



Sensory Quality Assessment of Shrikhand from Different Milk Varieties

Shweta Sharma*

Assistant Professor, Sophia College (Autonomous), Ajmer, India

***Corresponding Author:** Shweta Sharma, Assistant Professor, Sophia College (Autonomous), Ajmer, India.

DOI: 10.31080/ASNH.2026.10.1605

Received: November 26, 2025

Published: January 31, 2026

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Abstract

The present study was undertaken as Organoleptic evaluation of Shrikhand obtained from different milk sources. 6 housewives in the age of 30-50 years were selected through threshold test for sensory evaluation of Shrikhand. Shrikhand were evaluated by 7 points hedonic scale. The characteristics of Shrikhand i.e. appearance, taste, consistency and flavor were given weightage according to their importance by method of Composite scoring. Shrikhand obtained from Buffalo's milk obtained 87.9% overall acceptability score and curd obtained from Goat's Milk scored 52.21%. Dairy's milk obtained 50.40% overall acceptability score and Vendor's milk scored 47.77%. Cow's milk obtained 37.63 overall acceptability score.

The result of the present study revealed that the Shrikhand taken from different milk sources varies from each other in accordance to taste, consistency, appearance and flavor because of different solid content and purity.

Keywords: Shrikhand; Quality; Milk

Introduction

Quality is the ultimate criterion of the desirability of any food. Product food quality can be evaluated by sensory and objective methods. When the quality of a food product is assessed by means of human sensory organs the evaluation is said to be Sensory or Subjective or Organoleptic. Every time food is eaten a judgement is made. Sensory quality is a combination of different senses of perception coming into play in choosing and eating a food. Appearance which can be judged by the eye e.g. colour, size, shape, uniformity and absence of defects is of first importance in food selection. The effective characteristics is not the property of the food, but is the subject's reaction to the Sensory qualities of food.

Milk is the normal mammary gland Secretion of female mammals. It is a complex fluid containing Protein, Fats, Carbohydrates, Minerals and Vitamins. The composition of milk varies from

sources to sources. For the same source the milk composition and yield is variable is decided by the breed, age, milking time and season, location stage and health of the animal etc., even the certain constituents occurs with in a definite range. The cow is the principle source of milk for human consumption in many parts of the world. Other animals as sources of milk for human beings are the buffalo, goat, sheep, camel, mare, etc. In India more milk is obtained from the buffalo than the cow. Some amount of goats milk is consumed.

During curd formation, the lactose of milk is converted into lactic acid. There is some breakdown of Protein increasing the non protein nitrogen. The fat globules coalesce and distribute themselves on the top. Physically, during dahi formation, milk Proteins are jellied and a thin exudates of clear serum on the curd is seen. The organism involved in dahi formation belong to the group of Lactobacillus and streptococci. The formation of

consistently good quality dahi depends upon the use of the right type of starter. A starter culture containing yeasts, molds and gas forming organisms spoil the quality of dahi when they are present. A product with a homogeneous texture of good aroma will not be obtained. There will be cracks and gas bubbles and the curd will be of poor quality and taste.

The methods of preparation and quality of dahi depends upon whether it is consumed as such or used for preparation of butter. In the preparation of dahi for consumption as food, milk is brought to a boil in order to destroy viable organism, cooled to the body temperature and seeded with dahi from an earlier batch. The quantity of seed depends upon the season of the year and severity of the climate. About 5-10% of the volumes of milk is added as starter during cold weather. More quantities are required during cold weather. Lesser quantities are required during summer. Milk is then kept in a warm or cool place, depending upon the season. After 6 to 24 hours, depending upon the climatic conditions, a smooth homogeneous product having an acidity of 0.90 to 1.0 percent acid is formed. Now, a starter for making dahi in a short time is available.

Dahi is used in the preparation of beverages by beating it with water and adding sugar of salt and spices.

Shrikhand is a semi-dry mass of dahi sweetened with sugar. It is made by suspending curd in a muslin bag until all the whey is drained off. It then sugared and coloured.

