



Effect of fat and sugar on sensory quality of Shrikhand

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ABSTRACT : Shrikhand is a semi-soft, sweetish sour, whole milk product prepared from lactic fermented curd, the curd is partially strained through a muslin cloth to remove the whey and thus, produce a solid mass called chakka. This chakka is mixed with the required amount of sugar to yield Shrikhand. This is very popular in Gujarat, Maharashtra and Karnataka. The buffalo milk was standardized to three fat levels *i.e.* 4 per cent (F_1), 5 per cent (F_2) and 6 per cent (F_3). During the preparation of Shrikhand three levels of sugar *i.e.* 30 per cent (S_1), 40 per cent (S_2) and 50 per cent (S_3) was added and then the Shrikhand was put in plastic cups and earthen pots. The experiment was laid in CRD with three replication. The impact of all treatment individually and their interaction was studied on sensory quality of Shrikhand. The results of present investigation useful information of productive utility. Fat (6 %) resulted in providing best flavour in Shrikhand and for sugar the treatment S_2 scored the highest value. Among the various treatment combinations F_3S_2 resulted in excellent flavour of Shrikhand. The maximum score of body and texture was recorded for fat at 6 per cent, sugar 40 per cent level. F_3S_2 resulted in excellent body and texture score on 9 point hedonic scale. At 6 per cent fat and 40 per cent sugar levels exhibited better sweetness in Shrikhand. F_3S_2 resulted in excellent sweetness score on 9 point hedonic scale. For overall acceptability of Shrikhand the maximum levels of fat and sugar ($F_3 \times S_2$) showed best acceptability individually irrespective of plastic cup used.

KEY WORDS : Fat, Sugar, Shrikhand, Sensory examination

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INTRODUCTION

Shrikhand as a semi-soft, sweetish sour, whole milk product prepared from lactic fermented curd, the curd is partially strained through a muslin cloth to remove the whey and thus, produce a solid mass called chakka. This chakka is mixed with the required amount of sugar to yield Shrikhand (De, 1982). The dish is very popular in Gujarat, Maharashtra

and Karnataka. The Shrikhand word is derived from the sanskrit root 'shrikha rani' meaning good nourishing food having high protein and calorific value.

The keeping quality of Shrikhand largely depends upon its initial micro flora like yeast, mould and other micro organism. Under ambient condition (30°C) it trends to spoil within 2-3 days. Under refrigerated condition (5°C) it can be kept for 40 days without deterioration. So in order to increase the milk availability during lean Periods (Summer months) the Shrikhand preparation is best under Indian condition. Shrikhand is prepared on small scale in a highly unorganized manner, which has great impact on microbiological characteristics of Shrikhand. The large variations have been reported in the organoleptical, microbiological and chemical qualities of Shrikhand. (Sarkar and Mishra, 1997) due to its variation in preparation and production techniques. By addition of

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sugar and other materials the taste and the appearance of the product can be improved. It may be considered the western equivalent to quarg yogurt (Sarkar, 2008). 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 (Sonawane *et al.*, 2007) and is recommended as health food for specific patients suffering from obesity and cardiovascular disease (Kumar *et al.*, 2008). 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 (Singh, 2007). To improve the nutritive and sensory quality of Shrikhand various attempts has been made to by adding ashwagandha Powder (Landge *et al.*, 2011) and apple pulp with celosia powder (Kumar *et al.*, 2011), papaya pulp (Nigam *et al.*, 2009), cocoa powder and papaya pulp (Vagdalkar *et al.*, 2002), strawberry pulp (Sonawane *et al.*, 2007), mango pulp (Bardale *et al.*, 1986) etc. In addition with this Shrikhand is often prepared by adding saffron to enhance its colour and appearance and flavour. 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 (Singh, 2007) with these view of utilization and industrial importance of milk entitled effect of fat and sugar on sensory quality of Shrikhand was carried out.

MATERIAL AND METHODS

The present investigation was carried out in the Department of Animal Husbandry and Dairying, C.S.A. University of Agriculture and Technology, Kanpur, India. The details of materials and various methods used for manufacture of Shrikhand and its analysis and Techniques used are given as under:

Materials :

Milk :

Fresh buffalo milk is received from university Dairy Farm for the preparation of experimental Shrikhand. Milk has been standardized at 4 per cent, 5 per cent, 6 per cent for the preparation of Shrikhand.

Starter culture :

Streptococcus thermophilous and *Lactobacillus sugericus*.

Sugar :

Commercial grade white crystalline sugar free from

impurities was added as sweetening agent.

