

# Current Status and Comparative Study on the Influences of Cattle Packed and Unpacked Milk in Tamil Nadu: A Detailed Survey

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## Abstract

*As milk is a very important component of the people's diet, this study explores consumer preferences for milk in Perambalur, Tamil Nadu, India, and also tries to determine consumer types based on their references and socio-demographic factors. To reach these objectives, this study was designed a conjoint choice experiment survey and collected primary data in the most populated city of Perambalur. Then the data were analyzed using chi-square test, analysis of variance (ANOVA) and F-test to determine milk classes based on the product attributes. Thus, present study was aimed to get detailed knowledge about the packed and unpacked milk in Perambalur district, Tamil Nadu, India. In brief, the study deals with the customer satisfaction regarding both packed milk and unpacked milk; get detailed survey on maximum usages of packed and unpacked milk among people. Further, this study extended to know about the contents which are added into milk during processing and transportation. The primary data were collected through a questionnaire to the individual persons and the secondary data were collected from various books, magazines, journals, and Internet. From the obtained data, we can get more details in terms of tendency of milk, criteria of milk standard quality and sensory properties. Accordingly, this study provides useful information to different stakeholders including cattle farmer and local vendors. In addition, the milk industry and its marketers may benefit from this information by using it to strategically market their milk to different groups.*

**Keywords:** Milk, packed, brand, nutritional composition, consumer preference

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## INTRODUCTION

Milk is a balanced nutritious food and provides relatively quick returns for small-scale livestock keepers and also is a key element in household food. In developing countries, smallholders produce the vast majority of milk; on the other hand, the demand is expected to increase by 25% by 2025. Over 200 billion liters annually (80%) of milk consumed in most of the developing countries is processed by unauthorized market traders with improper regulation. Ubiquitously, the dairy segment is probably one of the most slanted agricultural sectors.

Manufacturer supports are in place in many developed countries, promising excess production. These export supports are funded by governments to place the excess production

on the world markets. Tariff and non-tariff barriers are initiated both by developed and developing countries to defend their dairy sector from unfair competition [1].

India has the uppermost cattle inhabitants in the world with 50% of the buffaloes and 20% of the world's cattle population, most of which are milk cows and milk buffaloes. India's dairy commerce is considered as one of the most effective progress program in the post-independence period. The total milk production in the country was about 94.6 million tons in 2007.

The dairy commerce had been footage an annual growth of 4% from 1993 to 2005, which is almost three times the average growth rate of the dairy industry in the world. Milk

dispensation in India is about 35%, of which the organized dairy industry account for 13% of the milk produced, but the outstanding milk is consumed either by farm or sold as fresh, non-pasteurized milk through shambolic networks [2–4].

In this study, two types of liquid milk were studied: packed milk and unpacked milk. In general, the fluid milk gets through two forms like raw milk and packed milk. The raw milk does not follow any standard methodology like testing, heating, filtering, etc., whereas in the case of packed milk, it should be properly tested and thoroughly filtered, pasteurized for some days before it is sold into the end user's hand. Both packed and unpacked milk mostly attract the socioeconomic demographic characteristics of household sector like the household income, education, age, gender and employment status of consumer may influence the fluid milk consumption patterns. It will also be considered the addition attitudes towards the price, health of packed and unpacked milk.

For packed milk, the products are sold through different dealers like wholesalers, retailers, or other shopkeepers or any other middlemen who have the knowledge to sell their product. In recent period, lot of milk agencies have performed in well good manner and also they can supply their milk to the delighted consumer on area wise, or district wise.

People in developed cities mostly prefer packed milk for diet control, because of its low cholesterol, fat, energetic, whereas the people in rural areas would prefer fresh milk, because it is good for human health, and increasing the growing power of child as well as it is giving basic immunity power to the people. But they feel like the local vendor may charge the high price. An advertisement could also suggest some popularized packed milk product (e.g., Arokya milk). Many media people can give their advertisement very effectively. Not only milk products can be advertised and other substitute products such as ghee, butter, curd, milk halva, etc.

#### **DAIRY INDUSTRY IN TAMIL NADU**

Tamil Nadu, with a daily milk production of 145.88 lac liters, is one of the leading states in

milk production in India. And the Tamil Nadu milk cooperatives play a major role in the development of dairy within the state. The milk cooperatives of Tamil Nadu, with the help from the government and National Dairy Development Board (NDDB), have played substantial roles in taking the state to the current position. Besides, NDDB also undertakes methodical approach and appropriate strategy for the upliftment of Tamil Nadu milk cooperatives.

#### **RECENT SOURCES OF MILK**

Currently, we can get milk from two sources like:

- a) Unpacked milk
- b) Packed milk

##### **A) Unpacked Milk**

It is known as “fresh form” of milk. The people get milk through milkman. Most of the people in villages, they can have own cattle in their home itself. Normally, milkmen are directly getting the milk from cow and selling it directly to the customer's home.

