

Comparisomal Survey of Quality of Milk in Manjeri (Kerala) & Gudalur (Tamilnadu)

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ABSTRACT

In this study a comparision was conducted between the qualities of milk in manjeri (Kerala) and Gudalur (Tamilnadu). With the help of Milkoscan-F2 fat, snf (solid not fat), total solids, proteins, water were determined. The results were compared with PFA standards. A questionnaire was prepared to know the attitude of women about adulteration of milk.

Keywords: Milkoscan-F2, Solid Not Fat, Prevention of food adulteration act (PFA) act, Lactometer.

INTRODUCTION

Milk is a complete food. There are several definitions for milk. According to Biochemistry, Milk is a i) whitish nutrition fluid produced and secreted by the mammary glands of mature female mammals and used for feeding their young until weaned ii) The milk of cows, goats, or other animals used by man as a food or in the production of butter, cheese, etc. Another definition of milk is that a) whitish liquid containing proteins, fats, lactose and various vitamins and minerals that is produced by mammary gland of all mature female mammals after they have given birth and serves as nourishment for their young. ii) The milk of cows, goats, or other animals, used as food by humans. One more definition is that the milk is a white liquid produced by the mammary glands of female mammals for feeding their young beginning immediately after birth. Milk is an emulsion of proteins, fats, vitamins, minerals and sugars especially lactose in water. Protein in milk contain all essential aminoacids. There are different tyes of milk. Cow's milk, yak's milk, goat's milk, buffalo's milk etc.

The composition of milk varies from cow to cow and differs for the various breeds. Cow's milk contain 3.3 % protein, 4.8 % lactose, 3.8% fat, 0.7% minerals, 12.8% total solids. Goat's milk contain 3.4%

protein, 4.7% lactose, 4.1% fat, 0.77% mineral, 13% of total solids.

In this study the border area of Kerala and Tamilnadu were selected. Because on these areas, we could easily able to collect the samples at the same time for determining the quality. Price, scarcity of milk due to severe reasons could over come easily for those persons live in the border area. The attitude of the persons living in two culture (about adulteration) could also identify with the help of questionnaire.

MATERIALS AND METHODS

The study was conducted in the locality of Manjeri city, Malappuram (dist), Kerala. Samples were collected for one month in the month of July 2011. 100 samples of vendor's milk were analysed to find out the constituents of milk. Samples were collected form Ksheera Karshaka Sangham office, where the vender's milk are totally collected from different colonies of Manjeri.

In the case of Gudalur, Tamilnadu the samples were collected by appointing 5 members to collect the milk from different vendors and the identity of those persons and the purpose of collection are not disclosed to the vendors.

Samples were collected in sterilized plastic bottles of 100ml capacity which are specially designed for testing milk

samples. Chemical analysis of milk is required to ensure that the minimum compositional standards are met and the milk is free from contaminants and adulteration. In the present study MilkoScanFT2 was used for chemical analysis of milk. It scans the full infra red spectrum enabling the measurement of new parameters. The robust pumping system of milko scan FT2 helps to reduce the cost by allowing to test higher variety of products, including high viscous samples.

All the samples were first pre-heated to 40°C in a water bath, gently shaken to ensure equal distribution of the bottle fat. Normally milk contains Fat, Solid net Fat, Protein, Lactose, Water etc.

The instrument was calibrated with reference methods. Qualitative tests were done for finding out the presence of starch, NaHCO₃, Urea etc.

We collected the data from the public regarding

1. What type of milk they are purchasing,
2. Cost of the milk,
3. Time prefer to buy the milk,
4. Whether they have noticed any impurity.
5. Sterility of the apparatus during the time of dispensing
6. Details of the dispensing area
7. Use of lactometer
8. Whether they feel and type of adulterations etc.

Regarding all these matters a questionnaire was prepared.

RESULTS AND DISCUSSIONS

Fat

Milk lipid is otherwise known as milk fat. Fat in milk are called as butter fat and occur as suspended globules. The large globules tend to reach the top and formed as a yellowish colour substance called cream. Milk fat is composed of several triglycerides out of which Oleic and Palmitic acid are predominate.

Only 49% of samples were found to fulfill the legal standards of fat which is 3.5

gm%. Remaining 51% of samples were not fulfilling the legal limits, out of which 15% of samples contained fat less than 2.5 gm%. This shows that vendors, who may be responsible for low fat content. The scenario in Gutalur city is given below:

Only 62% of samples were found to fulfill the legal standards of fat which is 3.5gm%. Remaining 38% were not fulfilling the legal limits, out of which 8% of samples contained fat less than 2.5gm%

Total solids

Total solids were obtained by adding fat and solid not fat contents of the milk. According to PFA total solids in milk should not be less than 12 gm%.