Colour and flavour :

No colour and flavour is added. Only natural colour and flavour of dahi is allowed to develop in control and experimental Shrikhand.

Packaging materials :

Plastic cup was used for packaging.

Methodology :

For preparing the Shrikhand buffalo milk was received from dairy from of Chandra Shekhar Azad University of Agriculture and Technology, Kanpur, then the milk was separated by the cream separator suitable culture was added and the Shrikhand was prepared as for the flow chart given below :

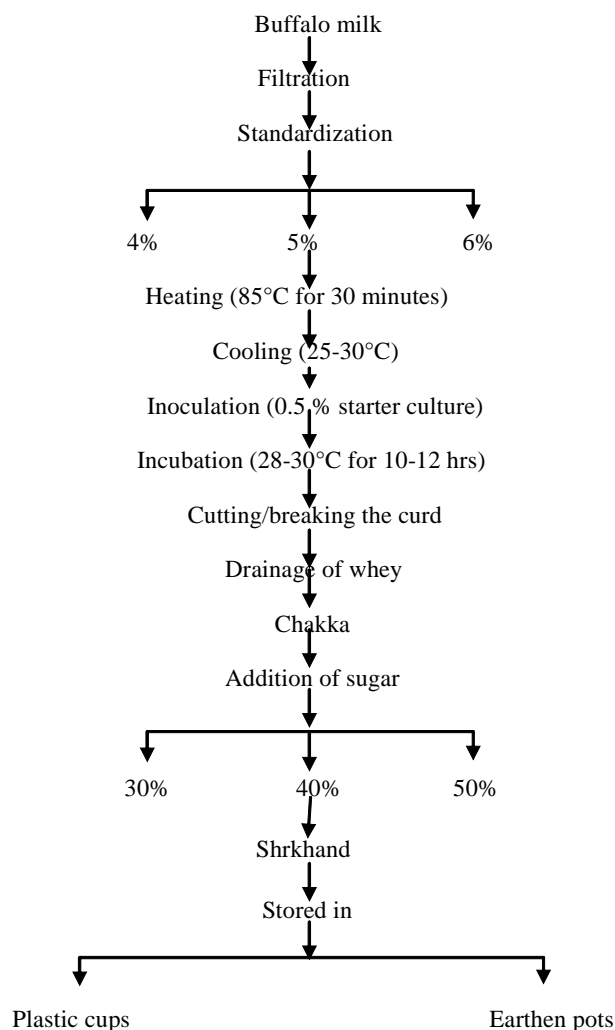


Fig. A: Flow chart for Shrikhand preparation

Treatment details:

Fat levels : F₁ (4 %), F₂ (5 %) and F₃ (6 %)
 Sugar level on Chakka basis : S₁ (30 %), S₂ (40 %)
 and S₃ (50 %).

RESULTS AND DISCUSSION

The results of the present study as well as relevant discussions have been presented under following sub heads:

Flavour :

Effect of different fat level on flavour of Shrikhand :

The flavour of Shrikhand was significantly. The best

flavour of Shrikhand was obtained when it was prepared with buffalo milk having 6 per cent fat. The minimum score of 6.666 and the maximum score of 8.000. It was revealed from the study that the milk having higher percentage of fat produced good flavour in Shrikhand.

Effect of sugar level on flavour of Shrikhand :

The flavour of Shrikhand was significantly influenced by different sugar levels.

The maximum score of 7.500 was obtained with S₂ i.e. buffalo milk having 40 per cent sugar. The minimum score 7.133 was obtained with S₃ (50 %) sugar. It was concluded that the Shrikhand prepared with higher level

Table 1 : Effect of fat and sugar level on flavor of srikhand

Treatments	S ₁ (30%)	S ₂ (40%)	S ₃ (50%)	Mean
F ₁ (4%)	6.70	6.80	6.50	6.666
F ₂ (5%)	7.30	7.50	7.10	7.300
F ₃ (6%)	8.00	8.20	7.80	8.000
Mean	7.333	7.500	7.133	

Table 2 : Effect of fat and sugar level on body and texture srikhand

Treatments	S ₁ (30%)	S ₂ (40%)	S ₃ (50%)	Mean
F ₁ (4%)	6.60	6.70	6.30	6.566
F ₂ (5%)	7.20	7.40	7.00	7.200
F ₃ (6%)	7.90	8.10	7.60	7.866
Mean	7.233	7.400	7.000	

