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Fat Contents in Milk of Buffalo and Caw from Local Diary Fields at Basrah Province / Southern Iraq

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Abstract

In this study the chemical compositions, fat, proteins, lactose, solid not fat, TSS, Salts, and moisture as well as physical properties, density and freezing point were determined in milk samples of cow's and buffalo's from Iraqi marshlands. Samples of milk were collected randomly from local diary markets. Analysis of samples were conducted by adopting the Lacto Plus milk analyzer in food industrial lab /College of Agriculture/ Basrah University. Average values recorded were higher in the milk of buffalo compared with cow's, but values for both cow's and buffalo's were lower than reported values worldwide.

On boiling, milk is losing its fat and could be skimmed therefore they are suitable for making cream and cheese.

KeyWards: Milk; Buffalo; Caw; Fat; Iraqi Marshland; Lacto Plus.

1. Introduction

In general animals, cattle, sheep's, goats, …etc, are an important source of agricultural economy for the country, due to their contents of milk and meat as maintained by Salem and Salman, [1].

Milk is a primary source for many important nutritional products, it is a biologically complex fluid secreted by mammals following Alfekaiki, [2]. Farmers in Marshlands /Southern Iraq grow Buffalo's and cattle, and it is reported that Buffalo has greater fat contents 7.4-8.3% compared to milk contains of cows. Fat contents in milks from different animals sources, Buffalo's. Cows, Camels, Sheeps, Goats, as well as Yaks are different, it range between 3.5 and 7.5%. The most consumption milk in Southern Iraq is buffalo followed by Cow's milk. It has low fat contents compared with other sources. Braveman [3] reported that the highest percent of fat in the milk of an animals.

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Comprehansive studies for fat contents in the milk produced from available animals, Buffalo's, Cattle's, Sheep's, and Goat's within Iraqi farmlands are rare, the constitutions of nutritional contents for these animals and reported %fat, %protein, %lactose, values were 5.5-9, 4.5, and 6 respectively in milk's of Buffalo's, and 3-4, 3-5, and 5 respectively in milk's of cattle's as recorded by Al-Kaylani, [4].

An Egyptian scientists Enb, and his colleagues [5], reported values for fat, protein and total solids in the milk of buffalo's greater than in the milk of cattle's, average values were 4.9%, 3.1%, and 13.4% respectively in Buffalo's milk compared with 2.2%, 3.2%, and 12% respectively in the milks of Cattle's.

The quality of milk is determined by its contents of fat, total solids(TS), solid not fat (SNF), lactose, … etc, therefore the aim of this study was to determine the composition of milk from buffalo 's and cow's the mostly existing animals in Southern Iraq.

2. Sampling and Analysis

Samples of milk were collected from local market for diary products from Southern Iraqi Marshland Al-Hammar marsh as shown in Figure 1. Samples were kept in fridge and transferred to Food Industrial Laboratory/College of Agriculture /Basrah University. In the lab quality of milk samples determined were percent of total solids (TS), fat, solid not fat (SNF),protein, lactose by using Lacto scan milk analyzer (Fig.2).

Figure 1: Map of Southern Iraq showing the Marshland area.

3. Lacto scan milk analyser

Lactoscan is an ultrasonic milk analyzer for quick analyses of fat, solids-non-fat (SNF), proteins, lactose, added water, temperature, freezing point, pH, solids, conductivity as well as density of one and the same milk sample directly after milking, at collection and during processing

Figure 2: Lacto scan apparatuses used throughout this study.

4. Results

Measurements conducted for some samples of milk reveal a certain percentage of fat, SF, Lactose, and salts as listed in table 1.

Table 1: % values of fat in milk samples for cow and buffalo from Southern Iraqi marshland (27 J.anuary 2022).

Sample	Fat	Protein	Lactose	Salt
Cow	**3.2**	**4.9**	**6.6**	**1.3**
Buffolo	**2.2**	**4.3**	**5.7**	

Results for experimental analysis at 30th Jan.2022. 1- raw buffalo's milk, and 2-boiled buffalo's milk from the same source. Lab instrument used was Lacto Plus as shown in Figure 3 bellow

Figure 3: Lacto Plus milk analyzer showing measured parameters.