##### **B) Packed Milk**

Raw milk procured from the producers is received at the plant in cans through procurement route vehicles. At the reception dock, raw milk received in each can is subjected to organoleptic test and only good milk is accepted for further processing. Good milk from each collection center is separately weighted and a representative sample is taken which is tested for various quality parameters. Good milk thus accepted is immediately chilled to 4 °C and is stored in raw milk. We are currently processing milk around 75000 L per day.

#### **OBJECTIVES OF THE STUDY**

The overall objective of the study is to know the usage of milk in Perambalur district whether packed or unpacked milk. The following are the most specific objectives. They are:

1. To study the customer satisfaction regarding both packed milk and unpacked milk.
2. To identify the maximum usages of milk.
3. To know about what are the contents added into the milk.

## STATEMENT OF THE PROBLEM

India is the largest producer of milk producing more than 100 million tons of milk per annum. Today there are two types of milk factor (i.e., packed and unpacked milk) influencing our country. Also the product name varies from place to place or district to district, etc. Therefore, the people get more confused, which one is better.

## TESTING OF HYPOTHESIS

- ✓ There is a significant association between average milk used per day and plus points of packed, loose milk of customer.
- ✓ There is a significant association between monthly income and requirements of milk.

## Sources of Data Collected

The data had been collected by two sources like primary and secondary. The primary data were collected through questionnaire and the secondary data were collected from various books, magazines, journals, Internet, etc.

## Sample Size

This refers to the number of items to be selected from the universe to constitute a sample. The sampling method is more frequently used for testing the accuracy of information collected through census method. The researchers have only selected a convenience sampling method, because of the time constraints, economic condition, etc.

## Tools Used

The collected data were tabulated and analyzed with the help of statistical tools like chi-square test, F-test and analysis of variance.

## REVIEW OF LITERATURE

In rural India, milk is home delivered daily by local milkmen carrying bulk quantities in a metal container, usually on a bicycle. In other parts of metropolitan India, milk is usually bought or delivered in plastic bags or cartons via shops or supermarkets.

Due to the short life of normal milk, it used to be delivered to households daily in many countries; however, improved refrigeration at home, changing food shopping patterns because of supermarkets, and the higher cost of home delivery mean that daily deliveries by a milkman are no longer available in most countries (Table 1)[5].

The number of factors affecting on households' choices of packed and unpacked fluid milk consumption was reported by several researchers [6–8]. Earlier, the validity of the relationship between consumer and the brand was described by Susan [9].

Consumer demand and preferences for food safety attributes in milk products were previously described by Wang *et al.* [10] and Ortega *et al.* [11].

**Table 1:** List of Tamil Nadu Milk Cooperatives.

Cooperative	Location	Soc	Mems	Avg. milk
Coimbatore Dist. Coop Milk Producers' Union Limited	Coimbatore	573	121749	109000 Lpd
Madurai Dist Coop Milk Producers' Union Ltd	Madurai	615	158808	76755 Lpd
Thanjavur Dist. Coop Milk Producers' Union Ltd	Thanjavur	151	73000	20000 Lpd

## PROCESSING OF MILK

### 1) Pasteurization

Pasteurization is used to kill harmful microorganisms by heating the milk for a short time and then immediately cooling it. It produces a 99.999% reduction in the number of bacteria in milk, rendering it safe to drink for up to three weeks, if continually refrigerated. An effect of the heating or pasteurization is that some vitamin and mineral content is lost. Soluble calcium and phosphorus decrease by 5%, thiamin and

vitamin B12 by 10% and vitamin C by 20% . Because losses are small in comparison to the large amount of the two B-vitamins present, milk continues to provide significant amounts of thiamin and vitamin B12. The loss of vitamin C is not nutritionally significant, as milk is not an important dietary source of vitamin C.

### 2) Microfiltration

Microfiltration is a process that partially replaces pasteurization and produces milk with

fewer microorganisms and longer shelf life without any change in the taste of the milk.

In this process, cream is separated from the whey and is pasteurized in the usual way, but the whey is forced through ceramic microfilters that trap 99.9% of microorganisms in the milk (as compared to 99.999% killing of microorganisms in standard HTST pasteurization). The whey then is recombined with the pasteurized cream to reconstitute the original milk composition.

### 3) Homogenization

Milk often is homogenized, a treatment that prevents a cream layer from separating out of the milk. The milk is pumped at high pressures through very narrow tubes, breaking up the fat globules through turbulence and cavitation.

## IMPORTANT CONTENTS OF MILK

### 1) Protein

It helps to build strong muscles and build antibodies to boost the immune system so kids can feel their best. Normal bovine milk contains 30–35 g of protein per liter of which about 80% is arranged in casein micelles.

### 2) Vitamin D

Milk is an excellent source of vitamin D that is essential for overall health, helps boost immunity, and is crucial for the body to absorb and use calcium to build strong bones.

### 3) Calcium

Critical for healthy bones and teeth, but also involved in muscle functioning, for example, calcium contributes to a healthy heart beat.

### 4) Carbohydrates

Milk contains several different carbohydrates including lactose, glucose, galactose, and other oligosaccharides. The lactose gives milk its sweet taste and contributes approximately 40% of whole cows' milks' calories.

