



ECONOMICS OF SHRIKHAND BLENDED WITH JAGGERY POWDER

R. S. Sonwane¹, S. B. Sonkamble¹, S. D. Kalyankar² and D. D. Thorat *

¹Deptt. of Dairy Sci., Yeshwant College, Nanded (Maharashtra), India.

²Head of the Section (Dairy Technology), MAFSU, Nagpur-Govt. College of Dairy Technology, Udgir Distt. Latur, India.

* Deptt. of Dairy Sci. Toshniwal Arts, Commerce & Science College, Sengaon (Maharashtra), INDIA.

* Corresponding author: Email id: 3dthorat@gmail.com

ABSTRACT:

Background: The investigation was planned to ascertain the optimum quantity of jaggery powder to substitute sucrose in Shrikhand, a popular festive dairy dessert. **Methods:** Various levels of the jaggery powder viz. 31, 41, and 51% were used to substitute sucrose. The control and experimental samples of different treatments were analyzed for organoleptic qualities (color and appearance, flavor, body and texture, and overall acceptability) by using a 9-point Hedonic scale. It was observed that the standardized Shrikhand containing 41% jaggery powder and 59% sucrose (S2) was at par with the control containing 100% sucrose as far as its sensory attributes are concerned. It was seen that the sample S2 (was most acceptable than other combinations of low-calorie Shrikhand). **Conclusion:** The Shrikhand can be prepared by replacing 41% sucrose with jaggery and thus would be the best option for diabetic consumers. The cost of production for a kg of the product S0, S1, S2, and S3 was Rs. 81.58, 82.78, 83.58, and 85.1, respectively.



KEY WORDS: Shrikhand, jaggery, cost of production.

INTRODUCTION:

Shrikhand is a semi-soft, sweetish-sour, whole milk product prepared from lactic fermented curd (De, 2011). The Indian curd (*dahi*) is partially strained through the cloth to remove the whey and thus produce a semisolid mass called *chakka*, the base ingredient of *shrikhand*. *chakka* is blended with the required quantity of sugar and natural flavoring and spices such as nuts, cardamom, saffron, etc. According to the Food Safety and Standards Authority of India (FSSAI, 2011), *Shrikhand* is a product obtained from *chakka* or skimmed milk *chakka* to which milk fat is added. It may contain fruits, nuts, sugar, cardamom, saffron, and other spices. It shall not contain any added colorings and artificial flavoring substances. It shall conform to the following specification namely, total solid not less than 58 (% by weight), milk fat (on dry matter) not less than 8.5%, not less than 10.5% milk proteins (on dry matter), not more than 72.5% sucrose (on dry matter), not more than 0.9% ash and the maximum acidity should not be more than 1.4 (% lactic acid). The maximum yeast and mold and coliform count should not be more than 50 cfu/g and 10 cfu/g, respectively.

The *Shrikhand* is a traditional dairy product especially prepared on the household-level on festive occasions in India and adjoining countries. It is consumed by most of the people almost all around the world. The basic ingredients for its preparation are *chakka* and sugar. It is a popular product in Maharashtra, West Bengal, Gujarat, and North Indian states as it is rich in nutrients and it's a unique aesthetic flavor. The organized dairy sector is yet to accept *Shrikhand* as a commercial product. Since its manufacturing, it does not need special equipment and it seems to be the only economical product for small quantity surplus milk at cottage level. The sugar and jaggery are the sweeteners; the process of its manufacture is different. In the manufacture of sugar, chemicals like phosphoric acid, sulfur dioxide, calcium hydroxide, polyacrylamide and bone char are used. Jaggery is far better than white sugar, which predominantly contains sucrose ($C_{12}H_{22}O_{11}$), with traces of mineral salts, iron and some fiber.

