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IMPROVING THE PROPERTIES OF RAS CHEESE MADE FROM GOATS MILK

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ABSTRACT

The effect of heat treatment of goat's milk and cold storage of milk pasteurization with or without refrigerated storage on the properties and keeping quality of Ras cheese was studied. Chemical composition, yield, ripening indices and microbiological properties were examined. Pattern of fatty acids and organoleptic properties of the resultant Ras cheese showed that the moisture, fat, yield and pH value of the cheese produced from goats milk were higher, while lower acidity was detected. Also values of ripening indices were higher in goat's milk cheese. On the other hand, a noticeable increase of short chain fatty acids in goats milk Ras cheese than cow's milk particularly T_2 however Ras cheese made from goats milk T_2 obtained the highest scoring points as in cow's milk cheese.

INTERODUCTION

Ras cheese is the main national variety hard cheese in Egypt and made from cow's milk or mixture of cows and buffalos milk. The properties of cheese as well as its keeping quality is governed by the properties and quality of milk used for its manufacture. Recently, goat's milk has been given great attention because, the goat's milk has a higher nutritional value than cow's milk, and it is recommended by some pediatrician for feeding infant. In a previous study (El- Abd et al., 1992), concluded that use of a mixture of goat's and cow's milk (1: 1) in making Ras cheese gave promising results. Also El- Batawy et al., (1992) used three salting methods in Ras cheese made from a mixture of goat's and cow's milk (1: 1). The chemical composition of Egyptian Goats milk was reported by El- Alamy et al., (1990). Hiekal et al., studied that the change in gross chemical composition, free fatty acids and organoleptic properties of Ras cheese made from cow, goat and mixed milk (1:1 cow to goat). On the other hand, with the changing practices in the dairy industry, milk is sometimes stored for extended periods before processing. The most appropriate method is refrigerated storage, although if extended, might lead to serious problems Yazid (1990). However, the nutritional value and composition of goat's milk is similar to cow's milk. Rakshy and Hassan (1971) and Isatchenko (1981) reported that the size of fat globule milk is nearly to be half the size of that in cow's milk. On the other hand, the content of whey proteins in goat's milk is higher than that in cow's milk. This led to the investigation of refrigerated storage as a means to limit bacterial growth (Diaman, 1993).

Besides, the goats milk contain more digestible proteins and fast incidence of allergy to goat's milk. Also the size of casein micelles in goat's milk is smaller than that in cow's milk (Dariani and Speck, 1980 and Battadjeva, et al., 1985). However, the duration for rennet coagulation of goats milk is longer and the gels is softer compared with cow's milk. There

were some trials to use goat's milk in making semi hard and hard cheese to overcome the problems which faced the cheese making from goats milk by heat treatment (Banks et al., 1987) and (Remeuf, 1992). However, little work has been carried out on Ras cheese which is considered the most popular hard type cheese consumed by the Egypt consumers. Also there was no information about the effect of heat treatment and cold storage on technological and chemical properties on the hard or semi hard cheeses produced.

The aim of this investigation, therefore, was to study the effect of heat treatment and cold storage of goat's milk on the properties of Ras cheese.

MATERIALS AND METHODS

Fresh cow's and goat's milks were obtained from the herd of the Animal Production Research Institute. Arab El-Awamer, Assuet Branch. Commercial fine grade salt was obtained from the local market. Lactic acid starters (*Lactococcus lactis* subsp. *lactis* and *Lactobacillus delbruekii* subsp. *bulgaricus*) and calf rennet powder were obtained from Chr. Hansen's Laboratories, Copenhagen Denmark. All media used for microbiological analysis were obtained from Oxoid Company (Hampshire, England) and Biolife S.R.L. (Milan, Italy).

Ras cheese was made from fresh cow's milk (3.5% fat), as described by Hofi et. al, (1970). Goats milk (3.5% fat) was divided into two parts, the first part (T_1) was heated 75°C / 15 sec. and used in the manufacture of Ras cheese as described by Hofi et. al., (1970). The second part was heated 80°C / 10 sec. and cold then divided to three equal portions. Ras cheese was directly manufactured from the first portion (T_2), the second and third portions were hold at 5−7°C for 24 and 48 hr. (T_3 and T_4) respectively, then made into Ras cheese as described above (Okasha, 2001). The resultant cheeses were salted and waxed then ripened at 14°±1°C and 80−85% relative humidity (RH) for three months during which it was analyzed periodically.