Objectives

Dahi in India is the most important milk product of the total quality of milk converted into milk products, about 15% is used for Dahimaking. Curd is reported to have a better nutritive value than milk. Though there is no increase in the Fat or Protein content of milk during fermentation, the digestibility of dahi is more than that of milk. The Calcium and Phosphorous contents of curd are easily assimilated. Dahi contains more vitamins than milk. Dahi can also be consumed by people who suffer from lactose intolerance. Shrikhand is a semi-dry mass of dahi sweetened with sugar. It is made by suspending curd in a muslin bag until all the whey is drained off. It then sugared and coloured. To undertake the above study the following objectives are as follows,

- To assess the purity of the curds obtained from different milk sources.
- To assess the acceptability of curds obtained from different milk sources.
- To evaluate the acceptability of shrikhand prepared from different milk sources.

Review of Literature

A comprehensive review of literature is important for any research work because it forms the foundation upon which all future work is built. In the event of not taking stock of this knowledge our work is likely to become irrelevant and incoherent. There will also be chances of duplicity as the same work might have already been done by someone else.

Thus, primary objective of reviewing literature is to imbibe understanding of previous work that has been done on the subject and to chalk out a research endeavour with a focus on the hitherto unexplored aspects of the problem. In this way, review of literature helps us to distinguish between what has been done and what needs to be done.

The review selection is divided into two parts:

- Review related to Curd
- Review related to Shrikhand.

Review related to Curd

Kar, *et al.* (1998) [1] studied the influence of fermented whey drink microflora on digestion of lactose. Utilization of Channa whey in the form of a beverages cultured with 2% each of *lactobacillus delbrueckii* Subsp. W and *Streptococcus thermophilus* H, and its effect on the digestion of residual lactose in the gastrointestinal tract was studied. The beverage was cultured for 8 h. at 42°C and was named "whey ghurt". Albino rats were fed with a preliminary diet of sucrose, lactose or sucrose + 20 ml. Of the beverages for 7 days, followed by a test diet of galactose and glucose or lactose, fresh of pasteurized (80 O'Connor's for 5 min.) beverages for another day consumption of Sucrose + 20 ml. of beverage as preliminary diet and beverage containing viable culture microflora as test diet improved the digestion of lactose with a maximum increase in serum galactose level and highest B - galactosidase activity (8.20 u mol/g per h. at pH 7) Gastrointestinal survival of

beverage micro organism was demonstrated in vivo upto 3 h. after feeding. It is concluded that consumption of milk based products.

Testolin., *et al.* (1999) [2] studied the effect of Lactic acid bacteria and fermented milks in gastrointestinal functionality. The nutritive value of cultured milk and the role of lactic acid bacteria in these products in improving digestibility of certain components and promoting absorption of nutrients are discussed. The beneficial effects of lactic acid bacteria in stimulating the immune system and balancing the intestinal ecosystem and their application in the control of intestinal inflammatory disorders, diarrhoea and colon cancer, are reviewed.

Pizzoferrato, (2000) [3] studied the role of yoghurt in diet: naturalness and digestibility. The nutritional composition of yoghurt is discussed and average percentage of essential amino acids, organic acids, minerals, vitamins and Lactose and energy values in yoghurt are compared with those of milk.

Lourens Hattingh., *et al.* (2001) [4] found that the Yoghurt as probiotic Carrier food. This paper reviews the history of the development of probiotics and the effect of the human gastrointestinal micro-ecology. Furthermore, the application of probiotics to yoghurt, commonly referred to as bio-yoghurt and the effectiveness of yoghurt as Probiotic carrier food are also discussed. The paper also reviews the literature explaining in essence, the concept of "Therapeutic minimum levels" and the importance of the survival of probiotic microorganism in food products. The production of bio-yoghurt during retail storage, technical consideration for incorporating Probiotic microorganisms into yoghurt, starter culture technology and enumeration of the Probiotic organism are also reviewed.

