



Sensory and chemical quality of sapota milk shake

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ABSTRACT : The three levels of pulp of sapota, at 7, 8 and 9 per cent were used with three levels of jaggery *i.e.* 7, 8 and 9 per cent to study the sensory and chemical quality of sapota milk shakes. On the basis of sensory evaluation of sapota milk shake prepared with 7 per cent jaggery and 8 per cent pulp was accepted by the all judges therefore this treatment got highest scored than other treatments. The chemical composition of this treatment was observed *i.e.* protein (2.43 %), fat (3.52 %), non-reducing sugar (5.13 %), reducing sugar (4.41 %), iron (1.17 mg/100g), ash (0.53 %), total solid (15.20 %) and acidity (0.16 %).

KEY WORDS : Milk, Sapota, Jaggary

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INTRODUCTION

At present the dairy industry is both actively and articulately involved in product development. This includes new formulations and imitation product designed to compete with or replace existing products based on their superiority in convenience, cost and quality, so the progress in product development. Fruit milk shake and *Kulfi* are the one of milk product for value addition. Day by day use fruits pulp and sweetener as jaggery. Fruits like sapota (Chikku), *Ber*, custard apple pulp are also used in milk shake and *Kulfi*, so milk shake become the name of fruit milk shake and *Kulfi* become frozen dairy dessert.

'Milk shake' a product of western origin which is obtained by preparing mix containing milk, skim milk powder, stabilizer and sugar and speed mixing the product in mixer to make it pourable and generate foam in it. It has low fat and sugar content than ice-cream. The milk shakes that are commonly

· sold in the Indian sub-continent consist of sweetened cold
· milk added with colouring and flavouring agents without
· freezing but vigorously shake. The most commonly used
· flavour blends are of rose, coffee and chocolate (Kadav, 2001).

· Mango fruit milk shake is most popular in India. Other
· fruits like apple, banana, orange, sapota etc. may also be used
· in place of mango. A blend of different fruit pulps like mango,
· sapota, orange, apple etc. will be delicious and popular drink.
· These fruit milk shakes are having much demand, particularly
· in summer months. When fresh fruits are not available in the
· market, the preserved pulp can be used to prepare such fruit
· milk blend (Taware, 2000).

MATERIAL AND METHODS

· The three levels of pulp of sapota, at 7, 8 and 9 per cent
· were used with three levels of jaggery *i.e.* 7, 8 and 9 per cent to
· study sapota milk shakes. The sensory evaluation of milk shake
· and *Kulfi* were carried out by the panel of six semi trained
· judge by adopting 9 point Hedonic scale, given in BIS: 1971
· and referred by Gupta (1976). Also the samples were analyzed
· for chemical composition, *viz.*, protein, fat, non-reducing sugar,
· reducing sugar, iron, ash, acidity etc. by using standard
· procedure as per IS: 1479 (Part II) 1961 and IS: 1224 (Part-I)
· 1977. The results obtained during the investigation were
· subjected to statistical analysis by using Completely
· Randomized Design (CRD) as described by Panse and
· Sukhatme (1985).

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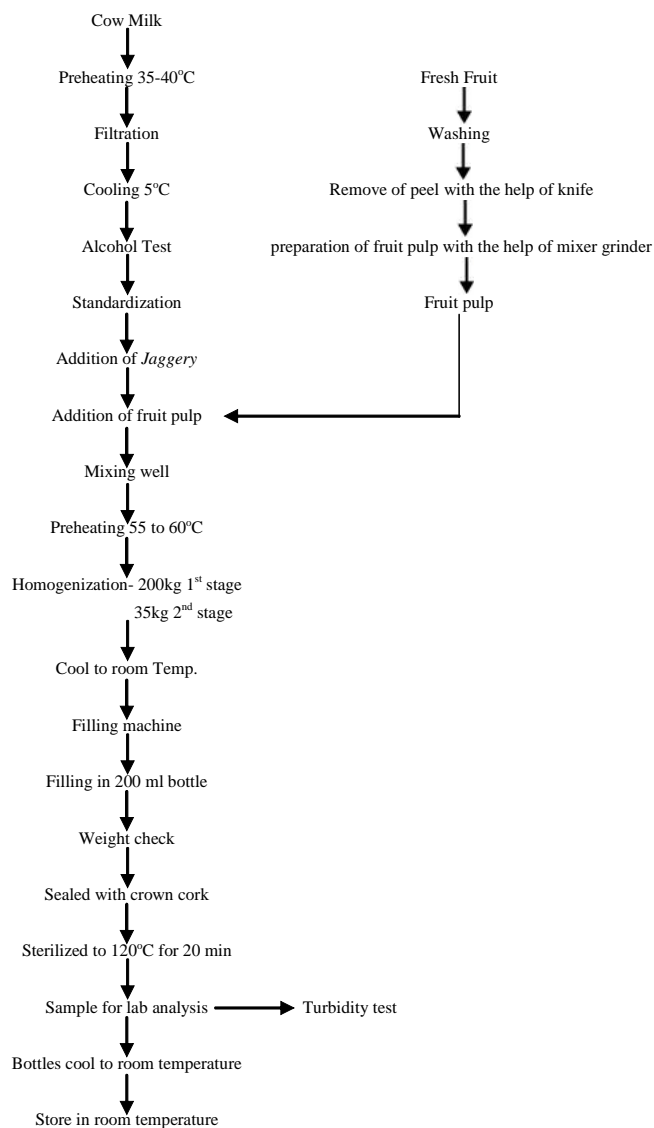


