

Microbial Load in Fore-milk and Total Milk of Iraqi Local Goat Breed



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Abstract:

The current study was carried out on ten local goat breed belong to a private farmers in Bashika city, 20 km north east of Mosul province. The aim of this study was to evaluate the hygienic state of goat's milk, depending on the Total Bacteria Count and Total Fungi count. Milk samples were collected from each goat every ten days and for three times. The samples represented the fore-milk, remained milk [which is free from fore- milk] and the total milk. The laboratory examination of milk samples revealed that the total bacteria count were [3.36 log for fore - milk, 2.8 log for remained milk and 3.3×10^3 log/ml [cfu] for mixed milk]. Also total fungi count were [2.72 log for fore - milk, 2.5 log for remained milk and 2.63×10^2 log / ml [cfu] for mixed milk]. The results showed that there is variation in the percentage of total bacteria count and total fungi between the fore-milk, remained milk which free from fore- milk and the mixed milk were 72.25, 12.88, 68.28 % and 39.77, 18.74, 25.89% respectively.

Key words: Goat milk; Bacteria; Fungi; Fore-milk; Udder preparation; Total bacterial count

I. Introduction

The chemical composition and the number of bacteria and fungi in milk usually used to assess the status of milk quality and how the raw milk was saved. The chemical and range of contamination of milk is the main base for dairy products, therefore for production of good quality milk should be given a great importance because of its economic effect and supports development of the farm and dairy plants and it is very necessary to know the total number of bacteria and fungi in milk for the purpose of manufacturing, The planned world milk production in 2010 is approximately 665

million tons and it is expected to occur a significant increase in milk production in developing countries and expected increase is from 71 million tons to 293 million tons in these countries, and that because of the increase of demand for milk and milk products in these countries. In the tropics countries there are about 95% of total goats in the world as well as the increased need for milk can be covered from goat's milk since the goats can be adapted to the environment of tropics countries, where it has a short gestation period, high fertility and multiple births, with higher food conversion efficiency than cattle when fed

on bad quality feed [1]. The importance of dairy industry of goats milk has increased rapidly around the world [2]. Goat are the fourth largest group domestic animal in the world and the numbers of goat in the world increased from 520 to 840 million [3] and the numbers of goats in Iraq is [645,668] [4]. The sequence of production of goat milk produced in the world comes in the third stage after the production of both cattle and buffalo [5]. The consumption of goat milk and its products became more by consumers of dairy people compared with other dairy products from other animals [6]. Many people with allergies, including children are able to drink goat's milk if they cannot drink cow's milk [7]. Goats have a significant role, especially in the lives of small farmers since the size of small goats makes the goats owners able to keep a large number in a small space [8]. We can call the goat the cow of poor man because it produces milk and consume a little amount of feed and do not need pastures as is the case in cattle, sheep[9]. Goats has a great ability to adapt and live in most countries of the world [10].The milk consider an important food for the humans so it is very necessary to produce clean milk with low number of bacteria from the animals at the farm until it arrived to the consumer [11]. The number of bacteria in the milk is the first step which are used by dairy factories and farmers to assess the efficiency of the production steps [12].Hence, the achievement of health goals in the production of milk requires good management at all stages of production to produce milk of good quality and low numbers of bacteria and that begins in the farm from healthy animals and with clean and sterile instruments [13].So the objective of this study is:

- 1- Study bacteria and fungi content of the fore-milk[the milk which is in the teat canal].
- 2- Study bacteria and fungi content of milk after the exclusion of the fore- milk.
- 3 -Study bacteria and fungi content of goat's milk [which it presents the normal milk].

II. Material and Methods:

This study was conducted on ten goats producing milk form one farm belonging to a private farmers in Bashika city located in the north-east of the province of Nineveh, about 20 km. from the center of Mosul, the goats were in good health and continued in milk production.

Methods of sample collection

A. Sample A:

Samples of milk was taken directly from the udder of each goat without any preparation of udder which is the first milk present in the teat from each goat, we called [fore- milk] from both halves of udder, separately in clean and sterile container's and then we mixed it , as illustrated by [14] and samples were cooled immediately and within 45 minutes reach the laboratory in the Faculty of Veterinary Medicine / Veterinary Public Health Department directly for the purpose of Culturing, and estimate the bacterial and fungi Count of the milk.