Table 3 : Effect of fat and sugar level on sweetness of srikhand

Treatments	S ₁ (30%)	S ₂ (40%)	S ₃ (50%)	Mean
F ₁ (4%)	6.80	6.90	6.60	6.766
F ₂ (5%)	7.40	7.60	7.20	7.377
F ₃ (6%)	8.20	8.30	7.90	8.133
Mean	7.466	7.588	7.222	

Table 4 : Effect of fat and sugar level on overall acceptability of srikhand

Treatments	S ₁ (30%)	S ₂ (40%)	S ₃ (50%)	Mean
F ₁ (4%)	6.69	6.80	6.49	6.657
F ₂ (5%)	7.29	7.49	7.09	7.296
F ₃ (6%)	8.03	8.18	7.76	7.993
Mean	7.334	7.494	7.118	

Table 5 : Effect of fat and sugar level on fat of srikhand

Treatments	S ₁ (30%)	S ₂ (40%)	S ₃ (50%)	Mean
F ₁ (4%)	6.10	6.40	5.80	6.088
F ₂ (5%)	6.70	7.10	6.90	6.900
F ₃ (6%)	8.10	8.30	8.20	8.200
Mean	6.955	7.266	6.966	

of sugar responded better as compared to low level so far as flavour of the product is concerned.

Interactional effect of fat and sugar on flavour of Shrikhand :

Treatment combination of fat and sugar significantly influenced the flavour of Shrikhand.

The best flavour (8.000) as obtained with $F_3 \times S_2$ which was statistically at par with $F_3 S_2$. The minimum (6.666) obtained with $F_1 \times S_3$.

Body and texture :

Effect of different fat level on body and texture of Shrikhand :

The body and texture score of Shrikhand was highly affected by different fat levels of buffalo milk. The highest body and texture score (7.866) was observed with F_3 i.e. 6 per cent fat. While the lowest score of 6.3566 was noted with F_1 .

Effect of sugar level on body and texture of Shrikhand:

The body and texture score of Shrikhand was highly affected by different sugar level. The maximum score (7.400) was recorded with S_2 (40 % sugar) and the lowest score (7.000) was recorded with S_3 (50 % sugar).

Interactional effect of fat and sugar on body and texture of Shrikhand :

Treatment combination of fat and sugar significantly influenced the body and texture of Shrikhand.

The best body and texture (7.866) as obtained with $F_3 \times S_2$ which was statistically at par with $F_3 S_2$. The minimum (6.566) obtained with $F_1 \times S_3$.

Sweetness :

Effect of different fat levels on sweetness of Shrikhand:

The fat levels influenced significantly the sweetness of the products. The maximum sweetness was obtained in F_3 (8.133) i.e. 6 per cent fat and the minimum sweetness was obtained in F_1 (6.766) 4 per cent samples.

Effect of sugar level on sweetness of Shrikhand :

The sweetness of Shrikhand was highly effected by the levels of sugar. The sweetest Shrikhand was prepared from S_2 (7.377) followed by S_1 (7.466) and S_3 (7.222). The higher value of sweetness in S_2 is due to higher amount

of sugar added during the preparation of Shrikhand.

Interactional effect of fat and sugar ($F \times S$) on sweetness of Shrikhand :

The maximum sweetness (8.133) in Shrikhand was noted when prepared with buffalo milk having 6 per cent fat (F_3) and 40 per cent sugar (S_2) and the lowest score was recorded for $F_1 \times S_3$.

Overall acceptability :

Effect of different fat level on overall acceptability of Shrikhand :

The fat levels significantly affected the overall acceptability of Shrikhand. The maximum score of 7.993 was noticed for Shrikhand prepared from milk having 6 per cent fat. The minimum score 6.657 was recorded for F_1 .

Effect of sugar level on overall acceptability of Shrikhand :

The sugar levels influenced significantly affected the overall acceptability of Shrikhand. The maximum score of 7.993 was noticed for Shrikhand prepared from milk having 6 per cent fat. The minimum score 6.657 was recorded for F_1 .

Interactional effect of fat and sugar on overall acceptability of Shrikhand :

The Interactional effect due to levels of fat and sugar ($F \times S$) for overall acceptability of the product was found to be significant the treatments $F_3 S_2$ recorded the maximum score of (7.993) and the minimum score of (6.657) $F_1 S_3$.

However, Kumar *et al.* (2013) found lower concentration of milk solids except ash and higher retention of moisture in Shrikhand samples prepared from milk of 9.0 per cent SNF. These differences might be due to some deviation in the method of manufacturing of this product.