Fig. A : Method of milkshake flow diagram

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Effect of level of jaggery on sensory quality of sapota (7 % pulp) milkshake :

It is evident from Table 1 that, the colour and appearance score for different levels of jaggery on milkshake ranged from 6.12 to 7.71. The data shows that product prepared with 7 per cent jaggery scored the highest score followed by 8 and 9 per cent. It was observed that addition of jaggery upto 7 per cent; increases the colour and appearance score of milk shake, however, addition of jaggery beyond 7 per cent there is a

decrease in the colour and appearance score of milk shake. There were significant differences amongst all the treatment for colour and appearance score.

Mean score for flavour ranged from 6.00 to 7.10. The score of flavour for product prepared with 8 per cent jaggery scored the highest score. The product prepared with 9 per cent jaggery scored lowest score followed by 7 and 8 per cent.

Mean score for body and texture ranged from 6.20 to 7.28. The score of body and texture for product prepared with 7 per cent jaggery scored the highest score. The product prepared with 9 per cent jaggery scored lowest score followed by 7 and 8 per cent. It was observed that addition of jaggery upto 7 per cent, increases the body and texture score of milk shake; however, addition of jaggery beyond 7 per cent there is a decrease in the body and texture score of milk shake. There were significant differences amongst all the treatment for body and texture score. All the treatment were ranked in between like very much to like extremely.

Table 1 showed that the mean score for the taste attributes of milk shake it was in the range of 6.10 to 6.55. The product prepared with 9 per cent jaggery was significantly lower over rest of the treatment.

It is evident from Table 1 that the overall acceptability score of milk shake for various treatments varied between 6.10 to 7.06. The mean overall acceptability score for the product prepared with 7, 8 and 9 per cent jaggery was 7.06, 6.28 and 6.10, respectively. The product prepared with 7 per cent jaggery (7.06) was most acceptable by the judges, so blending of 7 per cent jaggery in the blend was most acceptable than other treatment combinations.

Effect of level of jaggery on sensory quality of sapota (8 % pulp) milk shake :

It is evident from Table 2 that, the colour and appearance score for different levels of jaggery on milk shake ranged from 6.09 to 7.79. The data shows that product prepared with 7 per cent jaggery scored the highest score followed by 8 and 9 per cent. It was observed that addition of jaggery upto 7 per cent; increases the colour and appearance score of milk shake, however, addition of jaggery beyond 7 per cent there is a decrease in the colour and appearance score of milk shake. There were significant differences amongst all the treatments for colour and appearance score.

Mean score for flavour ranged from 6.22 to 7.11. The score of flavour for product prepared with 7 per cent jaggery scored the highest score. The product prepared with 9 per cent jaggery scored lowest score followed by 7 and 8 per cent.

Mean score for body and texture ranged from 6.30 to 7.33. The score of body and texture for product prepared with 7 per cent jaggery scored the highest score. The product prepared with 9 per cent jaggery scored lowest score followed by 7 and 8 per cent. It was observed that addition of jaggery upto 7 per

cent, increases the body and texture score of milk shake; however, addition of jaggery beyond 7 per cent there is a decrease in the body and texture score of milk shake. There were significant differences amongst all the treatment for body and texture score. All the treatments were ranked in between like very much to like extremely.

