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COMPRESSION PHYSIC-CHEMICAL PROPERTIES OF MILK FROM CAMEL, COW, GOAT, HUMANE AND SHEEP IN AL-MUTHANNA GOVERNMENT, IRAQ

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Abstract-*Milk is very important nutrients, that human cannot be dispensed with, in this study eight parameters of physic-chemical properties besides energy that obtained from the species that study (camel, cow, goat, sheep, and human milk) and compared between milk species. The milk samples were collected in Al-Muthanna province during the period from July- October 2018, the samples that are collected analyzed by EKO-Milk Scanner. Results that obtained from analysis input to statically analyzed by using ANOVA (version 10.spss), at significant differences at P<0.05, and there were significant differences between types of milk. The parameters under study were higher in sheep's milk than other species which tested, except on lactose was higher in human milk.*

Key word*: emulation, mammalian species, composition, energy, nutritional****.***

I INTRODUCTION

Milk is described as an emulation of fat in watery solution of protein, fat, mineral, lactose in colloidal suspension [1]. Humane breast milk is recommended as the exclusive food for the first six months of life, nutrition complementary foods, up through two years [2]. The milk and its products are not consumed during adult year, it may causes depletion to bone of human body to obtain the needed of this essential must consumed milk and its products [3]. Milk represents the basis of nutrition, a medium that embodies the perfection of nature reflected in the survival and upbringing of the offspring of mammals, the milk represents a stable fat emulsion in colloidal solution pf proteins and gonium solution of lactose and mineral matter, the great nutritional and biochemical-metabolic significance of milk in the nourishment of the newborns and infant stems from its richness in vitamins, enzymes as well as cellular elements that have an active role in protection from infections [4], [5]. Milk composition of mammalian species varies widely with reference to genetic physiological, nutritional factors and environmental conditions [6]. There are physical-chemical factors that affect on the production and composition of the milk such as the freezing points, electrical conductivity, density and PH. The freezing point is introduce in quality standards for milk it is defined as the temperature that milk freezes in, and it effected with components of milk , ion concentration and osmotic pressure of milk, it is away to detect milk cheating by adding water to it [7]. Milk freezing point is a physical indicator used to milk food chain quality control [8] .The density

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of milk is mass divided by volume, it influenced by temperature; composition of the material and biological differences of milk, the PH of milk is near the neutering **[9].** The aim of this research is assessment the differences between humane, sheep, cow, goat, and camel milk chemically and physically

Experimental section

Collection the sample

100 Milk samples (50 ml) were collected from the total milk yield of each females during milking periods from July - October 2018 all the animals in study were health of farms located in Al-Smawa government, humane milk was token from healthy breast-feeding volunteer mother samples were put in plastic vials and immediately cooled to 4C° then transported to the laboratory to analyses in agriculture college/ al-muthanna university , the chemical analyses including protein, lactose, fat, solids non fat, ash, PH, freezing point, and total solids percentages were analyzed by ECO-Milk scan .

Analysis of the samples

Each milk samples were analyzed by using an EKO Milk (Eko-milk Ultrasonic analyzers, Eon Trading, British for evaluation the contents of milk (fat, protein, total solid nonfat, and lactose), a PH, and freezing point.

Statistical analyses

Data that collected from analyses were statically analyzed using ANOVA (version 10.spss).

II RESULT AND DISCUSSION

Protein: the protein content of each milk type camel, cow, goat, humane, and sheep are (3.043%), (3.379%), (3.586%), (2.923%), and (5.260%) respectively table (1) explain these results, and there were significant differences between the protein of each group at ($P<0.05$), except the protein in camel and humane milk there are no significant differences between them as in the table (1). The results of the present study are consistent with both [10], and [11] in milk of camel, cow, and goat. The results differed with both [12], and [10] in camel milk and also with [11] in humane milk, while in the sheep milk protein, the results were lower than those obtained by [13], [10], and [14]. The range of major constituents of camel milk protein is (2.5-4.5%) [15].

Lactose*:* The proportions of lactose in milk were camel (4.2%), cow (4.44%), goat (4.64%), humane (4.57%), and sheep (4.14%), the differences were significant at the level significance ($P <0.05$), among the values of the milk group, except camel and sheep milk, there are no significant differences between them table (1). The results of milk lactose are agreement with both [10], and [11], and the results of camel milk lactose are very with what obtained by [12] where he recorded (4.91%). In lactose camel milk content is varies from (2.4-5.8 %) [16], the wide variation of camel milk lactose could be due to type of plants in the desert [17]. The major range of constituent of camel milk lactose (2.5-5.8%) [15] and (3.91-4.69%) [18], the results of milk lactose of cow were agreement with [11], and [19] but less than from [10], and [20], and in lactose goat milk agreement with [10] but

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less than [19] and more than [11]. While the results of humane milk lactose were less than from what recorded by [11], and [10], these differences are also pointed out by [21]. The sheep milk lactose corresponding with what recorded by [22], and [19], but less than from what obtained by [23], [24], and [10], the sex lamb and liter size will affect on the production of milk and its components (protein, fat, lactose, and total solid nonfat) according to [25].

