

# COMPARATIVE STUDY ON PANEER MAKING FROM BUFFALO AND COW MILK

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## Summary

The objective of this study is to compare the qualitative and quantitative properties of paneer prepared from buffalo and cow milk. Paneer from buffalo milk had higher total solids as compared to cow. Moreover significant differences were recorded in fat and protein contents among tested samples of milk, cheese and whey respectively. The results of the organoleptic evaluations showed that paneer made from cow milk was liked more as compared to buffalo.

(Key Words: Indigenous, Paneer, Buffalo Milk)

## Introduction

Paneer is an indigenous coagulated milk product prepared by addition of organic acids to milk at higher temperature. This product is extensively used as an ingredient for preparing cooked meat and vegetable dishes in North West Frontier Province (N. W. F. P) of Pakistan (Athar et al., 1989; Athar and Masud, 1989). This product is mostly prepared from buffalo milk. In the present investigation an attempt was made to compare the quality and quantity of paneer prepared from buffalo and cow milk by using known strength of coagulant at a particular temperature.

## Materials and Methods

### Preparation of paneer

The direct acidification process as described by Kosikowski (1982) was used for the preparation of paneer from fresh cow and buffalo milk collected from Animal Sciences Institute dairy farm.

Four litres milk of each type was taken in a stainless steel container. Both types of milk were heated to 85°C for 5 minutes and then cooled down to 70°C before coagulation with

10% lactic acid solution. Lactic acid was added with constant stirring till the completion of coagulation. The curd so obtained was allowed to settle for 5 minutes. The whey was drained with a muslin cloth and the curd was salted at the rate of 1.5% by the weight of curd. The curd was then moulded and pressed for 2-3 hrs at room temperature. The paneer so obtained was weighed and stored at 4°C for further evaluation.

### Chemical analysis of milk, paneer and whey

The representative samples for each parameter were analysed for total solids, protein, fat and ash by Official Methods of Analysis (1984). Lactose content was determined by difference.

### Sensory evaluation of paneer

The sensory attributes of paneer were evaluated by a panel of five experienced judges. The observations were recorded daily for one week and after 14 days of storage at 4°C by using score card on five point hedonic scale i.e. colour, flavour, taste, body and texture.

### Data analysis

The methods of Steel and Torrie (1980) were followed for the statistical analysis of the data.

## Results and Discussion

### Milk composition

The average chemical composition of both types of milk used in this study is shown in (table 1). The results revealed that buffalo milk

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TABLE 1. CHEMICAL COMPOSITION OF MILK, PANEER AND WHEY SAMPLES OF COW VERSUS BUFFALO (AVERAGE OF SEVEN INDEPENDANT OBSERVATIONS)

Constituents (%)	Milk		Paneer		Whey	
	Cow	Buffalo	Cow	Buffalo	Cow	Buffalo
Total Solid	13.32 <sup>b</sup>	16.24 <sup>c</sup>	48.74 <sup>b</sup>	49.93 <sup>c</sup>	7.25 <sup>b</sup>	7.83 <sup>b</sup>
Fat	4.2 <sup>b</sup>	7.1 <sup>c</sup>	22.46 <sup>b</sup>	28.86 <sup>c</sup>	0.8 <sup>b</sup>	1.30 <sup>c</sup>
Protein	4.0 <sup>b</sup>	3.7 <sup>b</sup>	21.23 <sup>b</sup>	16.07 <sup>c</sup>	0.45 <sup>c</sup>	0.86 <sup>b</sup>
Lactose	4.4 <sup>b</sup>	4.7 <sup>b</sup>	2.52 <sup>b</sup>	2.33 <sup>b</sup>	5.37 <sup>b</sup>	4.82 <sup>c</sup>
Ash	0.72 <sup>b</sup>	0.74 <sup>b</sup>	2.53 <sup>b</sup>	2.67 <sup>b</sup>	0.63 <sup>b</sup>	0.65 <sup>b</sup>

<sup>b,c</sup> different superscript differ significantly ( $p < 0.05$ ).

had higher total solids as compared to cow milk. The difference may be attributed by the fat content of buffalo milk. Similar views are expressed by Athar et al. (1989). Moreover, there was no significant difference in the total protein, lactose and ash contents of both the types of milk.

#### Paneer composition

The mean values recorded for different parameters for making paneer from buffalo and cow milk is shown in table 1. The results showed that paneer prepared from buffalo milk had higher total solids as compared to paneer from cow milk. The table further revealed that higher total solid in case of paneer obtained from buffalo milk may be attributed by fat as compared to other contents whereas in case of paneer obtained from cow milk the fat and protein are the major constituent of total solid as compared to other contents. The difference recorded among the tested samples of paneer may be due to difference in their fat and SNF ratio of their milk. Similar views are expressed by Chapman (1981). This variation usually accounts for variation in the contents of milk used. Moreover, there is no significant difference in the lactose and ash contents of paneer prepared from both the types of milk.

#### Whey composition

The results of the whey composition showed that whey obtained from buffalo milk contained higher total solid as compared to cow milk at this particular temperature and the strength of coagulant used. Moreover, a slightly higher fat contents were recorded in case of buffalo whey as compared to cow whey. The fat losses recorded in buffalo whey may be due to higher fat % of

milk used for the preparation, as it has been reported by Vishweshwaraiah and Anantkrishnan (1986) that fat losses in paneer are directly proportional to the milk used.

#### Yield of paneer

It is now well established that the main determinants of cheese (paneer) are normally the level of those milk solids retained in the cheese, the fat and casein (Spurgeon et al., 1981; Phelan, 1981). These depend on seasonal, and physiological factors, but they can also be manipulated by the cheese makers. However, the average paneer yield recorded in the present study for buffalo milk 16.64% and for cow 14.10% respectively were nearly in line with the observations of Wilter (1974) who reported that 14 to 16% yield is satisfactory. However, the difference observed in yield recovery among paneer samples of cow and buffalo may be attributed to the difference in their chemical composition.

#### Organoleptic evaluation

Pannel results revealed that freshly made paneer from cow milk was liked more due to its superior flavour, body texture and colour as compared to buffalo milk. The main reason for this high preference may be due to their difference in their bio-chemical make up. As it has been reported by Kumar and Srinivasan (1982) that the nature of the protein effects the water binding capacity which in turn effects the body and texture of the product. The characteristic flavour of cow milk fat may also contribute to the higher rating of paneer. On the other hand Vishweshwaraiah and Anantkrishnan (1986) reported that paneer prepared from low fat milk had highest score as compared to high fat milk.

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It was further observed that there was a gradual decrease in the total score of both the types of paneer during storage at 4°C. This decrease in score on the third day for all paneer samples may be due to loss of fresh flavour but there was no further decrease in score from 3rd to 6th day of storage. However, after one week of storage a significant decrease in score was recorded for buffalo paneer as compared to cow paneer. The samples of buffalo paneer were mainly criticized for bitter and rancid flavour. Therefore, it may be assumed that fat contents of milk had no significant effect on the total score of fresh paneer of both the types but had a significant effect after 1 to 2 weeks of storage. Similar views are expressed by Kumar and Srinivasan (1982).

On the basis of this investigation, it is concluded that paneer prepared from buffalo milk has high yield as compared to cow milk. However its organoleptic properties decrease significantly after one week of storage at 4°C. As the buffalo milk is the main source for the preparation of this product, therefore, further study is needed to chalk out the best fat and SNF ratio of buffalo milk for preparation of high quality

paneer with minimum losses.

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