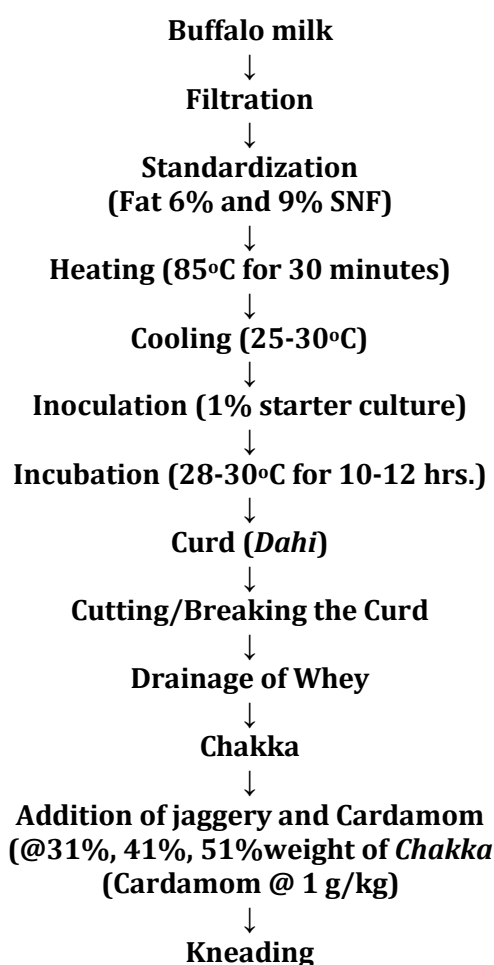
Several workers have recommended different definitions of dietetic dairy items, such as high-strength sugars and mass fillers, e.g., sucralose, sorbitol, aspartame, and so on. Keeping this in view, the present investigation was undertaken to prepare *Shrikhand* blended with jaggery powder and to study its cost of production.

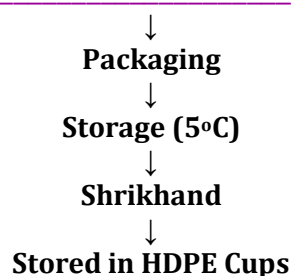
EXPERIMENTAL METHODS

Fig 1. Flow chart of preparation of Shrikhand blended with jaggery powder: as per the procedure below:

Control (T_0) and experimental *Shrikhand*

Starter culture: *Streptococcus thermophilus* and *Lactobacillus bulgaricus*





(Source: Aneja *et al.*, 2002)

Method:

The present investigation was carried out in the Deptt. of Dairy Sci. Research Centre, Yeshwant College, Nanded in Maharashtra. An attempt was made to replace white sugar with jaggery powder. It was done to add value to the *Shrikhand* by replacing three levels of white sugar *i.e.* 31, 41, and 51% with jaggery powder. The Completely Randomized Design with three replications was used for the data analysis (Amble, 1975). The effect of all treated samples and their interaction were studied on the sensory quality of the product (Gupta, 1976).

Determination of cost of the product:

The cost of the product was calculated at the prevalent prices of raw materials purchased from the local market of Nanded during study period.

RESULTS AND DISCUSSION

The cost of the ingredient is very important factors in determining the cost of production of *shrikhand*. It is the basis for deciding the price and determining the extent of profit. The *shrikhand* was prepared from buffalo milk *chakka* by partially replacing white sugar with different levels of jaggery powder. The cost of the lab-made *shrikhand* was calculated and depicted in the table. It is observed that the production cost for one kg of *shrikhand* from the treatments S0, S1, S2, and S3 was Rs. 81.58, 82.78, 83.58 and 85.1, respectively. The cost of production from treatment S0 (*i.e.* control) was comparatively high than the S1, S2, and S3. The lowest cost was observed for treatment S1. The jaggery powder was used as it is a health-friendly (prepared without using any chemicals) and as a cheap source of carbohydrates, proteins, minerals and some vitamins. The results obtained from the study with relevant discussion thereon has been presented. The data obtained on its cost of production are tabulated and statistically analyzed within and between the treatment combinations.

Incorporation of three different levels of jaggery powder on the physico-chemical attributes, overall acceptability and cost of production was studied. It was found that the product obtained by addition of 41% jaggery powder was found to be acceptable as far as organoleptic score was concerned thus *shrikhand* could be prepared and made available at an affordable price for the rural masses on one hand and to the health conscious people on the other.