B. Sample B:

Another samples of milk were taken also from each goat after the exclusion of the fore- milk, as explained in Sample [A]

also to estimate the bacteria and fungi content of this milk.

C. Sample C:

We mixed the fore- milk [Sample A] with [Sample B] for each goat and we called it [Sample C] also to estimate the bacteria and fungi content of this milk.

Counting of bacterial In this study [15] Procedure was used to count the bacteria.

1 - Nutrient agar was prepared by mixing 28 grams of the Agar to one liter of distilled water as instructed by the manufacturer Company [LAB UK]. Then sterilized by Autoclave at 121° C for 15 minutes.

2 - Potato dextrose agar

It was prepared by mixing 30 grams of the Agar to one liter of distilled water as instructed by the manufacturer. After the preparation of the above agars sterilized by autoclave at temperature 121 ° C for 15 minutes. Samples placed in plastic pack containing ice and then transferred to the laboratory for testing included the following: For diluting the sample [16] method was used and [17] method also was used for Culturing bacteria. After we doing

the suitable dilution of the samples,[0,1 ml] of each Dilution were planted in two dishes and then we leave the Plates containing culture in the room at a temperature of 25 ° C for a period of 3-5 days for counting the fungi.

III. Results and discussion:

The Count of bacteria in fore-milk [first milk] and in the milk after we remove the fore- milk and in the total milk [mix milk] were: 3,36 , 2.8 and $3,3 \times 10^3$ Log/ml cfu respectively that represents the means of three times collection of 10 goats with average 3.15 Log/ ml,[cfu] Table (I) ,as the proportion of the difference in the number of bacteria between fore- milk and milk after we remove the fore- milk and in the total milk were 72,25% ,12,88% and 68,28% respectively, Table (II) and figure (1) and (2) . This mean that the fore-milk contains bacteria with 72,25% more than milk after we remove the fore- milk as well as the fore-milk containing the bacteria by12,88% more than total milk and total milk containing the bacteria by 68,28% more milk after the exclusion of the fore-milk and total milk

Table.I: The bacteria count means of three times collection of 10 goats.

Type of milk	Average $10 X^3$ log.
Fore- milk [first milk]	3,36
Milk after we remove the fore- milk	2.80
The total milk	3,30

Table.II: The difference in the proportion of the total counts of live bacteria in the milk of goats.

The difference in the proportion of the total bacteria between fore- milk and the milk after the exclusion of the fore- milk.	72,25%
The difference in the proportion of the total bacteria between fore- milk and the total milk.	12,88%
The difference in the proportion of the total bacteria between the milk after we mixed the fore- milk with total milk.	68,28%

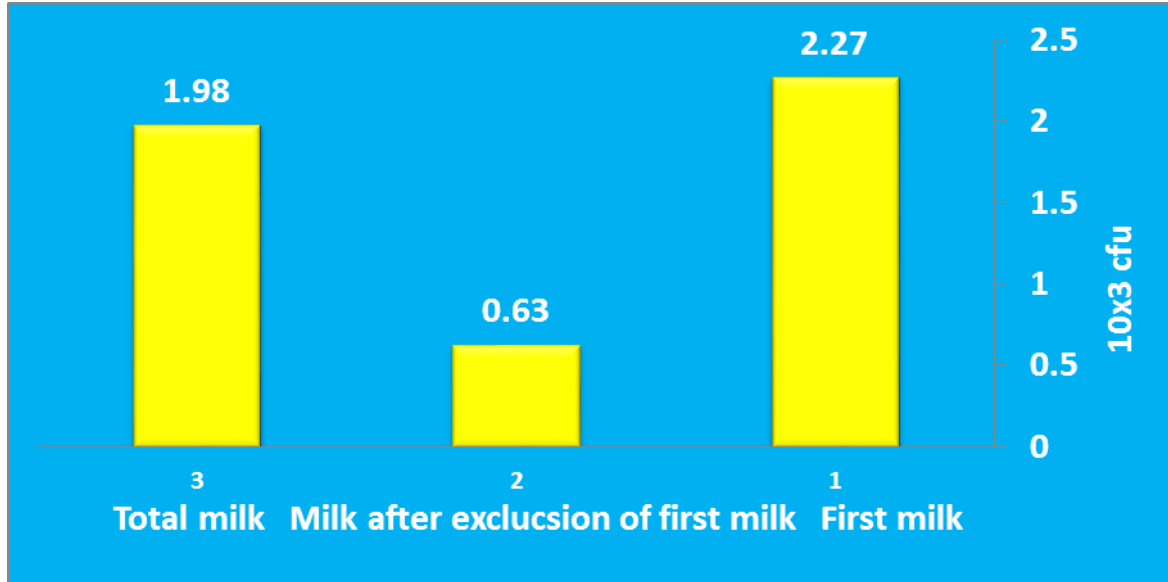


Fig.1: Total Count of bacteria in goats milk [c.f.u].