Rota, C. (2001) [5] studied about New fermented milks. This paper reviews the different types of fermented milks and their micro-flora, and the "new" health promoting products containing micro organisms isolated from the intestine, such as *Lactobacillus acidophilus*, *Lactobacillus caei* and *Bifidobacterium* Sp.. The nutritional attributes, organoleptic characteristics, therapeutic attributes and future prospects of these products are discussed.

Review related to Shrikhand

Jain (1998) [6] studied about chemical quality of market Shrikhand sold in Gujrat. Shrikhand samples collected from

traditional and industrial manufactures from selected cities of Gujrat state wise analysed for composition. Significant difference existed for moisture, protein, lactose, sucrose, titrable acidity, pH and soluble N between samples from different cities. Traditionally made Shrikhand had significantly lower content of moisture, Protein and mineral and a lower pH than that made on an industrial scale. Sucrose content was significantly higher in the traditional product.

Karthikeyan (2000) [7] Studied the effect of replacement of Buffalo skim milk by sweet buttermilk on storage changes of shrikand.

Boghra., *et al.* (1998) [8] studied the comparative study on mineral composition of different whey systems obtained during channa, paneer and chakka were determined. Channa whey from cow milk contained Ca, Mg, p. Citra.

Methodology

The present study deals with the evaluating the acceptability of curds obtained from different milk sources (Cow's Buffalo's, Vendor's Dairy and Goat's milk). The different characteristics that are appearance Consistency, Taste and Flavour were evaluated by Organoleptic evaluation by the Panel member. The methodology is described under following sections.

Experimental plan

- Selection of Recipes.
- Standardization of Recipes.
- Selection of Judges.

Proposed plan of work

- Basic recipe of Curd.
- Basic recipe of Shrikhand
- Organoleptic evaluation of Curd.
- Scoring Techniques.

Before carrying the actual experimental plan, the Panel member were explained the following terms, which are used for Organoleptic Evaluation, as it would become easy for them to evaluate the characteristics of the curd obtained from different milk sources. The panel members were explained the following terms:

- **Appearance:** It can be judged by the eyes, e.g. colour, size, shape, uniformity and absence of defects. Some characteristics such as transparency, opaqueness, turbidity, dullness and gloss is mediated by the organs of sight. In addition to giving pleasure the colour of food is associated with other attributes for e.g. The ripeness of fruits such as Banana and Strawberries judged by colour, toast which is too brown is likely to be rejected in anticipation of some what scorched, with taste etc. (Charley, 1982) [9]
- **Consistency:** Ice cream may be too hard or too soft which can be found out by mouth feel. Gravies, sauces and syrups range in consistency. Consistency of food e.g. ghee, curd, cheese and Ice Cream.
- **Flavour:** It is the impressive perceived via the chemical senses from a product in the mouth. Defined in this manner flavor include:
- The aromatics i.e. olfactory perceptions caused by volatile substances released from a product in the mouth via the posterior nares.
- The tastes i.e. gustatory perceptions (salty, sweet, sour, bitter) caused by soluble substances in the mouth.
- The chemical feeling factors, which stimulate nerve ends in the soft membranes of the buccal and nasal cavity (astringency, spice heat, cooling, bile, metallic flavor) (Meilgaard. A1.1991) [10]
- **Taste:** Taste i.e. gustatory perception and it is just limited to sweet, sour, salty and bitter. (Swaminathan 1996) [11]. It is secured by the taste buds, which are located in the Papillae on the Tongue (Charley 1982) [12].

Experimental Plan: Further the following steps were taken for experimental purpose:

- **Selection of Recipes:** There are many recipes which could be prepared using curd. Only one recipe of curd was formulated and that was shrikhand.
- **Standardization of Recipe:** Amerine, *et al.* (1965) [13] suggested that a standardized recipe should be such that it produces identical results whenever tried under the condition specified. Accordingly, all the variable such as the ingredients cooking time, duration of cooking, the quantity of water were controlled.

Development of basic recipe

A recipe is a formula by which measured ingredients are combined in a specific procedure to give pre-determined results. Once a recipe has been repeatedly tested and accepted by people, it becomes a standardized recipe that always gives the same results.