Table 2: Physical properties and % percent constitutional values for two samples of milk for Buffalo from the same source, the first 1) raw sample and 2) boiled sample.

Samples	1-Raw buffalo's milk	2-Proccessed buffalo's milk
	Physical properties	
Density	1.0324	1.0315
Freezing points	0.664	0.576
	Compositional contents %	
Fat	7.1	2.3
Protein	4.2	3.6
Solid Not Fat	10.6	9.7
Lactose	5.2	4.8
TSS	12	18.3
Salts	1.0	0.9
Moisture	81.7	88

5. Discussion

Nutritional compositions in milk of different species are different depending upon the species of animals. Reported percent values, Fat, Protein, Total Solids, Solid Not Fat, and Lactose as an average values of 4.82, 5.43, 12.77, 7,95, and 1.84 respectively in the milk of cattle's and 5.3, 5.43, 15.19, 9.89, and 3.73 respectively in the milk of sheep's as maintained by Malau-Aduli and his colleague,[6] . Globaly, quality of milk represented by levels as follows 3.43% protein, 2.23%fat, 9%total solid, 6.82%solid not fat, 0.21% acidity, and 1.025 specific gravity for milk marketed in Quetta, Pakistan as reported by Fahmid, and his colleagues [7].

Certain levels of nutritional compositions in milk of different animal species are represented as standard values [8], are listed bellow:

Table 4

Species	**Fat%**	**Protein %**	**Total Soild %**	**Lactose%**	**SNF %**	**Water %**	**Minerals%**
Cattle	**4.0**	**3.4**	**12.8**	**4.7**	**8.8**	**87.2**	**0.7**
Buffalo	**7.2**	**3.8**	**16.5**	**4.8**	**9.3**	**83.5**	**0.7**

For the last four decades a great changes have taking place in the quality and quantity of waters of Southern marshes of Iraq which led to change the characteristics of living mammals and their products which reported by Al-Saad and his colleagues [9],.

Results maintained in table 1 for the first experiment reveled contradicting values compared to those listed in the literature. Values for cow's milk are acceptable while those for buffalo's milk are quite law. This might be explain on the bases of treatment of raw milk by boiling and skimmed.

At the beginning of this study we attempted to identify the type of animal species by measuring the chemical composition of the milk taken from certain animals, cattle's and buffalo's. Buffalo's milk from southern Iraqi marshes is high in fat and total solids giving it a rich flavor , reported by Nature Iraq, [10]. These properties are

change according to the feeding habitat of the animals mainly reed in the marshland which is effected heavily by water quality as reported by Al-Saad and his colleaques [9].

Compared to Cow's milk Buffalo's milk tastes smother and more pleasant, and it contains more fat, calcium, and protein, and can be stored for a long time without being rancid (Milk Production[11]).

Comparison of the overall compositions in the milk of buffalo's and cow's from Southern Iraqi marshland revealed a large differences. The chemical constitution in the milks of Buffalo's and Cow's from Iraqi marshland are lower than those reported for example in the milks of buffalo's and cow's from Qena Governorate in Egypt as reported by Hamad and his colleque [12], except those for protein and lactose in the milk of cow's from Iraqi marshland. The main difference in those levels was type of feeding which is poor in Iraqi marshes due to great change in water quality reflecting upon the types and properties of aquatic plants in the marshes reported by Al-Saad and his colleagues [9]. Differences are shown in table 3.

Table 3: Comparistion between properties of milk from Iraq and Egypt.

Properties %	**Marshland (Iraq)**		**Qena (Egypt)**	
	Cow's	**Buffalo's**	**Cow's**	**Bufalo's**
Fat	**3.2**	**7.7**	**4.2**	**7.8**
Protein	**4.9**	**4.2**	**3.37**	**4.15**
Lactose	**6.6**	**5.2**	**4.47**	**5.03**
Solid Not Fat		**10.6**	**8.53**	**9.89**
Total Solid			**12.8**	**17.70**
Salt	**1.3**	**1**		
Water		**81.7**	**87.19**	**83.17**

6. Conclusion

Milks of Buffalo from Iraqi marshland is richer in fat contents compared to cow's within the same place, therefore it is suitable for cream and cheese production even though Buffalo's milk contains mineral constituents as reported by Hamad and his colleque, [12].

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