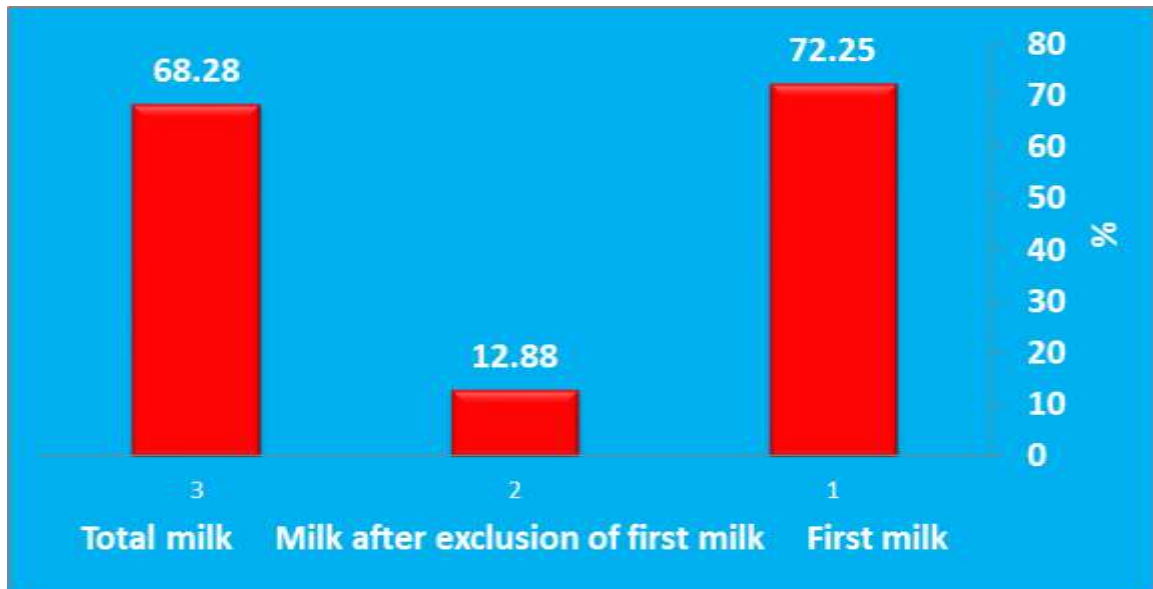


Fig.2: The total count of bacteria in percentage in goats milk.

While the number of fungi in the fore-milk, and in milk after the exclusion of the fore- milk and after we mixed the fore-

milk with total milk are 2,72, 2.5 and $2,63 \times 10^2$ Log/ ml,[cfu] respectively that represent the means of three times

collection of 10 goats with average 2.61×10^2 Log/ ml,[cfu],Table (III) as the proportion of the difference in the number of fungi between fore-milk and milk after we remove the fore- milk and in the total milk were 39,77%,18,74%and25,89% respectively. This mean that the fore- milk

contains fungi with 39,77% more than milk after we remove the first milk as well as the fore-milk containing fungi by18,74% more than total milk and total milk containing fungi by 25,89 % more than in milk after the exclusion of the fore-milk, Table (IV) and figure (3) and (4).

Table.III: The Fungi count means of three times collection of 10 goats.

The type of milk	Average 10×2 log.
Fore- milk [first milk]	2,72
Milk after we remove the fore- milk	2.5
The total milk	2,63

Table.IV: The difference in the proportion of the total counts of fungi in the milk of goats.