Fat: the current study agree with [11], and higher than what recorded by [12] and [10]. [18] mentioned that camel milk fat has been in the range of (2.5-4.04 %), [15] signal that camel milk fat was in the range of (2.9-5.5%), while the result of fat in cow milk agree with what found by [19], and [10], but less than what obtained by [11] table (3), as for goat milk fat, it approaching from what obtained by[20], and [19], while it higher from the results of each [11], and [10], the humane milk fat was closed to what obtained by [26], but higher than what found by [11], and [10], table (3). Either fat in sheep's milk the results that obtained had higher from what recorded by [24], and [27], but less than from what recorded by [22], [19], and [10] the results were close to what obtained by [13] table (3).

Ash: the study results in camel milk are consistent with [19], and higher than from what recorded by [10], and [11], but less than from the results of [12]. While in cow milk the results of ash were similar to what recorded by [19], [11], and [10] table (3). In goats milk ash percentage was (0.787%), and this result was analogous to what recorded by [19], it higher from what found by [10], but less than from what obtained by [11]. The percentage of ash in humane milk was (0.2%), this result agreement with results of [10], [11], [28], and [29]. Ash in sheep milk was (0.85%) table (1) and it close to the results with [10] but less than recorded by [24], [13] and [19].

PH: results of the study showed that the values of PH for each type of milk (camel, cow, goat, humane, and sheep) were (6.5, 6.5, 6.46, 6.99, and 6.53) respectively, where it was observed that there were no significant differences at ($P<0.05$), except significant differences between camel milk and humane milk table (1), these results were agreement with [10] in camel, cow, and sheep milk but differ his results in goat and humane milk table (3), also the results agree with [12] in camel milk but less than from what obtained by [19] in cow milk, the value of PH in sheep milk was less than from what recorded by [24], [10], and more than what recorded by [19] table (3).

Total soiled: the total soiled were (12.15%) for camel milk, (12.65%) for cow milk, (13.31%) for goat milk, (13.44%) for humane,, and (18.73) in sheep milk table (1), the significant differences in the research group were significant at ($P<0.05$) . the result of study agree with [19] and [30] for camel milk, while the results were higher than from what obtained by [10], and [11]. Either in cow milk the results were agreement with [10] and [19], but less than from the study of [11] table (3). The S.N.F in goat milk was agreement with what obtained by [19], and higher from what obtained by [10], and [11] table (3). In woman milk the results agree with [11] but higher than from what recorded by [10] table (3), total soiled values in sheep milk were higher from what recorded by [22], [13], and [24], but less than from what recorded by [19] and [10] as in table (3).

Freezing point: the results of study recorded freezing point at (- 0.575) for camel milk, (- 0.522) for cow milk, (- 0.552) in goat milk, (- 0.492) for woman milk, and (-0. 596) for sheep milk, there were significant differences at ($P<0.05$), table (1) explain the milk freezing points for the research group, for sheep milk F.P. was close to what recorded by [24] in ruby group sheep but more than recorded by [14] in ewe Arabian sheep, while [31] record F.P. for sheep milk at (-0.6048), (-0.5544) for goat milk, and (-0.5221) in cow milk, in camel milk the freezing point was higher than what recorded by [32], it was (-0.518), and he recorded freezing point for cow milk at (-0.530) which agreement with current study.

Energy: the results of the study showed that the calculated energy for camel milk (71.584cal.), (66.805cal.) cow milk, (70.632cal.) goat milk, (74.564cal.) humane milk, and (87.432cal.) for sheep milk, these results were agreement with [11] in calculated energy for camel milk and humane milk, also with [29] for cow milk, the results of the current study close to the results that obtained by [33] for goat milk, he recorded (69.5cal.) as a value of energy. [34] Was recorded the value of energy (65cal.) for humane milk, while [26] record (78cal.), (77cal.) in humane milk, the energy was (87.432cal.) in sheep milk. As we sow from the results the values of energy were dependent on the amount of milk contents (protein, lactose, fat), the relationship is more positive as these contents increase the values of the result energy increase too, according to the equation [35] bellow:

Calories = (protein * 4.27) + (fat* 8.78) + (lactose *3.87)

The differences between the results of the studies regarding milk components, perhaps it is explained on the basis weigner's law, which includes the milk components that have the largest volume will have the largest variability, on the basis of size, the components will spin as follows: fat, protein, sugars, and minerals. According to this law the fat shows a great difference after which the protein, minerals, and sugars have the lowest milk components of heterogeneity [36]. Physio-chemical characteristics of milk are related to its composition for particular species [37].