Table 1. Economics of *shrikhand* prepared by replacing sugar with jaggery powder

Ingredients	Rate in Rs. per kg/lit	Control		Experimental					
		S ₀		S ₁		S ₂		S ₃	
		Qty.	Cost.	Qty.	Cost.	Qty.	Cost.	Qty.	Cost.
		(L./g.)	(Rs.)	(L./g.)	(Rs.)	(L./g.)	(Rs.)	(L./g.)	(Rs.)
Buffalo Milk	54	1000	54	1000	54	1000	54	1000	54
Starter culture (per inoculum)	6	20	6	20	6	20	6	20	6
Sugar(kg)	40	45	1.28	-	-	-	-	-	-
Jaggery powder (kg)	500 g	-	-	31	2.48	41	3.28	51	4.8
Cardamom (g)		2	4.8	2	4.8	2	4.8	2	4.8
Nutmeg (g)		5	2	5	2	5	2	5	2
Total quantity Shrikhand obtained (g)		1072	-	1058	-	1068	-	1078	-
LPG fuel charges/hr.		15 min	5	15 min	5	15 min	5	15 min	5
Labour/hr.		120/8	6.25	120/8	6.25	120/8	6.25	120/8	6.25
Miscellaneous			2.25		2.25	-	2.25		2.25
Total Rs. Cost of Shrikhand obtained/kg			81.58		82.78		83.58		85.1
Total Production Cost for 100 g			8.158		8.278		8.358		8.51

Tondare, *et al.*, (2019) observed a similar trend while calculating the cost of production of Amrakhand prepared using stevia leaf extract powder proportionally increased the cost of production due to the cost of stevia leaf extract powder and reduction in the quantity of product. The present investigation is supported by the findings of Mane, *et al.*, (2019). Studies on sugar-free shrikhand prepared by using stevia (*Stevia Rebaudiana bertonii*) powder. As regards to the cost of production per kg shrikhand was lowest in T₁ (Rs. 138.12 per kg) and highest in T₅ (Rs. 215.68 per kg). This indicates that increase in the level of stevia powder showed an increase in the cost of production of shrikhand.

CONCLUSION

From the present investigation, it is concluded that the *shrikhand* prepared with 41% jaggery powder (S₂) is more acceptable. The cost of product can be reduced by using jaggery powder. It is concluded that the cost of production of *shrikhand* using different levels of jaggery powder is higher than control. The cost of production of *shrikhand* and control (S₀) was Rs. 81.58, and 83.58, respectively.

REFERENCES

1. Amble, V.N (1975). Statistical Methods in Animal Science (1st Edn.) *Indian Society Agricultural Statistics*, New Delhi, 199-219
2. Aneja, R.P Mathur, B.N., Chandan, R.C and Banerjee, A.K. (2002). *Technology of Indian milk products*. A Dairy India publication, Delhi, India.
3. De, S. (1991). Outline of Dairy Technology (2nd Edn.) Oxford University Press, New Delhi.
4. FSSAI (2011). The Food Safety and Standards Act, 2006, (34 of 2006), pp.156.

5. Gupta, S.K. (1976). Sensory evaluation in Food Industry. *Indian Dairyman*, 28: 293-295.
6. Mane, V.V., Shelke, R.R., Nage, S.P. and Shegokar, S.R. (2019). Studies on sugar free shrikhand prepared by using stevia (*Stevia rebaudiana Bertoni*) powder. *Food Sci. Res. J.*, 10(2): 211-216
7. Tondare J.C. and Hembade A.S. (2019). Production of dietetic Amrakhand by using *stevia* leaf extracts powder- An economic study. *International J of Research and Analytical Reviews* Volume 6(2): 648- 651(E-ISSN 2348-1269, P- ISSN 2349-5138)



D. D. Thorat

**Deptt. of Dairy Sci. Toshniwal Arts, Commerce & Science College, Sengaon
(Maharashtra), INDIA.**