The difference in proportion of total numbers of fungi between fore- milk and the milk after the exclusion of the fore- milk.	39,77%
The difference in proportion of total numbers of fungi between fore- milk and the total milk.	18,74%
The difference in proportion of total numbers fungi between the milk after the exclusion of the fore- milk with total milk.	25,89%

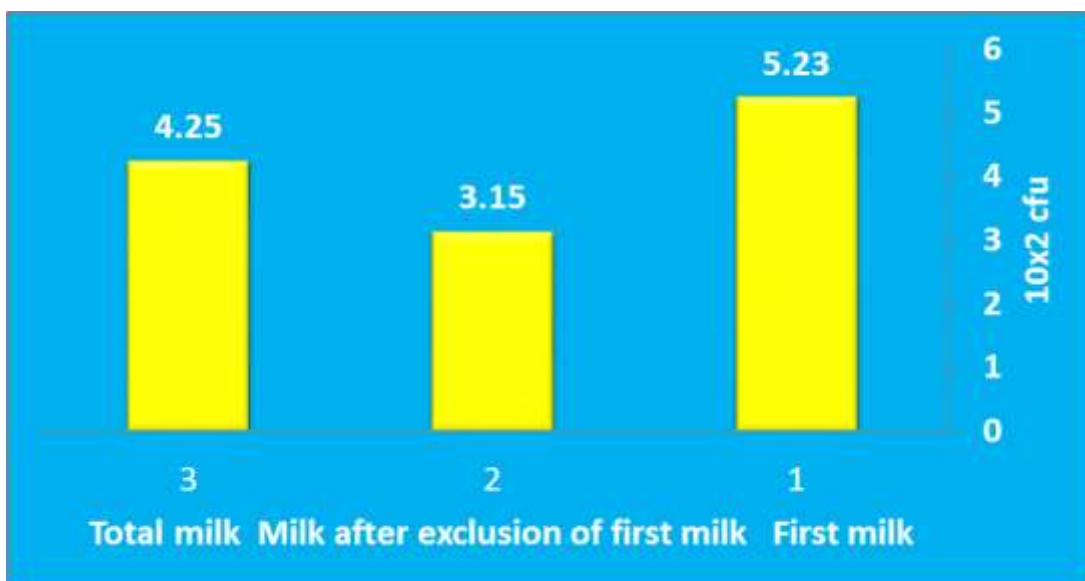


Fig.3: Total count of fungi in goats milk [c.f.u]

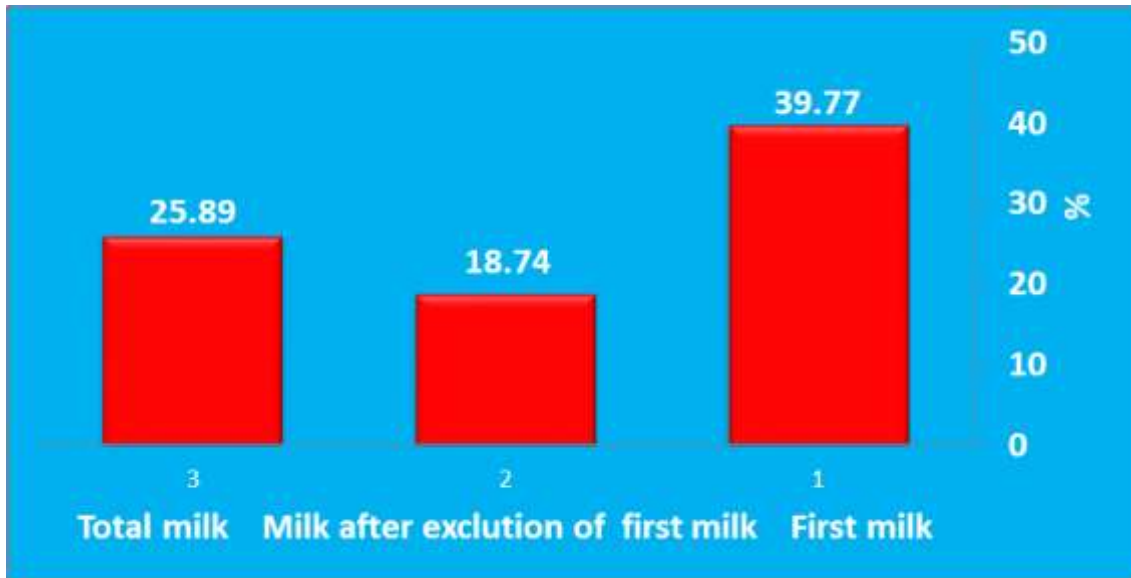


Fig.4: The total count of fungi in percentage in goats milk.