About 90% of samples did not fulfill PFA standards. Only 10% of samples fulfilled PFA standards.

The result of Gutalur city is somewhat different. There nearly 40% of samples did not fulfill PFA standards. Only 60% of samples complies with PFA standards.

Solid not fat

SNF is another important component of milk. Results of study revealed that only 8% of samples could fulfill PFA standards (≥ 8.5 gm%), while 92% of samples failed to fulfill the legal limits. 66% of samples were found to contain SNF less than 7 gm%.

SNF is a major content. Many dairies are giving more importance to Solid not Fat. Results of the study revealed that in Gutalur 9% of samples could fulfill PFA standards within the limit of (≥ 8.5), while 91 samples failed to fulfill the legal limits. 65 % of samples were found to contain SNF less than 7 gram per cent.

Large amount of water results in lower SNF.

Proteins

The milk Proteins has great importance because it provides all the essential amino acids. PFA is not maintaining any standard. But according to the nutritive values of Indian Food Standards milk contains proteins less than 3.25% gm%.

About 86% of samples contained less than 3 gm%. Only 14% of samples contained more than 3 gm%.

In the case of milk of Gutralur, the milk protein present is of about 88% (less than 3 gm per cent). About 12 per cent of samples contained more than 3 gram per cent.

Lactose

Milk contains the sugar lactose. PFA is not mentioning any standard for lactose. According to the nutritive values of Indian Food Standards cow's milk contains 4.4 gm% of lactose. 88% of samples contained lactose less than 4 gm%. Only 12% of samples contained lactose more

than 4 gm%, in the case of Manjeri. But in the case of Gutralur sample 72% of samples contained lactose less than 4 gram per cent. Only 28% of samples contained more than 4 gram per cent.

Water

Water in milk was calculated by subtracting total solids content in 1 gm% from milk. Water content should not exceed 88%, and the present study revealed that 19 percent of samples contained water less than 88%, while 81% of samples were found adulterated with water.

Scenario of gutralur is almost same. About 80% of samples contained water as an adulterated medium.

Distribution of fat, SNF and total content of vender's milk in Manjeri

Fat (gm%)	%	SNF (gm%)	%	Total solids (gm%)	%
2-2.5	15	6.5-7	66	6-8	32
2.5-3.5	24	7-7.5	10	8-10	30
3.5-4.5	26	7.5-8	10	10-12	28
4.5-6.5	29	8-8.5	6	12-14	04
6.5-7.5	06	8.5-9	8	14-16	06

Distribution of protein, lactose and total water of vender's milk in Manjeri

Protein gm%	%	Lactose gm%	%	Water gm%	%
1.5-2	28	1.5-2	20	84-86	12
2-2.5	36	2-2.5	17	86-88	07
2.5-3	22	2.5-3	24	88-90	18
3-3.5	07	3-3.5	17	90-92	29
3.5-4	03	3.5-4	10	92-94	21
4-4.5	04	4-4.5	12	94-96	13

Distribution of fat, SNF and total content of vendor's milk in Gudalur

Fat (gm%)	%	SNF (gm%)	%	Total solids (gm%)	%
2-2.5	8	6.5-7	65	6-8	08
2.5-3.5	20	7-7.5	08	8-10	13
3.5-4.5	32	7.5-8	12	10-12	19
4.5-6.5	11	8-8.5	06	12-14	46
6.5-7.5	19	8.5-9	09	14-16	14

Distribution of protein, lactose and total water of vender's milk in Gudalur

Protein gm%	%	Lactose gm%	%	Water gm%	%
1.5-2	26	1.5-2	21	84-86	06
2-2.5	33	2-2.5	10	86-88	04
2.5-3	29	2.5-3	14	88-90	26
3-3.5	07	3-3.5	16	90-92	28
3.5-4	02	3.5-4	11	92-94	27
4-4.5	03	4-4.5	28	94-96	09

Mean and Standard deviation of vendor's milk in Manjeri

Component	Mean	Standard deviation
Fat	4.97	1.24
SNF	7.65	0.65
Total solids	11.44	2.24
Water	90.58	2.98
Protein	2.42	0.63
Lactose	2.83	0.81

Mean and Standard deviation of vendor's milk in Gudalur

Component	Mean	Standard deviation
Fat	5.15	1.14
SNF	7.68	0.67
Total solids	13.90	2.25
Water	90.86	2.52
Protein	2.43	0.58
Lactose	3.10	0.94

According to Nutritive value of Indian foods cow's milk contain 4.4 gm of lactose. But in the case of Manjeri and Gudalur it is not in the prescribed limit. In the case of total solids PFA recommended the value not less than 12 gm percent. In the case of Gudalur it complies. But in the case of Manjeri the value is 11.44 ± 2.24 . According to nutritive value

of Indian standards the protein content of the milk should not be less than 3.25 gm. In both cases the values doesn't comply. In the case of Gudalur the mean water content was 90.86 ± 2.52 gm percent and in the case of Manjeri the value is 90.58 ± 2.98 which was higher than the prescribed standards.