Table 1: values of parameters in all study groups

parameters	**Camel(1) N= 14**	**Caw(2) N=14**	**Goats(3) N=14**	**Human(4) N=13**	**Sheep(5) N=15**	**P value**
Total s.	12.15±0.32	12.65±0.24	13.31±0.19	13.44±0.24	18.73±0.40	**S**
NFS	8.25±0.21	8.63±0.12	8.54±0.19	8.19±0.12	10.93±0.75	**Camel with human: NS Camel with goat: NS Others groups :S**
lactose	4.23±0.099	4.44±0.179	4.46±0.16	4.58±0.27	4.14±0.206	**Camel with sheep: NS**

						All other groups: S
Fat	4.12±0.16	3.54±0.12	4.38±0.33	5.05±0.23	6.12±0.30	**S**
protein	3.04±0.17	3.38±0.14	3.59±0.1	2.92±0.19	5.26±0.72	**between all group: S Camel with human: NS**
ash	0.78±0.02	0.72±0.02	0.79±0.02	0.20±0.02	0.85±0.19	**Camel with caw: NS Camel with goat: NS Others groups :S**
PH	6.50±0.19	6.53±0.15	6.46±0.21	6.99±0.17	6.53±0.29	**Camel with human: S All other groups: NS**
F.R.	-.575-±0.035	-.522-±0.0001	-.552±0.006	-.492±0.005	-.597±0.029	**S**

Value as Mean + SD, Significant at the P < 0.05

Table 2: the energy products from milk of camel, cow, goat, human, & sheep

Mamule	**Protein**	**Fat**	**Lactose**	**Energy/ cal.**
Camel	3.043	4.121	4.228	71.584
Cow	3.379	3.543	4.442	66.805
Goat	3.586	4.379	4.464	70.632
Humane	2.923	5.054	4.576	74.564
Sheep	5.260	6.120	4.140	87.432

Table 3: Comparative the Current Study with Other Studies

mammalian	**Totals.%**	**Lactose %**	**Fat %**	**Protein%**	**Ash %**	**PH**	**F. P.**	**references**	**Country**
Camel	12.5	4.4	4.1	2.8	0.79	6.44		**[19]**	Iraq

		4.91	2.92	2.5	1.30			**[12]**	Mauritania
	11.7	4.3	3.6	2.95	0.75	6.5		**[10]**	Sudan
	12.95	4.31	4.2	3.27	0.75			**[11]**	Egypt
	12.15	4.23	4.12	3.03	0.778	6.5	-0.575	**Present study**	Iraq
Cow	12.8	4.8	3.75	3.4	0.72	6.6		**[10]**	Sudan
	12.7	4.7	3.5	3.2	0.73	6.65		**[19]**	Iraq
	13.3	4.7	4.14	3.48	0.71			**[11]**	Egypt
	12.65	4.64	3.54	3.38	0.722	6.5	-0.522	**Present study**	Iraq
Goat	12.0	4.4	3.9	3.3	0.7	6.6		**[10]**	Sudan
	13.2	4.8	4.3	3.5	0.79	6.5		**[19]**	Iraq
	12.6	4.27	4.04	3.32	0.83			**[11]**	Egypt
	13.31	4.46	4.38	3.59	0.787	6.46	-0.552	**Present study**	Iraq
		4.82	4.46	3.58				**[20]**	Sudan
Human	11.8	6.95	3.2	1.25	0.21	7.2		**[10]**	Sudan
	13.53	7.12	4.17	1.11	0.21			**[11]**	Egypt
		7.5	4.8	1.9				**[26]**	
	13.44	4.58	5.05	2.92	0.2	6.99	-0.492	**Present study**	Iraq
Sheep	17.35	5.12	6.31	6.23	0.91			**[13]**	Turkey
	19.3	4.3	6.4	5.9	0.9	6.41		**[19]**	Iraq
	19.16	4.89	5.66	5.91		6.78	-0.57	**[24]**	Algeria
	18.10	4.43	6.71	5.23				**[22]**	Czech Rep.
	19.3	5.00	6.9	6.35	0.85	6.6		**[10**	Sudan
	18.73	4.14	6.12	5.26	0.854	6.53	-0.597	**Present study**	Iraq

III CONCLUSION

The result of the current study show all parameter that measured were higher in sheep's milk than other species under tested, except on lactose were human milk had higher value from other species, in PH the goat milk have the higher value but the lower value in freezing point, the energy that produced from sheep's milk were in high value follow by human, camel, goat, and cow milk. The compositions of milk are varying depending on the species

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