### 5) Vitamin B12

It is found naturally only in animal products, milk vitamin B12 in milk is easily absorbed by the body and is important for healthy neurological functioning.

### 6) Zinc

It is especially important for kids. Zinc is essential for optimal growth and development as well as cognitive function.

## MILK-BALANCING THE EQUATION

Young minds need good food to perform at their best; healthy choices at lunch give them the energy they need to get through the school day (Table 2).

- Providing children with essential nutrients they need to be the best that they can be.
- Reinforcing healthy living curriculum taught in the classroom.
- Encouraging children to adopt healthy eating habits

**Table 2: Strongest Opinion regarding Packed Milk and Unpacked Milk.**

Sources	Packed milk	Unpacked milk	No differences	Total	Percentage (%)
Freshness	06	42	02	50	100
Thickness	31	18	01	50	100
Goodness for health	07	41	02	50	100
Low cholesterol	27	20	03	50	100
Suitability for setting curd	06	39	05	50	100
Absence of smell	15	18	17	50	100

## Analysis and Interpretation

### Sources

**Primary Data:** The Table states the strongest opinion regarding packed and loose milk. From the Table, we can understand that 12% of the people felt packed milk was "Freshness," 84% of the people felt like loose milk was "Freshness." 62% of the people would like thickness of packed milk and 36%

of the people like thickness of loose milk. 14% of the people would like packed milk for "Goodness of health" and 82% of the people like unpacked milk factor.

54% of the people would like packed milk for low cholesterol, fat factors and 40% of the people liked loose milk. The 12% of the people liked packed milk for "suitability for

setting curd” and 78% of the people liked unpacked milk. And the remaining 30% of the people would like packed milk for “Absence of smell.” At minimum of 36% of the people would like loose milk. Nearly 34 % of the people said there is no difference between packed and loose milk. The above table indicates the association between types of milk and members in a family.

## TESTING OF HYPOTHESIS

### Hypothesis-I

There is a significant association between monthly income and requirement of milk.

### Null Hypothesis-I

There is no significant association between monthly income and requirement of milk.

### Statistical Tools-I

F-Test

### Descriptive Hypothesis

There is a significant association between monthly income and requirement of milk by using F-test (Table 3).

$X_1$  = Monthly income of the people

$X_2$  = Daily requirement of the Milk

Here,

$$F = S_1^2/S_2^2,$$

$$S_1^2 = \sum (X_1 - \bar{X}_1)^2/n_2 - 1$$

$$S_2^2 = \sum (X_2 - \bar{X}_2)^2/n_2 - 1$$

**Table 3: Relationship between Income and Requirement of Milk.**

Sources	Mean	F-test analysis	Calculated value	Table value
$\bar{X}_1$	12.5	S1 = 81.6	28.24	1.58
$\bar{X}_2$	12.5	S2 = 51.67		

### Result

Since the calculated value is more than the table value, the null hypothesis is accepted. So it is proved that there is no significant relationship between monthly income of the people and daily requirement of milk (Table 3).

### Hypothesis-II

There is a significant association between average milk used per day and the plus point of packed, loose milk of customer.

### Null Hypothesis-II

There is no significant association between average milk used per day and plus points of packed, loose milk of customer.

### Statistical Tools-II

Analysis of variance

**Table 4: Significations between Average Milk Used per Day and Loose Milk of Customer.**

Sources of variation	Sum of squares	Degree of freedom	Mean square	Calculated value	Table value
Between column milk per day	168.9	02	84.45	84.45/93.55	$V_2 = 5.05$
Between rows packed and unpacked milk	33	01	33	0.903	
Residual error	187.1	02	93.55	33/93.55	$V_1 = 230.2$
				0.353	
Total	389	05			

## RESULT

Since the calculated value 0.903 is less than the table value, we conclude that the requirement of milk per day is not same that is:  $F_{0.05} > 0.903$ . From Table 4, the calculated value 0.353 is less than the table value. Hence, the opinion about packed and unpacked milk of people is not same. So, the null hypothesis is accepted that is:  $F_{0.05} > 0.353$

## CONCLUSIONS

In this study, the authors examined the impact of various factors affecting households' choices of packed and unpacked fluid milk consumption. The findings of this study suggest that the socioeconomic and demographic characteristics of the households and their contribution show an important role in milk consumption adoptions. For purchasing unpacked milk, income and

education are primary reasons; by way of it is supposed to be quite economical compared with packed milk. When considerable upsurges in income and education level of consumers take place, a marked shift in predilection from unpacked to packed milk could probably occur.

In villages, most of the people have own cattle in their home. They will get milk from their cow and sell it to the local merchants. The local merchants can charge low price from the farmer, but will sell at high price to the people. So the farmer or the owner of cow basically pretentious a lot. Therefore, the government must take some initiative and effective steps to fix same price for all the kinds of milk (packed and unpacked). Research findings are quite consistent with the expected behavior of Perambalur consumers and provide a clear picture of the fluid milk consumption behavior. It is hoped that the findings of this study help to both domestic and foreign companies in Tamil Nadu to design pricing and promotion strategies and other marketing strategies for fluid milk consumption.

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