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STUDY ON THE FAT AND TOTAL SOLIDS CONTENTS OF MILK SUPPLIED BY DIFFERENT SOURCES IN ISLAMABAD

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Milk supplied to Islamabad area is handled by different agencies at various steges since its production, collection, transportation till distribution. These agencies are the milk producers, milk collectors, urban milk producers, milk vendors, milk plants and NARC dairy farm. Milk supplied to the consumers through milk vendors was found to be adulterated with water upto 43%. No significant differences were found in the fat and total solids contents of the milk supplied by the milk producers, milk collectors and Dairy Cooperative Union (5.80 and 15.24%; 5.70 and 14.84%; 5.78 and 14.50%, respectively), whereas the milk supplied by the vendors showed significantly low fat and total solids contents (3.70 and 9.69%, respectively). The processed milk supplied by the milk plants contained 3.50% fat and 12.48% total solids, fulfilling the requirements of standardized milk under current pure food laws. The buffalo and cow milk of NARC dairy farm contained 6.5 and 16.6% and 3.8 and 12.8% fat and total solidsres,peotively. A system has been proposed for efficient collection and distribution of milk in order to ensure adequate supply of quality fluid milk at low cost.

INTRODUCTION

Milk and milk products are the basic form of animal protein widely used in Pakistan (Anonymous, 1973). Milk is highly nutritious and is considered a nearly balanced food. It contains an adequate amount of essential amino acids and can well supplement the vegetable proteins to meet the human requirements (McGillivray and Porter, 1958). The availability and distribution of milk in our country is very uneven. Milk is mainly produced from small herds scattered over vast areas. Highly perishable nature of milk creates problem in its collection, safe transportation and distribution to various urban centres in accordance with their demand (Capstick, 1962; Hami, 1973).

From production to consumption, milk passes through many hands and its hygienic and nutritional quality lowers, whereas its price continues to increase. The wholesomeness of milk is further affected due to adulteration by milk traders (Karim *et al.*, 1963). There is a common belief that the unpacked milk offered for sale in urban centres is adulterated. Shah (1975) reported that in and around Peshawar, with the exception of urban milk producers who sell milk directly to the consumers, almost all the milk producers/wholesellers add nearly 8 seers (about 7 kg) of water per maund (37.3 kg) of milk. Keeping in view the increasing demand for milk in urban population and importance of milk as a dietary article, this study was initiated to identify the marketing channels of milk in Islamabad and to determine the changes in the percentage of fat and total solids of milk supplied by various sources in Islamabad.

MATERIALS AND METHODS

The information regarding the marketing channels was obtained while collecting the milk samples from individual sources. Observations were made on milk production and milk collection in rural areas around Islamabad and on milk distribution in the urban centres. To find out the extent of adulteration in milk from its production to distribution, the samples were collected from various consignments of the following sources:

1. Rural milk producers on the outskirts of Islamabad at the time of selling the milk to milk collectors.
2. From milk collectors during the transit phase.
3. Urban milk producers from Gowala Colony near Rawal Dam, Islamabad, at the time of despatch to consumer centres.
4. Milk vendors at the time of delivering milk to the consumers in different sectors of Islamabad.
5. Processed milk.
6. Dairy Cooperative Union, Chok Pindori, Islamabad.
7. National Agricultural Research Centre (NARC) dairy farm.

Sixty samples with three replicates from each source were collected and brought to the Dairy Technology Laboratory (NARC) for analysis. Each sample was analysed for fat, total solids and solids-not-fat (SNF) contents as described

by Ling (1957). The samples from sources 1-4 were collected in four days (one source each day), whereas the samples from sources 5-7 were collected from the daily supply of each source. The data were subjected to statistical analysis using one way analysis of variance technique (Federer, 1975).