Table 2 showed that the mean score for the taste attributes of milk shake it was in the range of 6.05 to 7.11. The product prepared with 7 per cent jaggery was significantly superior over rest of the treatment. Addition of jaggery in the blend beyond 7 per cent reduced the score for consistency.

It is evident from Table 2 that the overall acceptability score of milk shake for various treatments varied between 6.16 to 7.28. The mean overall acceptability score for the product prepared with 7, 8 and 9 per cent jaggery was 7.28, 6.17 and 6.16, respectively. The product prepared with 7 per cent jaggery (7.28) was most acceptable by the judges, so blending of 7 per cent jaggery in the blend was most acceptable than other treatment combinations.

Effect of level of jaggery on sensory quality of sapota (9 % pulp) milkshake :

It is evident from Table 3 that, the mean colour and

appearance score for different levels of jaggery on milk shake ranged from 6.00 to 6.96. The data shows that product prepared with 7 per cent jaggery scored the highest score followed by 8 and 9 per cent. It was observed that addition of jaggery upto 7 per cent; increases the colour and appearance score of milk shake, however, addition of jaggery beyond 7 per cent there is a decrease in the colour and appearance score of milk shake. There were significant differences amongst all the treatments for colour and appearance score.

Mean score for flavour ranged from 6.55 to 6.90. The score of flavour for product prepared with 7 per cent jaggery scored the highest score. The product prepared with 9 per cent jaggery scored lowest score followed by 7 and 8 per cent.

Mean score for body and texture ranged from 6.22 to 7.28. The score of body and texture for product prepared with 7 per cent jaggery scored the highest score. The product prepared with 9 per cent jaggery scored lowest score followed by 7 and 8 per cent. It was observed that addition of jaggery upto 7 per cent, increases the body and texture score of milk shake; however, addition of jaggery beyond 7 per cent there is a decrease in the body and texture score of milk shake. There were significant differences amongst all the treatments for body and texture score. All the treatments were ranked in between

Table 1 : Effect of level of jaggery on sensory quality of sapota (7% pulp) milk shake (Mean of three replication)

Sensory attributes	Level of jaggery (%)			S.E.	C.D.
	7	8	9		
Flavour	6.55	7.10	6.00	0.32	0.87
Taste	6.55	6.55	6.10	0.15	0.41
Body and texture	7.28	6.28	6.20	0.35	0.96
Color and appearance	7.71	6.79	6.12	0.46	1.27
Overall acceptability	7.06	6.28	6.10	0.29	0.81
C.D. (P=0.05)					

Table 2 : Effect of level of jaggery on sensory quality of sapota (8 % pulp) milk shake (Mean of three replication)

Sensory attributes	Level of jaggery (%)			S.E.	C.D.
	7	8	9		
Flavour	7.11	7.00	6.22	0.28	0.77
Taste	7.11	6.10	6.05	0.34	0.96
Body and texture	7.33	6.33	6.30	0.33	0.94
Color and appearance	7.79	6.61	6.09	0.50	1.39
Overall acceptability	7.28	6.17	6.16	0.37	1.03
C.D. (P=0.05)					

Table 3 : Effect of level of jaggery on sensory quality of sapota (9% pulp) milkshake (Mean of three replication)

Sensory attributes	Level of jaggery (%)			S.E.	C.D.
	7	8	9		
Flavour	6.90	6.80	6.55	0.10	0.28
Taste	7.00	6.11	6.12	0.29	0.82
Body and texture	7.28	6.28	6.22	0.34	0.95
Color and appearance	6.96	6.40	6.00	0.27	0.77
Overall acceptability	7.17	6.10	6.22	0.33	0.94
C.D. (P=0.05)					

like very much to like extremely.

Table 3 showed that the mean score for the taste attributes of milk shake it was in the range of 6.11 to 7.00. The product prepared with 7 per cent jaggery was significantly superior over rest of the treatments. Addition of jaggery in the blend beyond 7 per cent reduced the score for consistency.

It is evident from Table 3 that the overall acceptability score of milk shake for various treatments varied between 6.10 to 7.17. The mean overall acceptability score for the product prepared with 7, 8 and 9 per cent jaggery was 7.17, 6.10 and 6.22, respectively. The product prepared with 7 per cent jaggery (7.17) was most acceptable by the judges, so blending of 7 per cent jaggery in the blend was most acceptable than other

treatment combinations. The present investigation collaborates / similar with that of Dhupal *et al.* (1996), Kshirsagar (1996), Taware (2000), Kadav (2001), Salunkhe (2002), Hanwate (2003), Sawant *et al.* (2006), Rupnar (2006), Poul *et al.* (2009a) and Pakalwad *et al.* (2010).

