SUGGESTIONS FOR IMPROVEMENT IN MILK TO THE URBAN CONSUMERS BASED UPON CERTAIN OBSERVATIONS

SAJJAN SINGH* and D.N. SRIVASTAVA
Department of Livestock Products and Technology
Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar-125004

SUMMARY

A study was conducted to pin-point the consumers' preference for the type of milk supply and to ascertain the physico-chemical quality of market milk supplied by three sources of milk supply in Hisar city *viz.* Rural Vendors (S_1), Private city dairies (S_2) and Milk plant (S_3) in three different areas of the city. Six consumers getting milk supply from each of the three sources were randomly selected for a total of 18 Consumers from each area. Samples were collected in triplicate. A total of 57 milk suppliers were also selected randomly. Separate pre-tested interview schedules were used as the main tool of data collection regarding consumers' preference. Milk samples were analysed for fat, S.N.F, T.S, Specific gravity, pH, acidity, Methylene Blue Reduction (M.B.R.) time and Clot on Boiling (C.O.B.) tests. The level of satisfaction of the respondents for various factors influencing preference for a particular source of milk supply was determined with the help of weighted scores calculated as per the statistical technique given by Cochran (1966). Data pertaining to milk quality tests were analysed statistically for analysis of variance using Two-factorial-complete-Randomized-Block-Design. On the basis of certain observations during this study, various recommendations have been made for improvement in the milk supply of market milk for Hisar city in particular.

The role of milk vendors in the dairy industry in India is so vital that only 10 percent of the total milk produced in India is handled by the organized sector (Chatterjee and Acharya, 1987). They collect milk from the village house-holds and distribute it from door to door in cans to the urban consumers. Milk vendors hardly take any precautionary measures such as cooling or pasteurization to check the bacterial growth. To maintain quality standards, controlled operations have to be performed at all stages of the production of milk which include maintenance of sanitary conditions of buyers, cleanliness of utensils and of the milking machines, if used and care during storage and handling. Willful adulteration at the production or supply centre, by carriers or by middlemen has to be prevented. The only means of ensuring quality, when the purchaser cannot exercise a direct control over the production, transport and handling of milk, is by subjecting representative samples to chemical and bacteriological analysis. Milk plant in Hisar city met about $1/12^{th}$ of the total requirement of the city consumers. Various other agencies engaged in the supply of market milk were milk vendors, privately owned dairies, public sector milk plant, public sector dairy farms etc. The success of the public sector milk supply scheme will also depend upon the increased liking of the consumers for its supply of market milk. Therefore, it is all the more necessary to carry out an investigation to pin-point the preference of consumers for a particular type of milk supply and factors responsible for the same.

The study was conducted in Hisar City possessing the population of over five Lakhs. Three sources of milk supply namely, milk vendors from rural areas (S_1), privately owned city dairies running within the city (S_2) and milk plant, Hisar (S_3) were identified for the study. For this survey, 18 consumers were randomly selected from each source with a total of 54 consumers. The interview schedule was used as a main tool of data collection. For the present study, ten factors influencing consumers' preference were identified. The level of satisfaction of each of the respondents for each factor was calculated from the weighted scores. Three levels of satisfaction of the consumers' preference *viz.* low, medium and high were computed from the weighted scores as per the statistical technique' using the following formula. (As per Panse and Sukhatme (1967).

$$\frac{\text{Cum}\sqrt{f}}{3} = \text{Low Level of satisfaction.}$$

$$\frac{\text{Cum}\sqrt{f}}{2} = \text{Medium Level of satisfaction.}$$

$$\frac{\text{Cum}\sqrt{f}}{1} = \text{High Level of satisfaction.}$$

Where, cum $\sqrt{f}$ = Cumulative frequency of weighted mean score

The table 1 reveals that milk supplied by city dairies was preferred by the consumers most, while the supply of milk by milk plant was preferred the least. The weighted score for rural milk vendors, city dairies and milk plant

*Corresponding author: ssbrar1967@gmail.com

Table 1

Comparative level of satisfaction for various factors influencing consumers' preference for milk supplied to the consumers by different sources

Sr. No.	Factors	Sources of milk supply					
		Rural milk vendors		City dairies		Milk Plant	
		W.S.	Level (s)	W.S.	Level (s)	W.S.	Level (s)
1.	Measurement	38	S.M.	45	S.M.	49	S.H.
2.	Quality of milk through cream or fat content	30	S.L.	50	S.H.	34	S.L.
3.	Convenient in availability	54	S.H.	52	S.H.	32	S.L.
4.	Supplied in desired quantity	52	S.H.	49	S.H.	37	S.L.
5.	Price	39	S.M.	38	S.M.	40	S.M.
6.	Flavour	42	S.M.	50	S.H.	36	S.L.
7.	Colour	44	S.M.	51	S.H.	39	S.M.
8.	Freshness	49	S.H.	51	S.H.	33	S.L.
9.	Mode of payment	49	S.H.	51	S.H.	29	S.L.
10.	Regularity in supply	49	S.H.	48	S.M.	38	S.M.
	Total	446	II	480	I	367	III

S.H.: Scored High, S.M.: Scored Medium, S.L.: Scored Low, W.S.: Weighted scores.