Fresh milk is sterilized (in one heating) at 115° to 120°C, the time required being determined by the volume of the milk and the nature of the Container. Properly heated milk should have a dark coloured cream but should not be distinctly browned. After cooling to least 37°C, the milk is inoculated with pure strains of *B. acidophilus* which have been grown by repeated transfer of starter.

Sufficiently to bring about coagulation of casein present in milk within 24 hours is kept at temperature 35°C to 37°C. Viable milk culture of the organism are employed as the inoculum, and at least 10 C.C. of the inoculum are transferred for each litre of milk treated.

Selection of Judges: The study was conducted among Housewives of Ramganj locality of Ajmer.

The Criteria for selection were:

- Subjects who were willing to co-operate in the study.
- Those having qualified in Threshold Test.

Threshold test

Threshold Test is defined as statistically determined point on the stimulus scale at which a transition is a series of Sensation or Judgement occurs.

Taste Threshold simply indicates an endpoint relative to one's perception of a given stimulus. Although it is not a direct measure of sensitivity it can never be less serve as an indicates of degree of acuity (O'Mahony, 1975).

There are two types of threshold detection and recognition. Detection threshold can be defined as that solution in a concentration series which tasted different to water even though the basic can not be recognized, while the recognition threshold can be defined as that concentration at which the basic taste is recognized (Jellinick, 1985) [14].

In the present study, concentration of Sugar solutions was taken as basic taste stimuli, to determine the sensitivity of the subjects and to select them for the sensory evaluation of Shrikhand.

Sweet solutions were prepared in different concentration. These solution were poured in cups containing spoons and kept in a series of increasing concentration. Rinsing of mouth with water after tasting each solution was recommended and re-tasting of already tasted solution was not allowed.

Proposed plan of work

Basic recipe of curd

Ingredients	Amount
Milk	200 Gm.
Starter (Dahi Culture) (Mixed culture: Streptococcus)	6 Gm.
Latis	

Table a

Method

- Take 200 ml. of milk and boil it.
- Keep it at the temperature of 60°C.
- Add 6 gm. Of Dahiculure (stater) to it.
- Put it in a caseroll and store it in a warm place.

The time taken for the curd formation was eight hours. Due to decrease in temperature in the atmosphere, the time taken for the curd formation was long.

Basic recipe of Shrikhand

Ingredients	Amount
Milk	1 Litre
Starter (Dahi Culture)	30 gm.
Sugar	70 gm.
Cardimum Powder	2.5 gm.

Table b

Method

- Take 200 ml. of milk and boil it.
- Keep it at the temperature of 60°C.
- Add 6 gm. Of Dahiculure (stater) to it.
- Put it in a caseroll and store it in a warm place.
- As soon as the curd was obtained, a fine piece of muslin cloth was taken and the curd was tied in it.

- Keep it for 3 hours.
- After the completion of three hours the cloth was open.
- Add 60 gms. of sugar in it.
- Beat it properly so that the sugar gets mixed properly.
- Then add 2.5 gms. of Cardimum powder in it to get the flavor.

Organoleptic evaluation of Shrikhand

According to Preet, 1976 Sensory evaluation through various scientific techniques is used as a tool for measuring product characteristics and acceptability of Product attributes and quality level relative to degree of consumer preferences (Daget, 1977) [15].

The main aim of carrying out an organoleptic test on Shrikhand obtained from different milk sources was to see their acceptability (in terms of taste, consistency, appearance, texture and flavours).

Scoring technique

Scoring is used because of its diversity apparent simplicity and ease of statistical analysis. The fundamental supposition of any quality (characteristics) is that the number expressing the grade is proportional to the Property to be measured (Plank, 1948) [16]. The scoring technique used to find out acceptability of curd obtained from different sources.

Composite scoring test

In this test Scores are given for various quality characteristics of the product such as colour, consistency flavor and absence of defects and the total score is taken for the over all acceptability of the product (Swaminathan, 1990) [17].

In the present study, curd obtained from different sources were subjected to evaluation. Curd were evaluated for general appearance, texture taste and flavours. Each characteristics was allotted a maximum score out of which the panel members had to score the samples. Rinsing of mouth with water after tasting each of the samples was recommended and re-tasting of the sample was allowed.