Effect of level of jaggery on chemical quality of sapota (7 % pulp) milk shake :

The effect of level of jaggery on chemical quality of sapota milk shake prepared with 7 per cent pulp was studied and presented in Table 4. It could be seen from the table the protein contents for levels of jaggery *i.e.* 7, 8 and 9 were significantly ($P<0.05$) decreased to 2.50, 2.40, 2.32; fat significantly ($P<0.05$)

Table 4 : Effect of level of jaggery on chemical quality of sapota (7% pulp) milk shake (Mean of three replication)

Chemical constituents	Level of jaggery (%)			S.E.	C.D.	Results
	7	8	9			
Protein (%)	2.50	2.40	2.32	0.05	0.14	Sig.
Fat (%)	3.63	3.48	3.36	0.08	0.22	Sig.
Non-reducing sugar (%)	5.11	5.22	5.33	0.06	0.17	Sig.
Reducing sugar (%)	4.32	4.40	4.42	0.03	0.08	Sig.
Iron (mg/100g)	1.03	1.08	1.27	0.07	0.20	Sig.
Ash (%)	0.52	0.71	0.91	0.11	0.31	Sig.
Total solids (%)	15.03	15.83	16.52	0.43	1.19	Sig.
Acidity (%)	0.16	0.16	0.17	0.003	--	NS
C.D. (P=0.05)	Sig.: Significant,			NS : Non-significant		

Table 5 : Effect of level of jaggery on chemical quality of sapota (8% pulp) milk shake (Mean of three replication)

Chemical constituents	Level of jaggery (%)			S.E.	C.D.	Results
	7	8	9			
Protein (%)	2.43	2.35	2.31	0.04	0.10	Sig.
Fat (%)	3.52	3.41	3.35	0.05	0.14	Sig.
Non-reducing sugar (%)	5.13	5.27	5.38	0.07	0.20	Sig.
Reducing sugar (%)	4.41	4.47	4.52	0.03	0.09	Sig.
Iron (mg/100g)	1.17	1.25	1.29	0.04	0.10	Sig.
Ash (%)	0.53	0.80	0.95	0.12	0.34	Sig.
Total solids (%)	15.20	15.85	16.59	0.40	1.11	Sig.
Acidity (%)	0.16	0.17	0.17	0.003	--	NS
C.D. (P=0.05)	Sig.: Significant,			NS : Non-significant		

Table 6 : Effect of level of jaggery on chemical quality of sapota (9% pulp) milk shake (Mean of three replication)

Chemical constituents	Level of jaggery (%)			S.E.	C.D.	Results
	7	8	9			
Protein (%)	2.34	2.30	2.26	0.02	0.06	Sig.
Fat (%)	3.39	3.34	3.28	0.03	0.09	Sig.
Non-reducing sugar (%)	5.17	5.29	5.42	0.07	0.20	Sig.
Reducing sugar (%)	4.50	4.55	4.62	0.03	0.10	Sig.
Iron (mg/100g)	1.45	1.56	1.63	0.05	0.14	Sig.
Ash (%)	0.60	0.86	1.00	0.12	0.32	Sig.
Total solids (%)	15.30	15.88	16.65	0.39	1.08	Sig.
Acidity (%)	0.17	0.18	0.18	0.003	--	NS
C.D. (P=0.05),	Sig. : Significant,			NS : Non-significant		

decreased to 3.63, 3.48, 3.36; non-reducing sugar significantly ($P<0.05$) increased to 5.11, 5.22, 5.33; reducing sugar significantly ($P<0.05$) increased to 4.32, 4.40, 4.42; iron significantly ($P<0.05$) increased to 1.03, 1.08, 1.27 (mg/100g); ash significantly ($P<0.05$) increased to 0.52, 0.71, 0.91 and acidity was also ($P<0.05$) increased to 0.16, 0.16, 0.17 per cent, respectively but non-significant.

