

# Effect of addition of gulkand and rose petal powder on chemical composition and organoleptic properties of Shrikhand

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## Abstract

In this study, the effect of addition of Gulkand and rose petal powder on the chemical composition and sensory properties has been carried. Various compositions of gulkand and rose petal powder viz. 1-1.5, 1.5-1.5, 2-1.5 and 2.5-1.5 (in gm) has been added in chakka during Shrikhand preparation. The results revealed that the protein and fat percent of the Shrikhand decreased whereas carbohydrate, ash and moisture percent increased with increasing level of gulkand and rose petal powder. On the basis of various sensory parameters, Shrikhand containing 2:1.5 gm of gulkand and dried rose petal powder was most liked by panel members and hence further examined for storage efficiency. On the basis of sensory evaluation and microbial analysis the product was acceptable for a period of 21 days under refrigerated temperature.

**Keywords:** Shrikhand, gulkand and Rose petal powder, Chemical parameters, Storage time.

## INTRODUCTION

Cultured dairy products are the vital component of the human diet in India. Apart from imparting nutrition and novelty, these products help preserve the precious nutrients in milk which is tend to quick deterioration [1]. Curd (yoghurts), makhan (cultured butter), mishti doi (sweet yoghurts), cheese analogous, butter milk, lassi (sweet butter milk) prominently used as supplementary food in different parts of India. Due to high nutritive characteristics flavor, taste, palatable nature and possible therapeutic value Shrikhand is one amongst the most preferred dairy product in western India [2]. Shrikhand is a traditional indigenous fermented semi soft, sweetened whole milk product prepared using Chakka (strained dahi). Further teste and the appearance of the product can be improved by adding sugar and other ingredients like nuts, colors etc. It may be considered the western equivalent to quarg yogurt [3]. This low fat fermented product play an important role in synthesis of vitamin B complex in human body and in the prevention of stomachic diseases [4] and is recommended as health food for specific patients suffering from obesity and cardiovascular disease [5]. Because of the change in the economic status and food habit of consumers the other varieties of Shrikhand such as fruit Shrikhand are also in great demand [1]. Recently attempt has been made to improve the nutritive and sensory characters of Shrikhand by adding ashwagandha powder [6] and apple pulp with celosia powder [5], papaya pulp [2], cocoa powder and papaya pulp [7], strawberry pulp [4], mango pulp [8] etc. In addition with this Shrikhand is often prepared by adding saffron to enhance its color and appearance and flavor.

Gulkand is an Arabic word Gul means Rose and Kand means Sugar. Gulkand is undoubtedly the most delicious ayurvedic preparation known to mankind. Traditionally it has been used as a cooling tonic to combat fatigue, lathery, muscular aches, biliousness itching, and heat-related conditions. It is naturally rich in calcium and also known as antioxidant and good blood purifier. Commercially it is used in milk shakes, filling for cakes and pastries to improve the flavor and the appearance of the product. In present preparation an attempts are made to study the effects of rose petal powder and gulkand addition on compositional, physicochemical and organoleptic properties of Shrikhand.

## MATERIAL AND METHODS

### Preparation of Shrikhand

Shrikhand was manufactured from cow milk and standardized at 4% fat and 8.5% SNF (Solid no fat). Milk was heated at 85°C for 30 minutes. Then it was cooled down at 28 °C and inoculated by the starter culture (Dahi) at the rate of 1.5% and incubated at 30 °C till the firm coagulum was formed. Coagulum was then broken and transferred to a muslin cloth. Further it was placed in hanging position for expulsion of whey (for 4-6 hours). The semi solid mass left after drainage of whey (chakka) was used as a main ingredient in the production of Shrikhand.

For this particular study Shrikhand was prepared by adding different volume (in gm) of gulkand and rose petal powder in combinations viz. 1-1.5 (GRS 1), 1.5-1.5 (GRS 2), 2-1.5 (GRS 3) and 2.5-1.5 (GRS 4) in 100 gm chakka. Based on the various preliminary trials the level of sugar was adjusted at 40%. Shrikhand prepared without gulkand and rose petal powder was used as control and compared with the treatments.

### Sensory analysis

These different Shrikhand preparations were cooled to 5 °C and evaluated for sensory characteristics like color, aroma, taste, texture

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and overall acceptability by the panel of eight trained member (n=27) using nine point Hedonic scale with 9 for maximum score and 1 for minimum score [9].

### Chemical analysis

The protein, fat, carbohydrate, ash and moisture content of Shrikhand were determined using standard methods [10].

### Storage study

Further to evaluate the keeping quality and durability of product, subsamples were stored for 0 day, 7days, 14 days and 21 days at 5 °C. These subsamples were tested for sensory evaluation and microbiological analysis.

### Microbiological Analysis

Microbiological profile viz. total plate count (TPC), psychrophilic count and coliform count in the samples were determined by method described [11].