Milk and cheese samples of all treatment were chemically analysed for moisture, titratable acidity (T.A), fat, pH value, salt, total nitrogen (T.N), soluble nitrogen (S.N) and non protein nitrogen (N.P.N) contents according to Ling (1963). The total volatile fatty acids (T.V.F.A) in cheese samples were determined by the method of Kosikowski (1982). Milk fat was extracted from cheese according to Rosegotleb method as described by the AOAC (1975), fatty acids pattern was determined by Gas-liquid chromatography (GLC) as explained by Deeth et. Al., (1983).

At the same time, cheese samples were examined for the presence of certain microbial groups including total bacterial count (T.C) were determined as suggested by the American Public Health Association (A.P.H.A,1992), proteolytic bacterial counts as recommended by Harriagan and McCance (1976) and lipolytic bacterial count was detected as suggested by American Public Health Association (A.P.H.A, 1992).

All cheese samples were organoleptically evaluated when fresh and during ripening every month by five staff members of the dairy department using the following scheme flavoure (50), body& texture (40) and appearance (10) points as suggested by Abdel-Fattah (1966).

The data of all experiments were presented as the means of triplicate analysis. Statistical analysis was carried out using analysis of variance (ANOVA) and the differences between means were tested using Duncants test as well as average computer proram (SPSS,1999) at P<0.05.

RESULTS AND DISCUSSION

Data illustrated in Table (1) show that the chemical composition of cows and goats milk. Slightly higher content of T.S, fat and T.A were noticed in goats milk than the cow's milk, which agreed with those reported by Meislahn (1985), Ashmawy (1977), El-Alamy et al., (1990) and Girgis, et al., (1999). Variations in cheese yield of varios treatment are given in the same Table. As can be seen from the data, control cheese had the lower yield when fresh (before and after salting) and end ripening, compared with the all other treatments. These results are in agreement with those obtained by El-Batawy et al., (1992), El-Demerdash (1996) and okasha (2001).

Table (1): Chemical composition of milk used in cheese making and yield of the resultant Ras cheese during ripening period.

Parameters measured	C	T_1	T_2	T_3	T_4	F-test
T.S	11.68a±0.39	12.29a±0.31	12.30a±0.40	12.29a±0.45	12.28a±0.16	0.498ns
Fat	3.19a±0.03	3.32a±0.04	3.32a±0.02	3.32a±0.03	3.32a±0.02	2.259ns
T.A	0.16b±0.006	0.17ab±0.002	0.17ab±0.003	0.18a±0.004	0.175a±0.003	4.678 *
pH	6.75a±0.18	6.71a±0.15	6.71a±0.11	6.70a±0.09	6.71a±0.14	0.039ns
T.P	3.67a±0.07	3.52b±0.05	3.52b±0.06	3.51b±0.06	3.51b±0.05	3.228ns
Lactose	4.19a±0.02	4.25a±0.03	4.24a±0.021	4.24a±0.02	4.25a±0.11	0.856ns
Ash	0.71b±0.004	0.76a±0.003	0.76a±0.002	0.76a±0.003	0.76a±0.006	33.41**
Yield						
Before salting	11.46c±0.21	11.72bc±0.22	12.55a±0.13	12.32ab±0.16	11.89abc±0.15	4.308 *
After salting	10.92b±0.36	11.51a±0.38	12.00a±0.50	11.84a±0.18	11.32a±0.41	1.224ns
(90) days	8.51b±0.27	8.57b±0.29	9.32a±0.31	9.11a±0.35	8.61b±0.61	1.822ns

