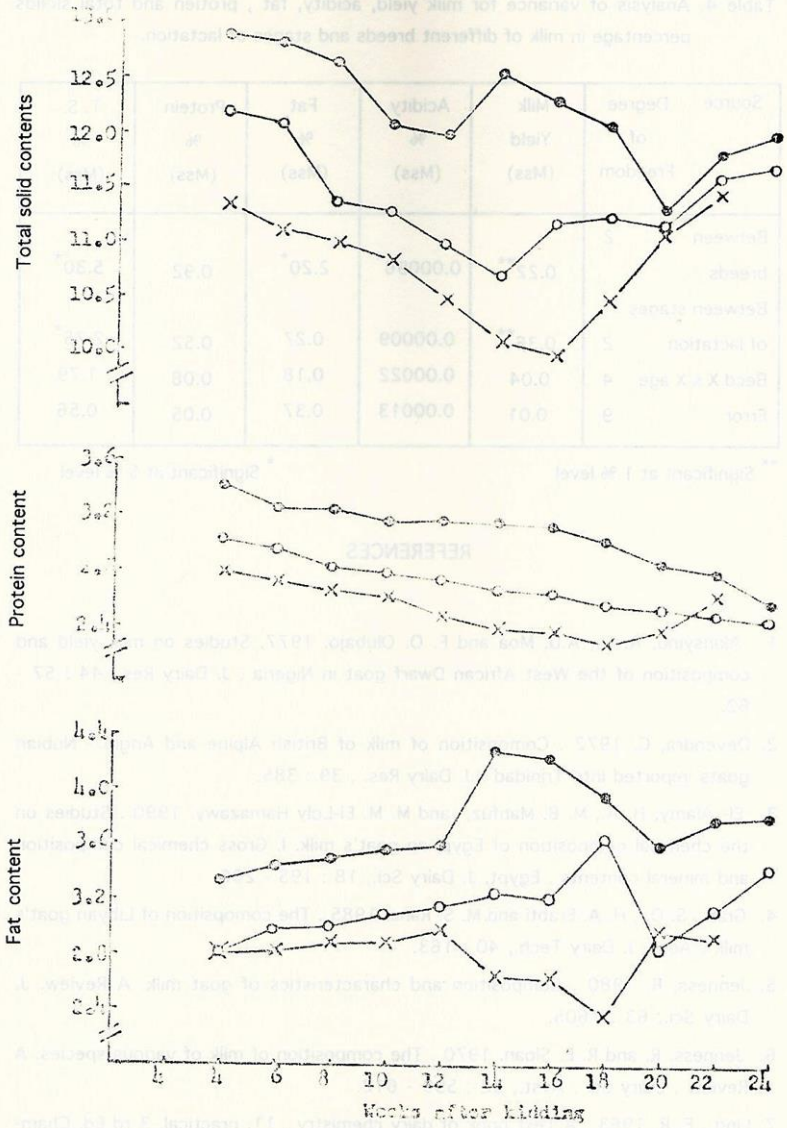

Fig 1. Differense in fat, protein and total solid contents of milk from Baladi goats, Damasecus goats and Alpine goats.

Table 4. Analysis of variance for milk yield, acidity, fat , protien and total slolids percentage in milk of different breeds and stages of lactation.

Source	Degree of Freedom	Milk Yield (Mss)	Acidity % (Mss)	Fat % (Mss)	Protein % (Mss)	T. S. % (Mss)
Between breeds	2	0.22**	0.00096*	2.20*	0.92	5.30*
Between stages of lactation	2	0.36**	0.00009	0.27	0.52	2.75*
Becd X s X age	4	0.04	0.00022	0.18	0.08	1.79
Error	9	0.01	0.00013	0.37	0.05	0.56

** Significant at 1 % level

* Significant at 5 % level

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مقارنة تركيب البان سلالات مختلفة من الماعز

شفيقه اسحق رمزى ، عادل طالب موسى ، السيد حسين حافظ

معهد بحوث الإنتاج الحيوان - مركز البحوث الزراعية - الدقى - جيزة

تم تجميع عينات لبن ماعز من محطة بحوث الإنتاج الحيوانى بسخا من ثلاث سلالات تشمل ١) البلدى (٩١ عينة) ٢) الدمشقى (١١٠ عينة) ٣) الالبابين (١٢١ عينة) وكانت متوسطات نسبة الحموضة فى اللبن ١٥٧ ر. ، ١٣٣ر. ، ١٤٧ر. ٪ وبالنسبة للدهن ٥٥ر٣ ، ٧٦٤ر٢ ، ٣١٥ر٣ ٪ وبالنسبة للبروتين ٩٢ر٢ ، ٤٣ر٢ ، ٦٤ر٢ ٪ وبالنسبة للجوامد الصلبة الكلية ٢٧ر١٢ ، ٤٩ر١٠ ٪ ، ١٨ر١١ على التوالى .

وتم دراسة إختلاف مكونات اللبن الراجع لتأثير مرحلة الإدرار (موسم الحليب) وتميزت نسبة الدهن والبروتين فى اللبن الناتج من الماعز البلدى بأعلى قيمة وخاصة فى بداية موسم الإدارد وأقل نسبة كانت فى لبن سلالة الالبابين فى موسم الحليب الذى لم يتعدّ ٢٢ اسبوعاً فقط .

أظهرت التحليلات الإحصائية فروقاً معنوية عالية التأثير على منتج اللبن ومكوناته بين الثلاث سلالات، اما مرحلة الحليب فكان تأثيرها عالى المعنوية على منتج اللبن ومعنوى على الجوامد الصلبة الكلية وغير معنوى على نسبة الدهن والبروتين والحموضة .