### Statistical analysis

The data obtained in the present investigation was subjected to one-way Analysis of Variance (ANOVA) [11] to determine the significant difference among the parameter means.

## RESULTS AND DISCUSSION

In present study the effect of different proportions of gulkand on chemical composition, organoleptic properties and keeping quality

has been studied and the results are discussed.

### Chemical analysis

The results of the chemical composition of different samples are presented in table 1. Increase in quantity of gulkand and rose petal powder decreases the protein content significantly ( $P<0.05$ ). The highest mean protein content was observed in the control ( $10.4 \pm 0.73$ ). However, among all the samples the highest mean protein content was found in GRS 1 ( $9.44 \pm 0.05$ ). Similarly increasing level of gulkand significantly decreases ( $P<0.05$ ) the fat content in the Shrikhand. The highest fat content was obtained in the control ( $8.03 \pm 0.08$ ) while the lowest ( $6.76 \pm 0.20$ ) in the samples GRS 4. This decrease in protein and fat may be due to the lower protein and fat content in the gulkand and rose petal powder. Earlier Nigam *et al.* (2009) also obtained similar results in case of papaya pulp. Furthermore Kumar *et al.* (2011) explained that the addition of apple pulp in Shrikhand also decreases the protein and fat content of the end product. The carbohydrate content in the control sample was significantly lower than the other gulkand added samples ( $p<0.05$ ). The highest mean carbohydrate content was obtained in GRS 4 ( $67.97 \pm 0.02$ ) while lowest ( $66.78 \pm 0.21$ ) was in control. The added sugar in the preparation of gulkand may interfere with the carbohydrate percentage of the samples. The ash content of the Shrikhand was significantly increasing ( $P<0.05$ ) with increasing quantity of gulkand. The lowest ash content was measured in the control sample ( $0.40 \pm 0.05$ ). This may be due to higher content of minerals in gulkand. Similarly results were observed in case of the moisture content. The highest moisture content was found in GRS 4 ( $43.19 \pm 0.03$ ). The similar observations were recorded by Kumar *et al.* (2011) prepared Shrikhand using apple pulp.

Table 1. Effect of different proportions of Gulkand and rose petal powder on chemical composition of Shrikhand.

Gulkand: Rose petal powder (in gm)	Control	GRS1 (1.0:1.5)	GRS2 (1.5:1.5)	GRS3 (2.0:1.5)	GRS4 (2.5:1.5)
Protein	$10.40 \pm 0.73$	$9.44 \pm 0.05$	$9.17 \pm 0.05$	$8.73 \pm 0.21$	$8.57 \pm 0.07$
Fat	$8.03 \pm 0.08$	$7.83 \pm 0.02$	$7.25 \pm 0.03$	$7.14 \pm 0.03$	$6.76 \pm 0.20$
Carbohydrate	$66.78 \pm 0.21$	$69.01 \pm 0.20$	$67.16 \pm 0.08$	$67.46 \pm 0.19$	$67.97 \pm 0.02$
Ash	$0.40 \pm 0.05$	$0.43 \pm 0.01$	$0.54 \pm 0.08$	$0.61 \pm 0.07$	$0.67 \pm 0.07$
Moisture	$41.30 \pm 0.24$	$41.53 \pm 0.06$	$42.26 \pm 0.06$	$42.74 \pm 0.05$	$43.19 \pm 0.03$

### Sensory analysis

The effects of different proportion of gulkand and rose petal powder i.e. on the sensory properties are presented in table 2. It was revealed that gulkand-rose petal had a significant ( $p<0.05$ ) influence on aroma, taste, texture and overall acceptability except on color. The mean color show that samples GRS3 ( $8.12 \pm 0.64$ ) took the highest scores whereas GRS 1 took lowest color score ( $6.88 \pm 0.35$ ). The mean scores of aroma and taste showed a significantly ( $p<0.05$ ) increasing trend with increasing level of gulkand except sample GRS4. The GRS 3 took highest aroma score ( $8.375 \pm 0.52$ ) whereas

GRS 1 ( $7.5 \pm 0.93$ ) and control sample ( $7.5 \pm 0.53$ ) took the lowest score. The mean texture and overall acceptability scores showed a significantly increasing trend with increasing level of gulkand except for GRS 4. Sample GRS 3 gained highest score ( $8.25 \pm 0.71$ ) for texture and overall acceptability ( $8.31 \pm 0.35$ ). The result obtained from this study reveals that the samples GRS 3 had achieved the highest scores for color, aroma, taste, texture and overall acceptability than control and other samples. Hence the GRS 3 sample was further studied for effect of storage period on sensory characteristics of Shrikhand at 5°C.

Table 2. Effect of different proportions of Gulkand and Rose petal powder on sensory attributes of Shrikhand.