Control (C): Cow's milk Pasteurization standard.
Treatment (T_1): Goat's milk heated to (75°C / 15 sec.)
Treatment (T_2): Goat's milk heated to 8٠°C / 10 sec. without cold storage.
Treatment (T_3): Goat's milk heated to 80°C / 10 sec. and cold storage at 5-7°C for 24 hr.
Treatment (T_4): Goat's milk heated to 80°C / 10 sec. and cold storage at 5-7°C for 48 hr.
a, b and c within the same row with different superscripts differed significantly(p<0.05).
(ns): insignificant.
(*): P < 0.05
(**): P < 0.01

Table (2) shows the change in the moisture content of Ras cheese made from either cows or goat's milk and all treatment. The changes in

moisture content of fresh Ras cheese as affected by heat treatment of cheese milk were higher than that in the control. It is clear from these data that the moisture content of all cheeses decreased gradually throughout the ripening period. This might be due to some of the water gradually evaporates during ripening or becomes bound with the protein as about water, as ripening progressed (Conner, 1988). On the other hand, the cheese made from milk heated and cold stored for different period had higher moisture content than that made from heated without cold storage. Similar results were obtained by El-Attawy (1980), El-Abd et al., (1992), Okasha (2001) and Hefnawy (2004).

From results present in Table (2), it could be concluded that the fat content in dray matter (D.M) of Ras cheese of all treatments increased gradually with the advancing of the ripening period. Also all Ras cheeses made from goats milk had higher fat content than those made from goats milk. The general trend of those results was in accordance to those reported by Fikry (1987), Shendy (1989), Harby (1991), El- Batawy et al., (1992) and Okasha (2001).

Results given in Table (2) reveal the total nitrogen (T.N %) and T.N in D.M content of the different treatments of Ras cheese. It is clear that there was no considerable difference in T.N content between the treated cheeses (made from goat's milk) and control (mad from cow's milk). These results are in agreement with those obtained by El-Demerdash (1996), Guinee et al. (2000) and Okasha (2001).

Concerning the salt content and salt water ratio (S.W.R), results the same Table generally show that the average of S.W.R. in all treatment increased till the end of ripening period. On the other hand, the salt water ratio of the control were slightly higher than in all cheeses when fresh cheese. The results are in agreement with Harby (1991)., El- Batawy et al., (1992) Girgis et al., (1999), Abo-El-Nor (2004) and awad (2006).

The titratable acidity (T.A) was higher in the control than the all treatments when fresh and during ripening period. On the other hand, the acidity of all cheese samples gradually increased with the increase of storage period probably as a result of fermentation of residual lactose and degradation of protein and fat (Hofi et al., 1991). The pH values rang parallel to the titratable acidity when fresh and throughout storage period. However, pH values of Ras cheese were decreased gradually in all treatments during ripening until 45 days while were increased until the end period 90 days. This is in agreement with that found by El-Abd et al., (1992), El-Demerdash (1996), Mostafa (1999) and Osman (2003).

Table (2): Effect of heat treatments and cold storage of Goats milk on chemical composition of Ras cheese during ripening period.