RESULTS AND DISCUSSION

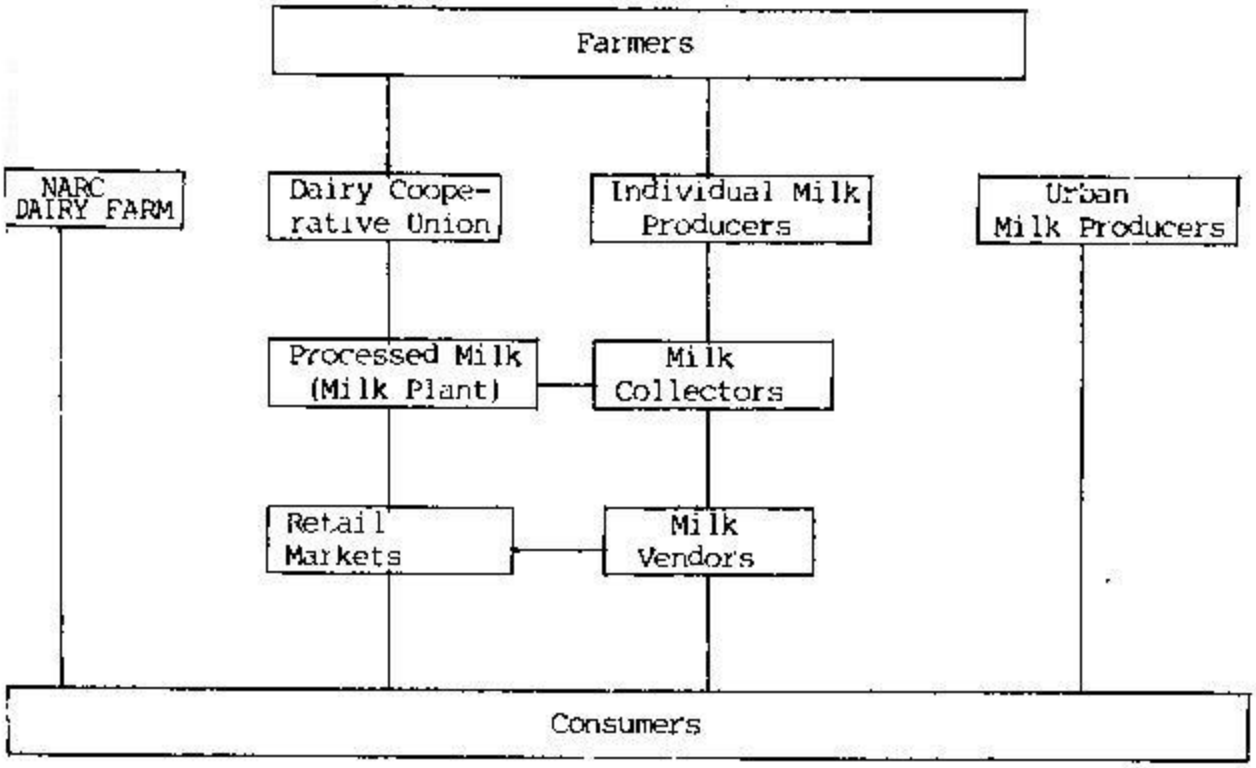
Marketing System and Channels for Milk in and around Islamabad

There is no organised system of milk collection in and around Islamabad except the Dairy Cooperative Union, Chok Pindori, which is supplying about 400 to 450 litres of milk daily to Islamabad Milk Plant. Scattered Milk production combined with inadequate all weather roads and improper transport facilities make the collection of milk in sizeable quantities very difficult. A number of agencies are involved in the collection, transportation and distribution of milk such as rural milk producers, urban milk producers, milk collectors, dairy farms, Dairy Cooperative Union, milk plants and milk vendors.

The quantity of milk available with the milk producers is small and thus the milk collectors have to go door to door for its collection and sometimes they hardly get 30-40 litres from one village. In order to check adulteration, the collectors prefer to have the animals milked in their presence. The collectors commonly make advance payments to farmers to purchase the milk. In this way the farmers are tied up to sell the milk at the price dictated by the collectors. Because of this system it has become difficult to bring these farmers out of these bindings and to reorganize them on cooperative basis. The milk collectors, an important link in the chain, visit different villages to collect milk from the small producers and supply the milk either directly or through milk vendors to the retail markets or to the consumers in the city (Ray-Chandri, 1964). The marketing channel for milk in Islamabad area is depicted in a flow diagram.

