International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(3): 3652-3654

Received: 10-03-2019
Accepted: 12-04-2019

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Studies on Physico-chemical quality of milk received from different sources in Nagpur Tahsil

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Abstract
The present investigation entitled "Studies on Physico-chemical quality of milk received from different sources in Nagpur Tahsil" was undertaken during the period Dec. 2011 to April 2012 for this study. Total 100 samples were collected from individual producer, co-operative society, Govt. milk scheme, Agriculture College Dairy Farm and analysed for physico-chemical quality of milk. The highest per cent of milk samples for specific gravity level below 1.0280 were found in individual producer (28.00%), lowest per cent were found in Agriculture College Dairy farm (8.00%). For the fat level group, highest per cent of milk samples in group of 3.5 to 4.5 were found in Agriculture College Dairy Form (92.00%), the lowest per cent were found in individual producer (60.00%) and for the SNF level group, highest per cent of milk samples showing the SNF level group of 8.0 to 8.499 were found in individual producer (24.00%) and the lowest per cent were found in Agriculture College Dairy Farm (8.00%).

Keywords: Physico-chemical, individual producer, co-operative society, fat, SNF

Introduction
Milk is one of the most whole some supplement to the unbalance diet for growing lacto-vegetarian millions in India. Due to its composition, high nutritive value and easy digestibility milk has become a very important part of diet. Milk is not uniform article of commerce as it varies considerable in composition. The composition of milk may be varied due to influence of different factors like procurement of milk from different sources i.e. individual producer, co-operative society, Government milk scheme, Agriculture College Dairy Farm etc. Legally, milk is defined as "the whole, fresh, clean lacteal secretion obtained by the complete milking of one or more healthy milch animals, excluding that obtained within 15 days before or 5 days after calving, containing no colostrums and not less than 3.5 per cent milk fat and 8.5 per cent solid not fat (De, 2001). It is a well-known fact that milk varies considerably in composition. The variations are caused by the interplay of a number of fact are affecting physiology of the milch animal, but some variation may result from treatments following milking. Since the extent of variation is appreciable, it is necessary to ensure that buying and selling of milk are conducted on quality basis, and that minimum nutritive requirements as laid down in legal standards are met. (Singh and Singh, 2008) [8]. Milk is considered as ideal food. It provide protein, minerals like calcium and phosphorus, health giving vitamins like A,D,E,K and vitamin B-complex and furnishes energy giving lactose and milk fat**,** besides supplying certain essential fatty acids, it contain above nutrient in an easily digestible and assimilable form.

Methodology
The present research work was undertaken at Section of Animal Husbandry and Dairying, College of Agriculture, Nagpur during the year 2011-2012.

Collection of raw milk sample
The raw milk samples were collected from the following sources in Nagpur tahsil.
1. Individual producer
2. Co-operative society
3. Government milk scheme Dock
4. Agricultural College Dairy Farm.

The raw milk samples were collected in the month of Dec.2 011 to April 2012. Twenty Five Samples from each sources *o*f milk procurement were collected and total 100 sample were

were examined for the quality of milk.
The raw milk samples were collected aseptically as per the method recommended in BIS Handbook of Food Analysis in SP: 18 (part – XI) 1981 from various sources of milk procurement for determining the physico-chemical quality and adulteration of milk.

Sampling procedure
The samples were collected from milk can or pail and storage tank and procedure for sampling are given below.

a. Milk can or pail: Milk in the can or other container as mixed with sterile plunger and with the help of sterile dipper. Milk sample was taken into a sterile sample bottle and closed with sterile lid.

b. Storage tank: Milk in vat or storage tank was mixed thoroughly with the help of agitator and representative sample was drawn into sterile sample bottle with the help of sterile dipper and finally closed with sterile lid.

After taking each sample in sterile sample bottles (200 ml milk) aseptically the sample bottle were labeled properly indicating the source of milk sample procurement. These sample were preserved with formalin 36% is added @ 0.1 ml for 25 ml of milk and transferred to the laboratory for determining the quality of milk.