Ripening period (days)	C	T_1	T_2	T_3	T_4	F-test
Moisture%						
0	44.20b±1.18	45.27ab±1.21	47.15a±1.53	47.19a±1.14	46.51a±2.73	3.87ns
15	40.15a±1.17	41.23a±2.00	41.20a±1.72	41.85a±1.02	41.62a±1.67	0.68ns
30	36.71a±1.08	37.20a±1.16	37.81a±2.23	37.90a±1.17	37.95a±1.16	0.63ns
45	35.92a±1.15	36.21a±1.12	36.71a±1.13	36.20a±1.13	36.05a±1.77	0.19ns
60	33.21a±1.50	34.55a±0.88	35.20a±0.68	35.12a±1.08	35.72a±1.61	1.58ns
90	32.84a±1.08	32.10a±1.13	33.60a±1.02	34.10a±0.68	33.95a±1.07	1.83ns
Salt water ratio S.W.R%						
0	3.61a±0.36	3.49a±0.29	3.43a±0.29	3.48a±0.26	3.50a±0.31	0.53ns
15	5.28a±0.32	4.89ab±0.36	4.61ab±0.36	4.54b±0.41	4.73ab±0.36	2.01ns
30	6.02a±0.31	5.88ab±0.21	5.28b±0.21	5.25b±0.33	5.61ab±0.21	2.78ns
45	6.29a±0.30	6.18a±0.33	5.96a±0.45	6.10a±0.16	6.10a±0.22	0.22ns
60	6.95a±0.46	6.65a±0.31	6.39a±0.26	6.37a±0.27	6.35a±0.25	1.73ns
90	7.21a±0.37	7.28a±0.19	6.57bc±0.20	6.51bc±0.21	6.49bc±0.17	2.50ns
Fat /D.M%						
0	45.21a±0.75	46.34a±1.43	46.24a±2.63	46.42a±1.10	46.31a±0.69	0.33ns
15	49.51a±1.66	48.52a±1.18	48.64a±3.95	48.21a±0.68	50.44a±1.12	1.23ns
30	52.64a±1.6	50.66ab±0.68	52.11b±1.11	52.45a±0.61	50.11ab±2.16	2.78ns
45	52.78a±1.18	51.63a±2.12	52.57a±0.89	52.84a±1.31	51.83a±0.71	0.82ns
60	53.10a±2.23	52.15a±2.16	52.71a±1.23	53.19a±1.17	52.52a±1.08	0.28ns
90	53.75a±1.14	52.77a±1.21	53.92a±1.15	53.97a±1.22	52.71a±0.61	0.66ns
T.N %						
0	3.72a±0.09	3.83a±0.11	3.77a±0.11	3.92a±0.10	3.81a±0.10	0.47ns
15	4.05a±0.18	4.32a±0.13	4.11a±0.17	4.22a±0.10	4.14a±0.13	1.44ns
30	4.39a±0.11	4.47a±0.18	4.49a±0.13	4.44a±0.18	4.41a±0.15	0.09ns
45	4.51a±0.17	4.64a±0.10	4.69a±0.19	4.60a±0.13	4.56a±0.11	0.45ns
60	4.70a±0.09	4.77a±0.17	4.88a±0.10	4.83a±0.10	4.67a±0.11	0.67ns
90	5.15a±0.19	5.20a±0.11	5.17a±0.45	5.23a±0.23	5.11a±0.32	0.32ns
T.A						
0	1.07a±0.066	1.00a±0.06	0.95a±0.06	0.93a±0.06	0.92a±0.06	0.97ns
15	1.14a±0.11	1.10a±0.16	1.06a±0.11	1.01a±0.09	1.00a±0.09	0.69ns
30	1.37a±0.09	1.24ab±0.11	1.15b±0.06	1.12b±0.06	1.10b±0.11	3.06ns
45	1.50a±0.11	1.45a±0.09	1.41a±0.08	1.38a±0.11	1.32a±0.15	1.23ns
60	1.66a±0.06	1.62ab±0.10	1.57ab±0.04	1.50ab±0.06	1.42b±0.06	2.73ns
90	1.92a±0.03	1.85ab±0.06	1.77ab±0.06	1.73b±0.11	1.70b±0.11	2.82ns
pH values						
0	5.67a±0.16	5.68a±0.13	5.71a±0.20	5.75a±0.13	5.82a±0.13	0.29ns
15	5.51a±0.26	5.53a±0.22	5.59a±0.22	5.63a±0.12	5.70a±0.12	0.29ns
30	4.72a±0.22	4.77a±0.33	4.80a±0.13	4.85a±0.13	4.92a±0.16	0.57ns
45	4.61a±0.13	4.68a±0.13	4.72a±0.11	4.79a±0.22	4.83a±0.22	0.68ns
60	5.32b±0.13	5.95a±0.13	5.50b±0.13	5.45b±0.13	5.38b±0.13	3.87*
90	5.59a±0.22	5.69a±0.13	5.65a±0.21	5.71a±0.15	5.65a±0.46	0.22ns

See legand table (1)

Table (3) shows the changes in the soluble nitrogen (S.N), non protein nitrogen (N.P.N), S.N/T.N,N.P.N/T.N and total volatile fatty acids (T.V.F.A). It is clear from these results that the ripening indices increased

gradually during ripening period. Also those data revealed that using goat's milk in Ras cheese making showed high ratio of S.N/T.N% and NP.N/T.N% which means, more acceleration of cheese ripening than cow's milk. Also the T.V.F.A content of Ras cheese made from goat's milk was higher when compared with the control. On the other hand, it could be observed that the rate of ripening indices increased during ripening period were relatively higher in T_2 than that of control and the other all treatments. The general trend of those results agreed with those reported by Hiekal et al., (1992), El- Abd et al., (1992) Ashmawy (1997), Shendy (1998), Mostafa (1999), Girgis et al., (1999) and Okasha (2001).