Discussion

The chemical composition of milk can be influenced by several factors, including, age, stage of lactation, first milk and last milk... etc.[18]. The results of our research for the average number of bacteria in milk is 3.15×10^3 Log/ ml,[cfu] was less than what has been indicated by [19] which found that the number of bacteria in milk is more than that installed in the United States of America 5,47 Log / ml,[cfu] which result on the reduction of protein, fat and lactose amount in milk and also leads to undesirable odor and affects also the stability of milk and milk products, also our results were less than that founded by [20] in raw goat milk 4,69 Log/ ml, and also less than those set by [21].The total bacteria should not exceed than 5,7 -6 Log / ml, [cfu] in milk which is used in manufacture [22] and this is less than that founded by [23] in Sudan goats raw milk, Which contains of bacteria was 4,557 Log/ml [cfu] also less than that founded by [24] in milk in the Iranian markets 7,11

Log/ ml,[cfu], which consider as very high.

As explained by[25] that there are a few research's on the isolation of promise and classification of fungi in raw milk of goats which it condenser as an important components of the task of germs and outputs of lactic acid also they founded that the total fungi in raw milk of goats may reach to about 6 Log / ml,[cfu] and this result is higher than our results, 2,63 Log, and also less than that founded by[26] for bacteria and fungi, where they find that the upper and lower limit of bacteria and fungi in goats milk were 9,15 7, 2 and 7,85 5,48 Log/ml,[cfu] respectively. Our results were less than that founded by [27] for the number of bacteria 5, 11 Log / ml,[cfu] in the milk of goats, but our results were 2,61 Log / ml,[cfu] for fungi which is higher that founded by the above researcher 1,4 Log / ml,[cfu]. The results obtained by the researchers mentioned above and at

compared with our results in this study shows that, our results were less than the majority of the results obtained from the researchers and the reason may be that our study took place in the summer [July], where the lack of moisture, and that the goats herd is always in the dry pasture and not in the closed barns, which increases the amount of pollution in this case also that samples of milk used in this study was taken directly from goats, cooled and transported to the laboratory without put it in containers that may increase the rate of pollution if they were not clean and sterile.

As regarding the proportion of the difference in the number of bacteria in the ratio of the difference between first milk and in milk after exclusion the first milk 72, 25 % and the proportion of the difference between first milk and total milk 12, 88 % and the percentage difference between the milk after exclusion of the fore-milk and milk total 68,28%. This mean that fore- milk contains bacteria 72, 25 %, more than milk after exclusion the fore-milk, as well as the fore- milk contains bacteria 12, 88 % more than the

total milk and total milk contains bacteria 68, 28% more milk after exclusion the fore-milk. So we must excluded the fore-milk from the other milk.

As regarding the proportion of the difference in the number of fungi in the ratio of the you difference between fore-milk and in milk after exclusion the fore-milk 39, 77 % and the proportion of the difference between fore- milk and total milk 18, 74 % and the percentage difference between the milk after exclusion of the fore-milk and milk total 25,89%. This mean that first milk contains fungi 39,77%, more than milk after exclusion the fore- milk, as well as the fore- milk contains bacteria 18, 74 % more than the total milk and total milk contains bacteria 25,89% more milk after exclusion the fore-milk, and the reason may be that the fore-milk which is in the teat canal is more susceptible to contamination than other types of milk in our study because the milk in teat canal [teat cistern] is open to the outside which allows for the entry of germs and bacteria into the udder [28].

IV. Conclusion:

The evaluation of microbial quality of Goats milk produced in the farm revealed that milk was contaminated. The large variation in microbial contamination of milk, are the basis induced by the poor conditions for management and milking. The presence of the organism in milk indicates the poor hygienic practices and health conditions of animal. It is necessary to minimize microbial contamination which can be achieved through healthy

animal and milker and hygienic practices followed in dairy plant. For an effective action, we must establish a policy of milk quality; this requires respect and knowledge of farming conditions, plus a good extension of good husbandry practices, especially related to cleanliness animals and their environment and of course the security conditions for storage and delivery of milk to put in the hands of the consumer, a product of better nutritional value.

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