The major portion of the milk supply is solid by 220 pedlars on bicycles of which only 55% are registered with Capital Development Authority, Islamabad. The milk is claimed to be buffalo milk and priced accordingly. On average milk solid daily by each vendor is estimated to be about 25 litres. They make door to door delivery to the consumers.

Marketing Channel for Milk
in Islamabad



Adulteration of Fresh Raw Milk

Normally the determination of fat content is considered to be a satisfactory measure for estimating the overall quality of fresh milk, but where skimming of milk as well as addition of water or dried milk powder is suspected, estimation of total solids in the representative samples may also be necessary. The results concerning the composition of milk supplied by different agencies are given in Table 1. The representative samples collected from different sources showed that the fat and total solids contents of the milk at village level were 5.81 and 15.24%, respectively. The percentage of fat and total solids in the milk samples from milk collectors during the transit phase was found to be 5.70 and 14.36, respectively, whereas the milk supplied by milk vendors at the door step of the consumer had only 3.78% fat and 9.71% total solids. It was found that milk solid by milk vendors contained significantly ($P<0.05$) lesser total solids as compared to that from other sources. These results are in accordance with the findings of Shah (1975).

Table 1. *Variation in the percentage composition of milk supplied by different agencies*

Source	Fat	Total solids	SNF	Water
Rural milk producers	5.81a	15 24a	9.43	84.76
Milk collectors	5.70a	14.36a	8.66	85.64
Urban milk producers	4.70d	12.48d	7.78	87.51
Milk vendors	3.68b	09.71b	6.03	90.29
Processed milk	3.49b	12.49d	9.00	87.51
NARC dairp farm				
Buffalo	6.50c	16.65c	10 15	83.35
Cow	3.81b	12.84d	9.03	87.15
Dairy Cooperative Union	5.78a	14.51a	8.73	85 49

Means in vertical rows, having different superscripts are significantly ($P<0.05$) different.

The standardized and processed milk samples were found according to the specifications given under pure food laws (Kazmi, 1983). It contained 3.49% fat and not less than 12.49% total solids (Table 1). The Pure Food Laws state that buffalo milk should contain 6% fat and not less that 9% SNF. Cow milk should contain 3.5% fat and 8.5% SNF. It is further staeed that mixed milk from different species should not be offered for sale otherwise standards prescribed for buffalo milk should apply. Buffalo milk supplied by NARC dairy farm contained 6.50% fat and 16.65% total solids and 3.81% fat and 12.84% total solids in cow milk, adequately meeting the standards of pure food laws. The milk supplied by milk vendors and urban milk producers contained 3.68% fat and 6.03% SNF and 4.7% fat and 7.7% SNF, respectively. It was found that the milk supplied by milk vendors and urban milk producers does not meet the requirements of pure food laws (Kazmi, 1983).

Statistical analysis revealed that the differences in fat percentage in milk of rural milk producers, milk collectors, and Dairy Cooperative Union were non-significant (Table 1). Similarly, the difference in total solids content of the milk samples from the milk collectors and Dairy Cooperative Union was non-significant but was found significant ($<P0.05$) when compared with that of the milk vendors. The study reveals that the unpacked raw milk supplied in Islamabad is of unspecified quality and the adulteration with water has been

found to be as high as 43% in the milk supplied by milk vendors to the consumers.

The supply of quality raw milk to the consumers is posing a serious problem. Only negligible facilities for cooling of milk are available. Inadequate means for the rapid transportation of the collected milk from rural areas to urban markets further aggravate the situation. It is suggested that apart from taking steps to increase the milk production in the country, it is imperative to organize the methods of collection and distribution in order to ensure an adequate supply of good quality fluid milk at a low cost. Provision should be made for setting up milk chilling centres on cooperative basis at appropriate spots in rural areas. The chilled/cooled milk should then be transported in insulated cans or tankers under hygienic conditions to the urban centres or milk plants.

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