Table (3): Effect of heat treatments and cold storage of Goats milk on ripening indices of Ras cheese during ripening period.

Ripening period (days)	C	T_1	T_2	T_3	T_4	F-test
S.N%						
0	0.15a±0.012	0.18a±0.02	0.17a±0.01	0.16a±0.01	0.17a±0.01	0.82 ns
15	0.20b±0.02	0.24ab±0.04	0.25a±0.02	0.23ab±0.01	0.22ab±0.01	2.19 ns
30	0.30b±0.03	0.35a±0.01	0.33ab±0.02	0.32ab±0.02	0.31b±0.02	2.78 ns
45	0.39c±0.01	0.48a±0.02	0.44b±0.01	0.42bc±0.01	0.41bc±0.03	8.78**
60	0.44b±0.04	0.51a±0.01	0.50a±0.012	0.47ab±0.01	0.46ab±0.014	2.73 ns
90	0.63b±0.01	0.67a±0.01	0.61b±0.02	0.60b±0.02	0.59b±0.01	6.48**
N.P.N%						
0	0.055a±0.03	0.063a±0.02	0.074a±0.02	0.065a±0.02	0.069a±0.02	0.04 ns
15	0.11a±0.04	0.15a±0.01	0.14a±0.04	0.13a±0.02	0.15a±0.04	0.57 ns
30	0.20a±0.02	0.22a±0.03	0.23a±0.02	0.25a±0.04	0.20a±0.03	0.99 ns
45	0.22a±0.02	0.24a±0.02	0.27a±0.02	0.27a±0.03	0.23a±0.02	1.12 ns
60	0.25b±0.02	0.27ab±0.01	0.29a±0.02	0.30a±0.04	0.27ab±0.02	3.87*
90	0.30a±0.03	0.34a±0.02	0.35a±0.04	0.32a±0.02	0.31a±0.02	0.75 ns
S.N./T.N%						
0	4.03a±0.37	4.69a±0.44	4.50a±0.44	4.08a±0.76	4.46a±0.74	0.42 ns
15	4.93a±0.76	5.25a±0.43	6.08a±0.76	5.45a±0.44	5.31a±0.71	0.93ns
30	6.83a±0.71	7.82a±0.76	7.34a±0.81	7.20a±0.44	7.02a±0.44	0.72ns
45	8.64b±0.40	10.34a±0.44	9.38ab±0.76	9.13ab±0.70	8.99ab±0.79	2.14ns
60	9.36b±0.76	10.69a±0.39	10.24ab±0.44	9.73ab±0.8	9.85ab±0.44	2.81ns
90	12.23ab±0.52	12.88a±0.76	11.69ab±0.73	11.47b±0.71	11.54ab±0.4	2.24ns
N.P.N/T.N%						
0	1.47a±0.21	1.64a±0.23	1.96a±0.17	1.65a±0.36	1.81a±0.31	0.97 ns
15	2.71b±0.36	3.47a±0.19	3.40a±0.21	3.08ab±0.21	3.62a±0.37	3.15 ns
30	4.55b±0.33	4.92b±0.36	5.12ab±0.36	5.63a±0.32	4.53b±0.21	4.86*
45	4.87c±0.24	5.71ab±0.41	5.75ab±0.36	5.86a±0.33	5.04bc±0.26	4.01*
60	5.31b±0.31	5.66ab±0.32	5.94ab±0.33	6.21a±0.31	5.78ab±0.21	0.73 ns
90	5.82b±0.39	6.53ab±0.35	6.76a±0.34	6.11ab±0.24	6.06b±0.23	3.24ns
T.V.F.A 0.1 NaOH/100g cheese						
0	10b±1.18	13a±0.66	12ab±0.98	11ab±1.32	12ab±1.63	2.29 ns
15	16c±1.36	20ab±0.79	19b±0.79	22a±0.79	21ab±0.79	8.60**
30	24b±1.26	29a±1.36	30a±0.71	26b±0.77	29a±0.1.36	10.21**
45	29c±0.98	35b±2.23	39a±1.62	32bc±1.69	34b±1.76	12.99**
60	35d±1.11	42ab±1.69	44a±0.79	40bc±0.79	39c±0.79	17.47**
90	40c±1.69	49a±2.23	43bc±1.32	44b±0.72	42bc±1.29	9.09**