Table 2

Effect of source of supply on quality of milk supplied to various consumers on the basis of average values

Sr. No.	Particulars	Source of milk Supply		
		S_1	S_2	S_3
1	Fat (Per Cent)	3.799	6.491*	4.064
2	S.N.F. (Per Cent)	6.817	8.454*	7.712
3	T.S. (Per Cent)	10.632	14.908*	11.781
4	Specific Gravity at 60 ºF	1.025	1.029*	1.028*
5	pH	6.431	6.461*	6.365
6	Acidity (Per Cent)	0.153	0.157	0.164
7	M.B.R. Time (Minutes)	194	168	198
8	C.O.B. (+ve Out of 18 Samples)	1.00	0.33	1.32

*Significant (P<0.05).

was reported 446, 480 and 367, respectively.

Under the present study, the quality of milk (Table 2) supplied by three sources i.e. S_1, S_2 and S_3 contained fat (%) 3.8, 6.5 and 4.0, S.N.F. (%) 6.8, 8.4 and 7.7, and specific gravity (15 ºC) 1.025, 1.029 and 1.028, respectively (Singh 1991). These results clearly showed that milk supplied by rural vendors was heavily adulterated, while milk supplied by organized public sector was also not satisfactory, since the milk plant was selling its milk as standardized milk and therefore, the quality of milk supplied was sub-standard. However, the quality of milk supplied by private city dairies was satisfactory to some extent but the S.N.F. content and specific gravity of milk supplied by this source were also below the prescribed legal standards for buffalo milk. These observations indicate that none of the existing conventional sources is able to satisfy the consumers' expectations for the supply of genuine milk. Thus, a suitable strategy needed to be followed for the supply of genuine and fresh milk to the quality conscious consumers of the city.

As indicated in table 3, it was found that consumers' preference for milk supplied by rural vendors for the parameter quality of milk through cream or fat content was low and for rest of the parameters it was medium to high indicating level of satisfaction was good for the milk supplied by rural vendors especially for regularity in supply, freshness, supplied in desired quantity and convenient in availability of milk.

Consumer level of satisfaction for the milk supplied by the private city dairies was also found in high level especially related to freshness, supplied in desired quantity, convenient in availability, colour and flavor as compared to milk supplies by rural vendors it might be due to presence of cooling facility with the private city dairies (Table 4).

It is revealed from the table 5 that consumer preference for the milk supplied by the milk plant had least level of satisfaction as compared to rural vendors and private dairies. Consumer had high level of satisfaction for one parameter i.e. for measurement. It indicates that consumers are preferring fresh milk for consumption.

Opinion of the consumers was collected regarding four selected suggestions for improvement in the present distribution system of milk *viz.* (1) Regulation of milk

Table 3

Level of satisfaction for various factors influencing consumers' preference for milk supplied by rural vendors

Sr. No.	Factors	Categories of satisfaction (weighted scores)			Total score	Level (s)
		Highly satisfied (x 3)	Satisfied (x 2)	Unsatisfied (x 1)		
1	Measurement	9	28	1	38	Medium
2	Quality of milk through cream or fat content	3	20	7	30	Low
3	Convenient in availability	54	0	0	54	High
4	Supplied in desired quantity	48	4	0	52	High
5	Price	9	30	0	39	Medium
6	Flavor	21	20	1	42	Medium
7	Colour	30	12	2	44	Medium
8	Freshness	39	10	0	49	High
9	Mode of payment	39	10	0	49	High
10	Regularity in supply	39	10	0	49	High

Table 4

Level of satisfaction for various factors influencing consumers' preference for milk supplied by private city dairies