Hedonic scale

The term hedonic is defined as "having to do with pleasure" (Table 1, Hedonic Scale for Acceptability of food Products). Peryam and pilgrim (1957) [18] defined it as "Special type of rating scale

that measures psychological states directly." The reactions are indicated by descriptive words on a scale, for example, ranging from "like extremely to dislike extremely" in a 7 point scale.

Scales with different ranges and other experience could also be used. The scale used for the present study was 7 point scale, which was used for scoring the products.

The panel members selected for these tests were served sample of shrikhand prepared in the house. They were asked to score each sample in terms of the most prominent characteristics e.g. Taste, consistency, appearance and flavor. The term were explained orally and objective of study were stressed.

The test was conducted at home. No communication or discussion between panelist was permitted. They were provided with water for oral rinsing and score card.

Panel members were served 5 samples in a day with 5 minutes interval. Each sample served was in the same amount. Samples were served in similar bowl, which did not impart any taste or odour to the samples.

The scoring scale suggested by Plank (1948) was used to score the various characteristics. The scores used ranged from 0 to 6. In order to ensure uniformity in understanding of numerical values, qualitative description were assigned alongside. For example, a score of 6 is equal to perfect, 5 is equal to excellent, 4 is equal to very good, 3 is equal to good, 2 is equal to fair, 1 is equal to bad and 0 is equal to inedible.

After the panel list had scored the various samples the total scores of each sample were computed. The 4 characteristics of each

sample. Taste, Consistency, Appearance and Flavour were given weightage according to their importance as given below:

- Taste: 7
- Consistency: 5
- Appearance: 5
- Flavour: 5
- Total: 20

The scoring was then done for each characteristic on a 7 point hedonic scale testing. To see the acceptability of the Sample the 7 point scale was:

Scores	Product	Hedonic Scale for Acceptability of food products.
6	Perfect	Like extremely
5	Excellent	Like very much
4	Very good	Like moderately
3	Good	Like slightly
2	Fair	Neither like or dislike
1	Bad	Dislike very much
0	Inedible	Dislike extremely

Table 1: Hedonic Scale for Acceptability of food Products.

The total score of each characteristic was obtained by multiplying the weightage by the score for each characteristic according to the points given was computed.

Characteristics	Scores			
	Maximum Point	X	Weight of characteristics	Score
Taste	6	X	7	= 42
Consistency	6	X	5	= 30
Appearance	6	X	5	= 30
Flavour	6	X	3	= 18
Total maximum attainable Score				120

Table 2: Weightage given to different characteristics of Shrikhand.

Results and Discussion

The present study was undertaken to conduct organoleptic evaluation of Shrikhand obtained from different milk sources. The result was basically obtained from the Shrikhand after being tested from females of the age group of 30-50 years.

The Shrikhand was evaluated by seven points hedonic scale. The characteristics of Shrikhand such as Taste, Consistency, Appearance and Flavour were given weightage according to their importance by method of composite scoring.

General information of the subjects

Total 15 members (females) were selected and threshold test was conducted out of which 6 were selected for panel out of 15, 6

were selected as panel members. The subject Surveyed belonged to Hindu, it was not deliberately done. All Subjects were from joint family.

Organoleptic Evaluation of Shrikhand obtained from different milk sources

Organoleptic evaluation involves measurement and evaluation of those characteristics of foods and other material as are rated by Sense of Sight, Smell, Taste and Touch. In the present study Sensory evaluation was done for the acceptability of Shrikhand obtained from different milk Sources. It was done with respect to the Taste, Consistency, Appearance and Flavour by Panel members (Females) who were selected using Threshold Test.