See legand table (1)

The concentration of saturated free fatty acids and short chaine acids increased in Ras cheese mad from goat's milk as the ripening period than cow's milk cheese Table (4). On the other hand, results showed fatty acids, which play an important role in flavor formation of cheese Omar (1984). Also cold storage of heated milk for 24 hours (T_3) caused more increase in the cold storage period (T_4) more increase in the short chaine fatty acids was observed. These results are in agreement with Hagag et al., (1987), Hiekal et al., (1992), El-Demerdash (1996), Mostafa (1999) and Okasha (2001).

Table (4): Effect of heat treatment and cold storage of goats milk on fatty acids in Ras cheese during ripening period.

Treatments	Short chain fatty acids	Middle chain fatty acids	Long chain fatty acids	Total saturated fatty acids	Total unsaturated fatty acids
30 days					
C	4.66d±0.49	42.22ab±0.65	53.12a±0.76	59.24b±1.15	40.76a±1.72
T_1	5.35cd±0.35	40.23b±1.13	54.42a±1.19	61.72b±1.67	38.28b±0.96
T_2	6.75c±0.81	43.51a±1.09	49.74b±0.84	68.83a±2.31	31.17d±0.78
T_3	21.40b±0.85	40.15b1.13	38.45c±0.86	67.13a±1.65	32.87c±0.85
T_4	25.82a±0.67	36.71c±1.16	37.47c±0.81	66.23a±2.17	33.78c±1.04
F-tes	426.4**	15.74**	273.3**	12.97**	60.00**
60 days					
C	7.77c±0.84	46.84b±1.12	45.39a±0.95	63.51c±2.25	36.49a±0.95
T_1	8.51c±0.79	45.92b±1.65	45.57a±1.33	67.32b±1.81	32.68b±0.95
T_2	9.22c±0.85	49.93a±1.13	40.85b±0.63	72.15a±1.65	27.85d±1.51
T_3	27.12b±0.65	47.01b±1.16	25.87d±0.86	69.77ab±2.17	30.23c1.34
T_4	30.50a±1.13	40.61c±1.11	28.89c±0.9	70.11ab±2.10	29.89c±0.65
F-tes	388.2**	27.38**	371.9**	10.74**	26.95**
90 days					
C	9.21e±0.85	47.11b±0.88	43.68a±1.01	69.18b±1.67	30.82a±0.80
T_1	11.11d±0.53	46.07b±0.65	42.82a±0.85	71.11ab±1.68	28.89b±0.87
T_2	14.48c±0.53	51.26a±0.69	34.26b±0.77	73.92a±1.65	26.08c±0.61
T_3	31.22b±0.51	46.73b±1.13	22.05d±0.63	71.81ab±2.25	28.19b±0.45
T_4	33.14a±0.81	38.51c±0.66	28.35c±0.98	71.62ab±1.67	28.38hi±0.95
F-tes	616.0**	66.48**	303.6**	2.74ns	13.31**

See legand table (1)

Data illustrated in Table (5) show that the total, proteolytic and lipolytic bacterial counts of all treatments during ripening period of Ras cheese. It could be seen that the T.C, P.B.C and L.B.C of the control were lower than in all treatments when fresh and until 45 days. On the other hand TC, P.B.C and L.B.C of cheese of all treatments gradually decreased until the end of ripening period. This conclusion was in agreement which El-Shafi and Farag (1994) and Okasha (2001).