Sr. No.	Factors	Categories of satisfaction (weighted scores)			Total score	Level (s)
		Highly satisfied (x 3)	Satisfied (x 2)	Unsatisfied (x 1)		
1	Measurement	27	18	0	45	Medium
2	Quality of milk through cream or fat content	42	8	0	50	High
3	Convenient in availability	48	4	0	52	High
4	Supplied in desired quantity	42	6	1	49	High
5	Price	09	28	1	38	Medium
6	Flavor	42	8	0	50	High
7	Colour	45	6	0	51	High
8	Freshness	45	6	0	51	High
9	Mode of payment	45	6	0	51	High
10	Regularity in supply	39	8	1	48	Medium

Table 5

Level of satisfaction for various factors influencing consumers' preference for milk supplied by milk plant

Sr. No.	Factors	Categories of satisfaction (weighted scores)			Total score	Level (s)
		Highly satisfied (x 3)	Satisfied (x 2)	Unsatisfied (x 1)		
1	Measurement	39	10	0(0)	49	High
2	Quality of milk through cream or fat content	06	24	04	34	Low
3	Convenient in availability	06	20	06	32	Low
4	Supplied in desired quantity	12	22	03	37	Low
5	Price	15	24	01	40	Medium
6	Flavor	12	20	04	36	Low
7	Colour	12	24	03	39	Medium
8	Freshness	06	22	05	33	Low
9	Mode of payment	03	18	08	29	Low
10	Regularity in supply	12	24	02	38	Medium

prices by the Government. (2) Strict check by the Food inspectors. (3) Opening of milk booths by the milk plant. (4) Encouraging the privately owned dairies. About 76 and 72 percent of the consumers gave weightage to regulation of milk prices and opening of milk booths, respectively. The results indicated more or less, a favourable opinion of the consumers for all the four suggestions to be implemented with maximum emphasis for strict check by the food inspectors. Suggestions for improvement in the present milk distribution system are :

1. Majority of the consumers in urban area belong to highly educated and medium income group. Keeping this fact in view, the strategy for the supply of quality product-should be made.

2. The monthly mode of payment seems to be preferred by the consumers as evident from the study on consumer's preference (Table 1). Milk plant may also follow monthly system of payment instead of daily. To achieve this aim, a coupon system may be adopted by the Milk Plant.

3. There seems to be little difference in the price of milk of the three sources under study but the quality of milk from S_2 source is superior than the other two sources (Table 2). It showed the need for improvement in the quality of milk supplied by rural vendors and the milk plant. Hence, justifying sufficiently high milk prices of these two sources.

4. As per the opinion of the consumers, there is a need for regulation of milk prices, strict check by the Food Inspectors and also to encourage the privately owned dairies. Since the privately owned dairies cause unhygienic environment and the animals are also hazardous to the citizens, hence, these may not be encouraged.

5. Rural milk vendors are required mainly to improve the quality of milk. While, price, flavor and measurement satisfied the consumers to a medium level (Table 3).

6. Private city dairies satisfied the consumers for most of the attributes and they require further improvement regarding measurement, regularity in supply and price of milk.

7. Milk supply of milk plant do not satisfy for most of the attributes studied. There is much scope for improvement in quality, convenience in availability, supply in desired quantity, flavor, freshness, mode of payment and regularity in supply of milk.

8. Nearly about 85 and 81 percent of the consumers emphasized for strict check by the food inspectors and to encourage the privately owned dairies, respectively.

The quality of milk (based on fat, S.N.F., T.S and specific gravity tests) supplied by S_2 source (city dairies) was significantly better ($P<0.05$) than the two other sources. The quality of milk based on fat and S.N.F. content was not influenced significantly by area of distribution. However, quality of milk based on T.S. content and specific gravity tests were significantly better in area A_1 (Defence Colony) in comparison to the other two areas. Although, the price paid by the consumers for milk supplied by city dairies was higher in comparison to the other two sources, even then these consumers were more satisfied than the consumers supplied milk by the other two sources. It may be because of a better quality product supplied by city dairies. Nearly about 85 and 81 percent of the consumers emphasized for strict check on quality of milk by food inspectors and to encourage the privately owned city dairies, respectively to improve the present milk distribution system.

These results are almost similar as reported by Lavania (1969), who reported 4.39 per cent fat, 8.60 percent S.N.F. and 12.93 percent total Solids content in village milk. Lavania (1969) reported slightly higher specific gravity 1.030 of milk supplied by rural vendors, but the specific gravity (1.029) of milk supplied by private dairies was in agreement with our findings.

CONCLUSION

From the results of the present study, it may be concluded that market milk supplied by city dairies was preferred by the consumers most, while the supply of milk by milk plant was preferred the least. A total of 70,50 and 10 percent of the factors influencing consumers' preference studied scored high level of satisfaction for milk supplied by city dairies, rural milk vendors and milk plant, respectively.

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