The protein and fat content decreased with increase in levels of jaggery. Initially protein and fat content was 2.50, 3.63 per cent, respectively, which was then decreased to 2.32, 3.36 per cent, respectively. Protein and fat content of milk shake prepared with 7 per cent pulp significantly ($P<0.05$) affected with different level of jaggery. It was seen that with the increase in jaggery level there was decrease in the protein and fat level. The reason might be due to jaggery not to be obtain protein and fat therefore as jaggery level increased the protein and fat level decreased significantly in the end product. The non-reducing sugar, reducing sugar, iron, ash, total solids and acidity content increased with increase in levels of jaggery, because jaggery (Singh, 1998 and Rao *et al.*, 2007) have all these constitute.

Present observations on percentage of chemical constituents of milk shake in particular inline with Taware (2000), Hanwate (2003) and Rupnar (2006). Singh, (1998) Reported that chemical composition of jaggery in percentage of sucrose (65-85 %), reducing sugars (10-15 %), total minerals (0.6-0.1 %), calcium (8.0 mg), phosphorus (4.0 mg), iron (11 mg), moisture (3-10 g) and energy (383 Kcal).

Effect of level of jaggery on chemical quality of sapota (8 % pulp) milk shake :

From Table 5 it could be seen from the table the protein contents for levels of jaggery *i.e.* 7, 8 and 9 were significantly ($P<0.05$) decreased to 2.43, 2.35, 2.31; fat significantly ($P<0.05$) decreased to 3.52, 3.41, 3.35; non-reducing sugar significantly ($P<0.05$) increased to 5.13, 5.27, 5.38; reducing sugar significantly ($P<0.05$) increased to 4.41, 4.47, 4.52; iron significantly ($P<0.05$) increased to 1.17, 1.25, 1.29 (mg/100g); ash significantly ($P<0.05$) increased to 0.53, 0.80, 0.95; total solids significantly ($P<0.05$) increased to 15.20, 15.85, 16.59; and acidity was also ($P<0.05$) increased to 0.16, 0.16, 0.17 per cent, respectively but non-significant.

The protein and fat content decreased with increase in levels of jaggery. Initially protein and fat content was 2.43, 3.52 per cent, respectively, which was then decreased to 2.31, 3.35 per cent, respectively. Protein and fat content of milk shake prepared with 8 per cent pulp significantly ($P<0.05$) affected with different level of jaggery. It was seen that with the increase in jaggery level there was decrease in the protein and fat level. The reason might be due to jaggery not to be obtain protein and fat, therefore, as jaggery level increased the protein and fat level decreased significantly in the end product. The non-

reducing sugar, reducing sugar, iron, ash, total solids and acidity content increased with increase in levels of jaggery, because jaggery (Singh, 1998 and Rao *et al.*, 2007) have all these constitute.

Present observations on percentage of chemical constituents of milk shake in particular inline with Taware (2000), Hanwate (2003) and Rupnar (2006).

Effect of level of jaggery on chemical quality of sapota (9 % milk shake :

It could be seen from the Table 6, the protein contents for levels of jaggery *i.e.* 7, 8 and 9 were significantly ($P<0.05$) decreased to 2.34, 2.30, 2.26; fat significantly ($P<0.05$) decreased to 3.39, 3.34, 3.28; non-reducing sugar significantly ($P<0.05$) increased to 5.17, 5.29, 5.42; reducing sugar significantly ($P<0.05$) increased to 4.50, 4.55, 4.62; iron significantly ($P<0.05$) increased to 1.45, 1.56, 1.63 (mg/100g); ash significantly ($P<0.05$) increased to 0.60, 0.86, 1.00; total solids significantly ($P<0.05$) increased to 15.30, 15.88, 16.65; and acidity was also ($P<0.05$) increased to 0.17, 0.18, 0.18 per cent, respectively but non-significant.

The protein and fat content decreased with increase in levels of jaggery. Initially protein and fat content was 2.34, 3.39 per cent, respectively, which was then decreased to 2.26, 3.28 per cent, respectively. Protein and fat content of milk shake prepared with 9 per cent pulp significantly ($P<0.05$) affected with different level of jaggery. It was seen that with the increase in jaggery level there was decrease in the protein and fat content level, the reason might be due to jaggery not to be obtain protein and fat content therefore as jaggery level increased the protein and fat content level decreased significantly in the end product. The non-reducing sugar, reducing sugar, iron, ash, total solids and acidity content increased with increase in levels of jaggery, because jaggery (Singh, 1998 and Rao *et al.*, 2007) have all these constitute.

Present observations on percentage of chemical constituents of milk shake in particular inline with Taware (2000), Hanwate (2003) and Rupnar (2006).

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