Adulteration checking

Vendor's milk was tested for the presence of adulteration, in both areas

Test for adulteration	In Manjeri	In Gudalur
Starch	(+)	(-)
NaHCO ₃	(+)	(+)
Urea	(-)	(-)

Starch, NaHCO₃ was found to be the adulterants present in 4% of raw milk in Manjeri.

NaHCO₃ was found to be as an adulterant in milk of Gudalur is of about 2%.

This was compared with govt. Organised dairy milk of both Kerala and Tamilnadu.

In the case of Manjeri, Samples of the milk fulfilled the required constituents mentioned in the pouch. It contains fat 3.0gm, protein 3.2gm. And in the case of Gudalur authorised government dairy also the pouch complies with the PFA standards. This shows that the vendor's

milk was not in accordance with PFA and water is a common adulterant.

Scenario in Manjeri

House wives are asked for their preference in buying vendor's milk and dairy milk. About 60% of them preferred vendor milk even though they were aware of adulterants and poor quality, because of inconvenience in buying milk from dairy shop. Vendor's supply milk at 6.30 am, at that time they are very busy in kitchen. Because they have to pack food for their husband and for the kids. So no time to spend for going outside and buy milk. About 30% of them preferred dairy milk, because they are aware of pasteurization and quality of milk. Remaining 9% of them have no choice they will buy either one depending upon the monetary effect, because this category comes under layman people, who are not educated. Depending upon the wages of each day they are deciding the type of milk. (Vendor's daily amount). Remaining 1% have their own domestic animals.

90% of the house wives knew that the nature of vendor's milk. Most of them found hair, dust, fibre, grass and some sort of other impurities also. They were also aware of water in milk. Most of them analysed the fat content of the milk. But only a few were aware of common adulterants such as NaHCO_3 , starch etc. Nearly 50% were aware of lactometer, but no one was using lactometer in home.

Scenario in Gotalur

78% of house wives in Gudalur were giving importance to vendor's milk because they were aware of only one adulterant that is water. Vendor's milk was easy to get and they were ready to accept that watery milk. Ignorance in other type of adulteration, lack of dairy shops in remote area and poor refrigeration facility are the reasons that they are keeping a step behind to accept dairy milk.

But 20% of them collected the milk from dairy shops and they were aware of pasturisation of milk and they were giving

more preference of dairy milk due to availability of good curd, cheese etc.

Remaining 2% got very pure form of milk with no water or any other adulterants, because they had their own cow and they were not ready to sell their milk. They were using that only for their own purpose. Only 2% of them having idea about lactometer.

They also notice hair, grass, dust in the milk. For vendor's daily amount is not necessary. So they preferred vendor's milk than the dairy milk.

CONCLUSION

The study was conducted in the localities of Manjeri and Gudalur to evaluate the quality of milk. These areas are border places of Kerala and Tamilnadu. This was conducted in the month of July 2011. One hundred samples of vendor's milk were analysed using Milko Scan – 2 to find out the chemical constituents of milk. Results showed that vendor's milk sold in Tamilnadu and Kerala were not in accordance with the PFA standards and water was a common adulterant. Milk sold by govt. dairies present in Kerala and Tamilnadu were of good quality and they passed protein, fat, SNF, lactose and water content in accordance with PFA. In Tamilnadu the common adulterant was water and few percent of sodium bicarbonate, but in the case of Kerala water, starch and NaHCO_3 were used as adulterants.

The main theme was, all the house wives were aware of adulterated milk with water. In Kerala 50% were aware of lactometer. But no one was evaluating the milk with this. But in the case of Tamilnadu only 2% were aware about lactometer. No one was testing the samples at home.

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REFERENCES

1. Gopalan C, Shastri BV and Balasubramanian SC. Nutritive value of Indian Foods (ICMR) NIN, Hyderabad, 2000.
2. Biggs DA. Milk analysis with the infrared milk analyzer. J Dairy Science. 1967;50(5):799-803.
3. Sudershan RV and Bhatt RV. Changing profile of food adulterants: Perceptions of food analysis. J of Food Science and Technology. 1995;.32(5):368-372.
4. Biggs DA. Instrument infrared estimation of fat, protein and lactose in milk. J Assoc Off Analytical Chemistry. 1978;61:1015-1023.