Result and Discussion
Physico-chemical quality of milk

Table 1: Quality of milk in respect of specific gravity from different levels of milk procurement

S. No.	Sources of milk sample collection	No. of samples analysed	No. of milk samples in each group		
			Groups of specific gravity levels		
			Below 1.0280	1.0280 to 1.0300	Above 1.0300
1	Individual producer	25	7 (28.00)	14 (56.00)	4 (16.00)
2	Co-operative society	25	5 (20.00)	17 (68.00)	3 (12.00)
3	Govt. milk scheme	25	1 (4.00)	20 (80.00)	4 (16.00)
4	Agri. College airy Farm	25	2 (8.00)	21 (84.00)	2 (8.00)
	Total	100 (100.00)	15 (15.00)	72 (72.00)	13 (13.00)

Table no. 1 shows that the per cent milk samples showing specific gravity level below 1.0280 were found highest in individual producer (28.00%) followed by co-operative society (20.00%) and Agriculture College Dairy Farm (8.00%), the lowest number of milk samples for specific gravity level below 1.0280 were found in Govt. Milk scheme (4.00%).
The per cent milk samples showing specific gravity level group of 1.0280 to 1.0300 were found highest in Agriculture College Dairy Farm (84.00%) followed by Govt. milk scheme (80.00%) and co-operative society (68.00%), the lowest number of milk samples for specific gravity level group of 1.0280 to 1.0300 were found in individual producer (56.00%). However, in the last group i.e. per cent milk samples showing specific gravity level above 1.0300 were found highest in individual producer (16.00%) and also in Govt. Milk scheme (16.00%) followed by co-operative society (12.00%), the lowest number of milk samples for specific gravity level above 1.0300 were found in Agriculture College Dairy Farm (8.00%).
Thus, it is revealed from the data in Table 1 that, out of total 100 samples tested during the investigation, 15.00 per cent samples showed specific gravity below 1.0280, 72.00 per cent samples showed specific gravity between 1.0280 to 1.0300 and 13 per cent samples showed specific gravity above 1.0300.
The highest per cent of milk samples for specific gravity level below 1.0280 were found in individual producer (28.00%) which are not satisfying prescribed legal standard.
Lower specific gravity of market milk samples was also observed by Karpude *et al*. (1987) [5] in Parbhani town. The average specific gravity of market milk samples was 1.0229 and 1.025 in lean and flush season, respectively, which was some what lower than the specific gravity of milk samples tested in the present investigation.
Lavania (1969) [7] conducted study in Baraut city and reported that milk tested at producers level showed 1.0342 specific gravity. However, milk tested at society level showed 1.0262 specific gravity indicating the dilution of milk at the time of handing over to the society by the producers.

Table 2: Quality with respect to fat content of milk from different levels of milk procurement

S. No.	Sources of milk sample collection	No. of samples analysed	No. of milk samples in each group		
			Groups of fat levels (%)		
			3.5 to 4.5	4.6 to 5.5	5.6 to 6.5
1	Individual producer	25	15 (60.00)	6 (24.00)	4 (16.00)
2	Co-operative society	25	17 (68.00)	5 (20.00)	3 (12.00)
3	Govt. milk scheme	25	22 (88.00)	3 (12.00)	0 (00.00)
4	Agri. College Dairy Farm	25	23 (92.00)	2 (8.00)	0 (00.00)
	Total	100 (100.00)	77 (77.00)	16 (16.00)	7 (7.00)

From Table 2, it can be seen that per cent milk samples in the fat level group of 3.5 to 4.5 per cent were found highest in Agriculture College Dairy Farm (92.00%), followed by Govt. milk scheme (88.00%) and co-operative society (68.00%), the lowest number of milk samples for fat level group of 3.5 to 4.5 per cent were found in individual producer (60.00%).
The per cent milk samples showing fat level group of 4.6 to 5.5 per cent were found highest in individual producer (24.00%), followed by co-operative society (20.00%) and Govt. milk scheme (12.00%), the lowest number of milk samples for fat level group of 4.6 to 5.5 per cent were found in Agriculture College Dairy Farm (8.00%).
However, in the last group i.e. per cent milk samples showing fat level group of 5.6 to 6.5 were found highest in individual producer (16.00%), the lowest number of milk samples for fat level group of 5.6 to 6.5 per cent were found in co-operative society (12.00%) and no one samples were found in the fat level group of 5.6 to 6.5 per cent in Govt. Milk scheme and

Agriculture College Dairy Farm.