Table (5): Effect of heat treatments and cold storage of goat's milk on certain microbiological properties of the resultant Ras cheese.

Ripening period (days)	C	T_1	T_2	T_3	T_4	F-tes
Total viable count x 10^6 (cfu/g)						
0	201d±4.46	229a±3.31	222b±5.33	218bc±2.34	211c±3.23	24.28**
15	147c±3.46	191a±2.01	180b±2.99	187a±3.44	192a±3.45	101.3**
30	116d±3.35	137c±3.46	145b±3.46	151b±4.21	162a±4.41	74.60**
45	99b±3.42	111a±4.11	92b±2.76	95b±3.76	96b±2.15	13.70**
60	60bc±3.73	81a±4.79	56cd±3.42	52d±3.31	64b±1.99	24.31**
90	37b±3.52	41ab±2.16	35b±3.41	44a±1.32	47a±3.23	5.84**
Proteolytic bacterial count x10^4 (cfu/g)						
0	125c±2.13	149a±1.53	114e±2.59	121d±1.13	145b±1.13	409.4**
15	92c±1.06	98b±1.13	91c±2.54	96b±1.33	105a±3.00	30.03**
30	81d±2.71	87b±1.31	82d±2.31	85c±1.66	90a±1.45	36.67**
45	62cd±1.13	66b±2.11	61d±0.65	65bc±2.70	71a±1.31	16.33**
60	45b±1.15	46b±0.65	40c±1.07	46b±1.44	51a±2.25	42.10**
90	34c±0.65	37b±0.65	33c±1.13	39b±1.07	42a±2.14	21.70**
Lipolytic bacterial count x10^3 (cfu/g)						
0	103c±2.18	110b±0.87	101d±5.14	97e±0.86	114a±1.47	140.7**
15	77d±0.96	84b±1.48	73e±2.12	81c±1.55	94a±0.86	151.6**
30	70c±1.47	74b±0.86	61e±1.87	67d±1.82	80a±0.54	155.5**
45	60b±0.86	61b±1.47	48d±0.93	55c±0.81	64a±1.86	110.1**
60	42b±1.86	40c±0.54	35d±1.18	38c±0.96	49a±3.11	85.12**
90	23c±0.58	27b±0.52	21d±0.86	25c±1.47	33a±2.18	65.12**

See legand table (1)

Cheeses of all treatments were organoleptically evaluated when 30 days and each 30 days up to 3 months of ripening period. Cheese made from goat's milk was generally characterized by a smooth texture goatly flavoure and more piquant taste than cheese made from cow's milk. Data presented in Table (6) show that the flavour developed more rabidly and reached higher and almost similar scores in both the control and T_2 (Ras cheese made from heating the goats milk at 80°C for 10 sec. without cold storage). It was followed by T_1, T_3 and T_4 in a descending order.

Table (6): Effect of heat treatments and cold storage of goat's milk on the organoleptic properties of the resultant Ras cheese during ripening period.

Month	Treatments	Flavoure (50) points	Body& texture(40) points	Appearance (10) points	Total scores (100) points
1	C	35a±0.76	28a±0.49	7a±0.049	70a±1.07
	T_1	34ab±0.71	24c±0.48	6b±0.050	64bc±1.06
	T_2	34ab±0.81	26b±0.42	7a±0.050	67ab±1.10
	T_3	32bc±0.65	23cd±0.39	7a±0.030	62cd±1.20
	T_4	31c±0.56	22cd±0.75	6b±0.040	59c±1.70
	F-tes	4.72*	24.08**	124.6**	16.04**
2	C	41a±0.85	33a±0.52	8a±0.031	82a±2.10
	T_1	38bc±0.63	30bc±0.29	7b±0.100	75b±2.20
	T_2	40ab±0.31	31b±0.22	8a±0.060	79a±0.90
	T_3	37c±0.33	30bc±0.26	7b±0.020	74b±1.60
	T_4	36c±0.37	29c±0.21	7b±0.060	72b±1.50
	F-tes	7.52**	9.55**	124.6**	14.29**
3	C	42a±0.65	35a±0.41	8a±0.035	85a±2.50
	T_1	40a±0.73	31b±0.26	8a±0.090	79b±1.30
	T_2	4٢a±0.42	35a±0.33	8a±0.040	8٦a±1.20
	T_3	40a±0.34	30bc±0.27	8a±0.070	78b±1.10
	T_4	40a±0.76	29c±0.22	8a±0.020	77b±1.30
	F-tes	1.40 ns	33.22**	0.001 ns	11.66**