S. No.	Characteristics	Score Obtained				
		Cow's Milk	Buffalo Milk	Vendor's Milk	Dairy Milk	Goat's Milk
1	Taste	35.00 (83.33%)	30.33 (72.21%)	33.83 (80.54%)	25.66 (61.09%)	25.66 (25.66%)
2	Consistency	22.50 (75.00%)	24.16 (80.53%)	20.83 (69.43%)	21.66 (72.20%)	10.00 (33.33%)
3	Appearance	20.83 (69.43%)	22.50 (75.00%)	20.00 (66.66%)	22.50 (75.00%)	10.00 (33.33%)
4	Flavour	13.00 (72.22%)	11.50 (63.88%)	10.50 (58.33%)	10.00 (55.55%)	9.50 (52.77%)
	Overall Acceptability	91.33 (76.00%)	88.49 (73.74%)	85.16 (70.96%)	79.82 (66.51%)	55.16 (45.96%)

Table 3: Scores Obtained From Different Characteristics of Shrikhand Prepared from Different Milk Sources.

The Comparative study of Shrikhand obtained from different milk sources

Shrikhand is a recipe, obtained from curd. As the curd in itself is obtained from different milk sources, so it can be varied from each other in accordance to taste, consistency, appearance and flavor.

Shrikhand obtained from different sources of milk were evaluated on the basis of taste by housewives and results revealed that acceptability of Shrikhand obtained from Cow's was highest as compared to other milks. Cow's milk obtained the score of 35 i.e. 83.33 acceptability by the panel members. Second highest is Vendor's milk obtained the score of 33.83(80.54) acceptability among the

panel members, acceptability of Buffalo's milk was 30.33(72.21%). Dairy and Goat's milk obtained equal score of 25.66 i.e. 61.09 percent acceptability among the panel members.

Consistency wise, Buffalo milk obtained the score of 24.16 i.e. 80.53 percent acceptability among the panel members. Cow's milk obtained the score of 22.5(75%) acceptability as compared to Dairy's Milk. Dairy's milk obtained the score of 21.66 which shows 72.2 percent acceptability. Vendor's milk obtained 69.43 percent acceptability whereas the acceptability of Goat's milk was very low. It was only 33.33 percent acceptable by the panel members.

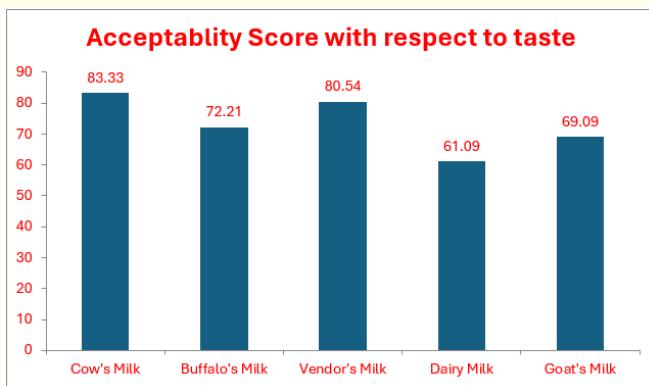


Figure 1: Acceptability score of Shrikhand obtained from different milk sources with respect to taste.



Figure 2: Acceptability score of Shrikhand obtained from different milk sources with respect to consistency.

Results related to appearance revealed that Shrikhand obtained from Buffalo's milk and Dairy's milk obtained equal score of 22.50 i.e. 75 percent acceptability among the panel members. Cow's milk obtained the score of 20 i.e. 66.66 percent acceptability. Acceptability of Shrikhand obtained from Goat's milk was the lowest. Goat's milk obtained the score of 10 which shows that acceptability was only 33.33 percent.

According to flavor, Cow's milk obtained the highest score of 13 i.e. 72.22 percent acceptability, this shows that the acceptability

of Shrikhand obtained from Cow's milk was highest as compared to others milk. Buffalo's milk obtained the score of 11.5 i.e. 63.88 percent acceptability. Vendor's milk obtained score of 10.5(58.33). Dairy milk obtained the score of 0.5 i.e. 52.77 percent acceptability with respect to flavor by the panel members.

Over All Acceptability

Lastly it can be concluded that the acceptability of Shrikhand obtained from Cow's Milk was high, (87.90%) by the Panel members. Cow milk obtained score of 91.33 out of 120 i.e. 76 percent acceptability by the Panel members.