Treatments	Control	GRS 1	GRS 2	GRS 3	GRS 4
Color	7.50±0.53	6.88±0.35	7.75±0.46	8.12±0.64	7.38±0.74
Aroma	7.50±0.53	7.50±0.93	7.63±0.52	8.37±0.52	7.63±0.52
Taste	7.87±0.35	7.38±0.52	7.71±0.71	8.50±0.53	6.37±0.52
Texture	7.02±0.71	7.75±0.46	7.75±0.46	8.25±0.71	7.88±0.83
Overall acceptability	7.78±0.64	7.37±0.53	7.71±0.64	8.31±0.35	7.31±0.52

### Microbiological Analysis

The values of various microbiological characteristics for Shrikhand sample GRS3 and control sample are presented in table 4. The initial day TPC was low in both (control and GRS3) samples and gradually increased over the period of incubation. The mean values of TPC (log cfu g<sup>-1</sup>) showed that number of microorganisms increases with increase in storage days but this increase was not significant (P>0.05). The mean TPC values for control samples (1.45±0.03) and GRS3 (1.08±0.09) sample was minimum during

initial refrigeration period. The mean TPC ranged from 1.45 to 2.16 cfu g<sup>-1</sup> for control samples and from 1.08 to 1.81 cfu g<sup>-1</sup> for GRS3 sample containing optimum level of gulkand. However at the initial day of storage the psychrotrophic bacteria were not detected in sample, but their count was gradually increased throughout the storage period. Apart from this coliforms were not detected in control as well as in the GRS3 sample throughout the refrigeration storage period. The results of microbial characteristics reveal that the product GRS3 can be stored up to three week under refrigerated condition.

Table 3. Effect of refrigerated storage on microbiological characteristics of Shrikhand.

Treatments	Storage period (days)			
	0	7	14	21
Total plate count (log cfu g <sup>-1</sup> )				
Control	1.45±0.03	1.71±0.05	1.81±0.05	2.16±0.03
GRS 3	1.08±0.09	1.55±0.05	1.64±0.06	1.81±0.11
Psychrophilic count(log cfu g <sup>-1</sup> )				
Control	ND	1.44±0.04	1.83±0.05	2.28±0.3
GRS 3	ND	1.34±0.06	1.65±0.04	1.84±0.03
Coliform count (log cfu g <sup>-1</sup> )				
Control	ND	ND	ND	ND
GRS 3	ND	ND	ND	ND

Note: ND = not detected

Table 4. Effect of refrigerated storage on sensory attributes of Shrikhand.

Treatments	Storage period (days)				
	0	7	14	21	
Color	Control	7.5±0.53	7.12±0.35	7.12±0.35	6.87±0.64
	GRS 3	8.12±0.64	7.12±0.35	6.62±0.52	6.00±0.11
Aroma	Control	7.5±0.53	7.37±0.52	7±0.53	6.5±0.53
	GRS 3	8.37±0.52	7.37±0.52	6.87±0.64	6.25±0.71
Taste	Control	7.87±0.35	7.5±0.53	7.12±0.64	6.37±0.52
	GRS 3	8.5±0.53	8.12±0.35	7.37±0.52	7.12±0.83
Texture	Control	8.25±0.71	7.87±1.13	7.75±0.46	7.25±0.71
	GRS 3	8.25±0.71	7.5±0.53	6.75±0.46	6.25±0.46
Over acceptability	Control	7.78±0.64	7.46±0.64	7.24±0.53	6.74±0.46
	GRS 3	8.31±0.52	7.52±0.35	6.90±0.52	6.40±0.64

### Effect of storage time on sensory properties

To evaluate the overall acceptance of the shrikahnd sample GRS3 over a refrigeration storage period, sample was subjected for the sensory evaluation by expert panel (Table 3). The mean values of color and aroma decreases significantly ( $p < 0.05$ ) over a storage period. The mean scores for color and aroma ranged from  $8.12 \pm 0.64$  to  $6.00 \pm 0.11$  and  $8.37 \pm 0.52$  to  $6.25 \pm 0.71$  respectively for treatment samples. The mean scores of taste for GRS 3 and control shows insignificant decrease. During storage acidity of product increase<sup>[4]</sup> which may gives negative impact on the taste. Furthermore the mean value of texture for GRS 3 was decreasing significantly ( $8.25 \pm 0.71$  to  $6.25 \pm 0.46$ ) may be due to loss of water hard texture was not able to give mouth melting feeling to observers. The overall acceptability of GRS3 sample decreased with increase in storage period. Similarly it has been reported that the overall acceptability of apple pulp Shrikhand scores decreased with increase in storage period due to deterioration of flavor<sup>[5]</sup>.

### CONCLUSIONS

The present study confirmed that gulkand and rose petal powder can be used as flavoring and coloring agent in Shrikhand without adversely affecting the quality of the product. The product GRS 3 prepared with the addition of gulkand and rose petal powder in combination of 2:1.5 gm was selected as optimum on the basis of various sensory parameters. Furthermore Shrikhand blended with gulkand and rose petal powder could be stored for 21 days under refrigeration temperature ( $4 \pm 1^\circ\text{C}$ ).

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