See legand table (1)

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دراسه على تحسين بعض صفات الجبن الراس المصنع من لبن الماعز

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محاوله للتغلب على رائحة لبن الماعز والتى تظهر عادة عند تصنيعه الى جبن جاف (جبن راس). وقد تم فى هذه الدراسه تصنيع جبن راس من لبن بقرى كمقارنه (كنترول) وجبن راس من لبن الماعز تم تقسيمه كالاتى:

(١) لبن ماعز معامل حراريا على 75 °م لمدة ١٥ ثانيه.
(٢)لبن ماعز معامل حراريا على ٨٠°م لمدة ١٠ ثوانى.
(٣) لبن ماعز معامل حراريا على ٨٠°م لمدة ١٠ ثوانى ثم تبريده الى ٥-٧ °م لمدة ٢٤ ساعه.
(٤) لبن ماعز معامل حراريا على ٨٠°م لمدة ١٠ ثوانى ثم تبريده الى ٥-٧ °م لمدة ٤٨ ساعه

وتم تخزين جميع الجبن الناتج للتسويه على درجة حراره ١٣°م ± ١°م ورطوبه نسبيه من ٨٠-٩٠ % لمدة ثلاث شهور تم خلالها تحليل الجبن كيميائيا مع تقدير بعض المجاميع الميكروبيه كما تم تقييمه حسيا كل شهر ولمدة ثلاث شهور كما تم تقدير النسبه المئويه للتصافى قبل وبعد التمليح وكذلك فى نهاية مدة التسويه

ويمكن تلخيص أهم النتائج المتحصل عليها فيما يلى:

(١) زيادة النسبه المئويه للتصافى فى الجبن الناتج من اللبن الماعز عن مثيلاتها الناتجه من اللبن البقرى.
(٢) زيادة نسبة الرطوبه و الدهن و النيتروجين الكلى فى الجبن الناتج من اللبن الماعز عن الجبن الناتج من اللبن البقرى سواء فى الجبن الطازج أو خلال مدة التسويه .
(٣) زيادة نسبة دلائل التسويه النسبه المئويه للنيتروجين الذائب وكذلك نسبته الى النيتروجين الكلى فى حميع الحبن الناتجه من معاملات اللبن الماعز عن مثيلاتها الناتجه من اللبن البقرى.
(٤) لوحظ أيضا زيادة نسبة الأحماض الدهنيه الطياره وكذلك الأحماض الدهنيه قصسرة السلسله والتى يعزى إليها أساس الطعم الناضج الجيد فى جميع معاملات الجبن الناتج من اللبن الماعز عن الجبن الناتج من اللبن البقرى.
(٥) كما تشير النتائج الى الانخفاض التدريجى فى العدد الكلى للبكتريا وعدد البكتريا المحلله للدهن وكذلك عدد البكتريا المحلله للبروتين طول فترات التسويه فى جميع المعاملات.
(٦) وعند تحكيم الجبن الناتج حسيا حصل الجبن الناتج من اللبن الماعز والمعامل حراريا على درجة حراره ٨٠°م لمدة ١٠ ثوانى وبدون تخزين اللبن إلى للتبريد على درجة تحكيم حسيه تقارب درجة الجبن الناتج من اللبن البقرى حيث تميز الجبن الناتج من هذه المعامله بالنظافه ولم تلاحظ به رائحة اللبن الماعز والتى تظهر عادة عند تصنيع اللبن الماعز الى منتجات لبنيه أخرى كذلك تميز جبن هذه المعامله بإرتفاع معدلات التسويه.

بتحكيم البحث

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