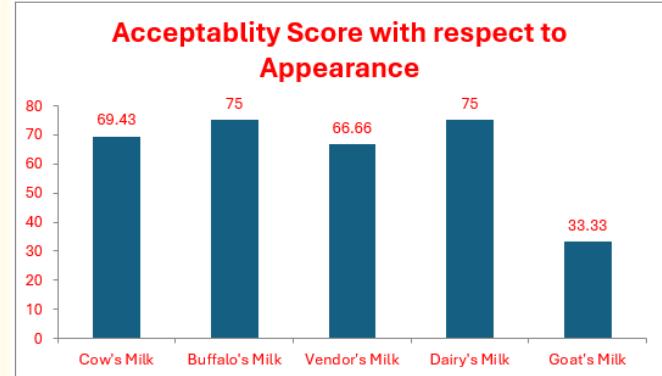


Figure 3: Acceptability score of Shrikhand obtained from different milk sources with respect to appearance.



Figure 4: Acceptability score of Shrikhand obtained from different milk sources with respect to flavour.

Acceptability of Shrikhand obtained from Buffalo's Milk was 73.74 percent (88.49 out of 120).

Overall acceptability of Shrikhand obtained from vendor's milk was 70.96 percent (85.16).

Shrikhand obtained from Dairy's milk was 66.51 percent (79.82) acceptable.

Last acceptable Shrikhand was that, obtained from Goat's milk was 45.96 percent (55.16) acceptability by the panel members.

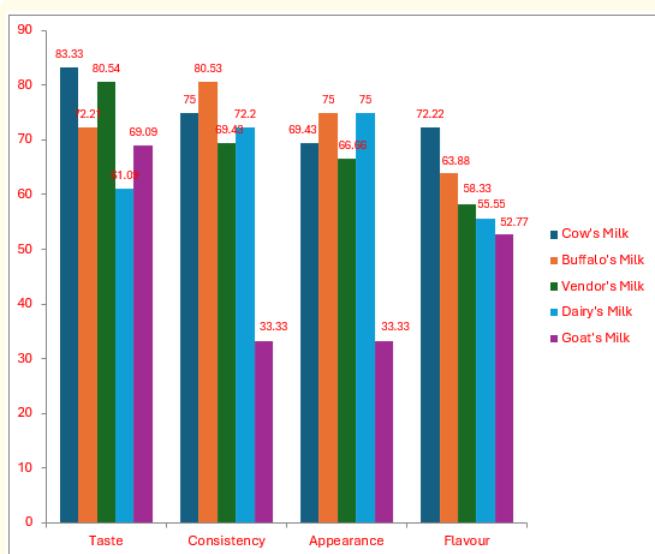


Figure 5: Acceptability score of Shrikhand obtained from different milk source with respect to taste, consistent, appearance and flavour.

Conclusion

Shrikhand is a semi dry mass of curd sweetened with sugar. It is made by the suspending curd in a muslin bag until all the whey is drained off. If then sugared and coloured. The present study was undertaken as organoleptic evaluation of Shrikhand obtained from different milk sources. Although the main emphasis of this study was organoleptic evaluation of curd obtained from different milk sources, but other aspect like purity of milk was also studied by Lactometer.

6 housewives in the age group of 30-50 year were selected through threshold test. All the subjects surveyed belonged to

Hindu community. All subjects were from Joint family. The sensory evaluation was conducted by using 7 points hedonic scale. Curd prepared from different milk sources were Cow's milk, Buffalo's milk, Vendor's milk, Dairy's milk and Goat's milk.

The sensory evaluation results of Shrikhand revealed that the overall acceptability score of Shrikhand prepared from Cow's milk was 76%. Shrikhand prepared from Buffalo's milk obtained overall acceptability score of 73.74%. The overall acceptability of Shrikhand prepared from Vendor's milk was 70.96%. Dairy's milk obtained score of 66.51% Shrikhand prepared from Goat's milk obtained overall acceptability score of 45.96%.

The overall result showed that Shrikhand prepared from different milk sources were not equally acceptable due to different composition.

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