Singh *et al.* (2014) was investigated to suggest the best level of SNF for Shrikhand making. The yield and sensory score of Shrikhand increased with increase in the SNF content of milk. The total solids, protein, lactose and ash contents of Shrikhand were found increased with the increase in the SNF content of milk but fat content reduced and the acidity of the product remained unchanged. At 13.0 per cent SNF level of milk, the product fulfilled all PFA specifications. Since, 13.0 and 15.0 per

cent SNF levels were statistically similar with respect to sensory quality, hence, 13.0 per cent SNF level of milk has been recommended for Shrikhand making at the commercial scale.

LITERATURE CITED

- A.O.A.C. (2000). *Official methods of analysis*. Edited by Horwitz W. Association of analytical chemists, WASHINGTON, D.C.
- Bardale, P.S., Waghmare, P.S., Zanjad, P.N. and Khedkar, D.M. (1986). The preparation of Shrikhand like product from skim milk chakka by fortifying with fruit pulps. *Indian J. Dairy Sci.*, **39**(4) : 480-483.
- De, S. (1982). *Outline of dairy technology* (2nd Ed.) Oxford University Press, NEW DELHI, INDIA.
- Kulkarni, Chandrashekhar, Belsare, Nilesh and Lale, Ashish (2006). Studies on Shrikhand rheology. *J. Food Engg.*, **74** (2) : 169-177.
- Kumar, Ravendra, Kumar, Rajeev and Bhaskar, M.L. (2013). Effect of sugar levels on the quality of Shrikhand. Proceeding of National Seminar on "Value added functional foods: prospects and future challenges" organized by Janta College, Bakewar, Etawah (U.P.) INDIA.
- Kumar, S., Bhat, Z.F. and Kumar, P. (2011). Effect of apple pulp and *Celosia argentea* on the quality characteristics of Shrikhand. *American J. Food Technol.*, **6** (9) : 817-826.
- Landge, U.B., Pawar, B.K. and Choudhari, D.M. (2011). Preparation of Shrikhand using Ashwagandha powder as additive. *J. Dairy, Foods & H.S.*, **30**(2) : 79- 84.
- Nigam, N., Singh, R. and Upadhyay, P.K. (2009). Incorporation of Chakka by papaya pulp during the manufacture of Shrikhand. *J. Dairy. Foods & H.S.*, **28**(2) : 115-118.
- Patel, Prafulla, Salunke, H.A. and Thakar, P.N. (2006). Physico-chemical properties of Shrikhand sold in Maharashtra state. *J. Food Sci. & Technol.*, **43**(3) : 276-281.
- Salunke, Prafulla, Patel, H.A. and Thakar, P.N. (2006) Sensory profile of market Shrikhand sold in Maharashtra state. *Indian J. Dairy Sci.*, **59**(6) : 363-368.
- Sarkar, S. (2008). Innovations in Indian fermented milk products: A Review. *Food Biotechnol.*, **22**(1) : 78-97.
- Sarkar, S. and Mishra, A.K. (1997). Commercial production of Shrikhand. *Indian Food Indian*, **16**(1) : 20-25.
- Sindhu, J.S, Arora, Sumit and Nayak, S.K. (2000). Physio-chemical aspects of Indigenous dairy products. *Indian Dairy.*, **52**(10) : 51-64.
- Singh, Krishan Vir, Kumar, Rajeev, Singh, Laxman and Bhaskar, M.L. (2014). Effect of SNF levels of milk on the quality of Shrikhand. *J. Rural & Agric. Res.*, **14**(1) : 47-48.
- Singh, R. (2007). Characteristics and technology of traditional Indian cultured dairy products. *Bull. Internat. Dairy Federa.*, **415** : 11-20.
- Sonawane, V.K., Chavan, K.D. and Pawar, B.K. (2007). Effect of levels of strawberry pulp and sugar on chemical composition during storage of Shrikhand. *J. Dairy, Foods & H.S.*, **26**(3/4) : 153-158.
- Sukumar, De (1980). *Outline of dairy technology*, Oxford University Press.
- Swapna, G., BrahmaPrakash, G.P. and Chavannavar, S.V. (2011). Development of functional food: Shrikhand. *Environ. & Ecol.*, **29**(3A) : 1326-1332.
- Vagdalkar, A.A., Havan, B.R., Morkile, V.M., Thalkari, B.T. and Landage, S.N. (2002). A study on preparation of Shrikhand by using cocoa powder and papaya pulp. *Indian Dairy.*, **54** : 49-51.
- Venkateshaish, Amlkumar Singh and H., B.V. Arunkumar (2005). Effect of different levels of total solids in chakka in the preparation of soft serve frozen Shrikhand. *Mysore J. Agric. Sci.*, **39**(1) : 115-118.

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