Thus, it is revealed from the data in Table 2, that, out of total 100 samples tested during the investigation 77 per cent samples showed the fat level between 3.5 to 4.5 per cent, 16 per cent samples showed the fat level between 4.6 to 5.5 per cent and only 7 per cent samples showed the fat level between 5.6 to 6.5 per cent.

The highest per cent of milk samples for fat level group of 3.5 to 4.5 were found in Agriculture College Dairy Farm (92.00%) which are satisfying prescribed legal standard.

Kothwade (1999) [6] conducted study in Nagpur city and reported that the average fat content of cow milk and standardized milk were 3.53 and 4.47 per cent, respectively. Nearly same observation were found in the present study.

Table 3: Quality with respect to solid not fat content of milk from different levels of milk procurement.

S. No.	Sources of milk samlpe collection	No. of samples analysed	No. of Milk samples in each group			
			Groups of SNF levels (Per cent)			
			8.0 to 8.499	8.5 to 8.999	9.0 to 9.499	Above 9.5
1	Individual producer	25	6 n(24.00)	12 (48.00)	4 (16.00)	3 (12.00)
2	Co-operative society	25	3 (12.00)	15 (60.00)	5 (20.00)	2 (8.00)
3	Govt. milk scheme	25	2 (8.00)	20 (80.00)	3 (12.00)	0 (0.00)
4	Agri. College Dairy Farm	25	2 (8.00)	21 (84.00)	2 (8.00)	0 (0.00)
	Total	100 (100.00)	13 (13.00)	68 (68.00)	14 (14.00)	5 (5.00

From Table 3, it can be seen that the per cent milk samples showing SNF level group of 8.0 to 8.499 per cent were found highest in individual producer (24.00%) followed by co-operative society (12.00%), and the lowest number of the milk samples for SNF level group of 8.0 to 8.499 per cent were found same in Govt. Milk scheme (8.00%) and Agriculture College Dairy Farm (8.00%).

In the SNF level group of 8.5 to 8.999 per cent were found highest in Agriculture College Dairy Farm (84.00%) followed by Govt. milk scheme (80.00%) and co-operative society (60.00%), the lowest number of milk samples for SNF level group of 8.5 to 8.999 per cent were found in individual producer (48.00%).

In the SNF level group of 9.0 to 9.499 per cent were found highest in co-operative society (20.00%) followed by individual producer (16.00%) and Govt. milk scheme (12.00%), the lowest number of milk samples for SNF level group of 9.02 to 4.99 per cent were found in Agriculture College Dairy Farm (8.00%).

Thus, it is revealed from the data in Table 3 that, out of 100 samples tested during the investigation, 13.00 per cent samples showed SNF content between 8.0 to 8.499 per cent, 68.00 per cent samples showed SNF content between 8.5 to 8.999 per cent, 14.00 per cent samples showed the SNF content between 9.0 to 9.499 per cent and only 5 per cent samples showed the SNF content above 9.5 per cent.

The highest per cent of milk sample for SNF level group of 8.5 to 8.999 were found in Agriculture College Dairy Farm (84.00%). Which are satisfying prescribed legal standard.

Conclusions

It may be concluded from the present studies that the overall quality of milk samples as indicated by physico-chemical evaluation i.e. specific gravity, SNF content were below the prescribed legal standard collected from individual producer and fat content level were in prescribed legal standard from all different sources in Nagpur Tahsil.

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