Effect of Addition of Sapota Pulp on Physicochemical Attributes of Milk Pudding

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Abstract Milk pudding was prepared from buffalo milk (standardized with 6 per cent fat and 9 per cent SNF) with constant level of sugar (8 per cent by volume of milk) and different levels of (10, 15, 20 and 25 per cent of condensed milk). It was observed that an average 11.20 per cent fat, 46.73 per cent total solids, 7.02 per cent protein, 1.41 per cent ash, 25.04 per cent total sugar and 0.261 per cent acidity.

Key words: Physicochemical attributes Milk pudding, Sapota pulp and CRD.

Introduction: Milk is a food of outstanding interest, not least because it was designed to be a complete food for young growing animals. A balanced diet is essential for proper health and growth. Milk pudding is one of the milk products which have good potential in the world market. Pudding is quite popular in western countries as a dessert and party item. In India, it is considered as a luxury and party product at present. It is produced abroad more frequently at industrial as well as at home level. However, slowly the demand of this product is also increasing in Indian market.

Sapota (*Achras sapota* L.) is considered as energy giving fruit and having high nutritive value. It contains higher percentage of vitamin C. It is rich in carbohydrates and provide good amount of proteins and minerals like calcium, phosphorous and iron. Sapota pulp is used for making sweets and halawas. Sapota is rich source of antioxidants, which helps in lowering incidence of degenerative diseases. The present investigation was undertaken to standardize the technique of manufacturing milk pudding by using sapota pulp. Hence, considering the benefits of fruits in the human diet with respect to its Nutritional, medicinal values and technological properties, it was decided to undertake Research work on, "**Effect of Addition of Sapota Pulp on Physicochemical Attributes of Milk Pudding.**

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Materials and Method

Treatment details

Sapoata pulp was added at different levels viz., 10, 15, 20 and 25 percent on the basis of parts of milk in T1, T2, T3 and T4.

Treatment details:

Preparation of milk pudding blended with sapota pulp following treatment combinations was taken for study:

Level of Sapota pulp

T_1 – 10 per cent of condensed milk

T_2 – 15 per cent of condensed milk

T_3 – 20 per cent of condensed milk

T_4 – 25 per cent of condensed milk

In above all preparation, sugar will be added @ 8 per cent of original volume of milk and gelatin 2 per cent

Preparation of sapota milk pudding

Condensed milk

For preparation of condensed milk Fresh-pooled buffalo milk, preferably from the morning milking was procured from Dairy unit of College of Agriculture, Dapoli. This milk was filtered through 2 folds muslin cloth to remove any visible dirt particles, after that milk was continuously boil in ratio of 2.5:1. In this grounded sugar @ 8 % of original milk was added and contents were mixed thoroughly so that sugar will get dissolved completely. This condensed milk was stored in refrigerator and was used as base material for preparation of sapota milk pudding.

Pudding ingredients

Sugar and Stabilizer (Gelatine) were purchased from the local market.

Sapota pulp

Sapota pulp was prepared from ripened sapota fruits procured from local market as per the procedure given by Jadhav. P.V. (2002): **[11]**

Sapota Fruits
↓
Washing
↓
Peeling
↓
Slicing

↓
De-seeding
↓
Grinding
↓
Pulp

Fig. 1. Flow chart showing study protocol

3.2 Preparation of Pudding

At the time of preparation of pudding for every treatment 500 gm of condensed milk prepared as per procedure. 500 gm of condensed milk was heated slowly at simmering temperature. When temperature reaches upto 45^0C, 10 gm of gelatine was added in this mass. This mixture was mixed thoroughly and after that sapota pulp was added as per treatment i.e. 50 gm for T_1, 75 gm for T_2, 100 gm for T_3 and 125 gm for T_4. After that these contents again mixed well filled in a cups of 30 gm capacity and kept in refrigerator for setting for 3-5 hr. Quantity of each ingredient required for preparation of sapota milk pudding is tabulated hereunder:

Chart 1. List of treatments used for the study

Treatments	**Quantity of ingredients used (g)**		
	condensed milk	**Gelatine**	**Sapota pulp**
T_1	500	10	50
T_2	500	10	75
T_3	500	10	100
T_4	500	10	125

Chemical Analysis

The Strawberry pulp *kulfi* were chemically analyzed for moisture as per the procedure described by ISI: 2785 (1964) [8], fat by ISI: 1224 (part II) (1977) [6], ash by ISI: 1547 (1985) [4], total solids estimated as per the procedure described in ISI: (1981) [11],

Statistical Analysis:

The data obtained will be analyzed statistically by using Completely Randomized Design (CRD) as per Panse and Sukhatme (1985). **[12]**

RESULTS AND DISCUSSION

Table 1 represents the average chemical composition of sapota pulp and condensed milk observed in the study was comparable to that reported by Rajadhyax *et al*. (2000), Ghule (2015). The compositions of sapota pulp are in close agreement with Jadhav (2002), [13,], [2] and [11],

Table 1. Chemical composition of pudding ingredients (per cent)

Ingredient	Total solid	Fat	Protein	Total sugar	Ash	Acidity
Condensed milk	39.60	15.80	9.70	11.90	1.90	0.20
Sapota pulp	23.82	0.96	0.38	16.80	0.42	0.18

The data pertaining to chemical composition and quality of milk pudding influenced by different levels of sapota pulp are presented in Table 2. There were significant decrease in the fat, total solids, total sugar, protein, ash and acidity content of milk pudding with increase in the level of sapota pulp. This is due to lower content of these nutrients in sapota pulp as compared to condensed milk, the major base ingredient of milk pudding.

Table 2. Chemical composition of pudding (per cent)

Constituent	Levels of sapota pulp (per cent)			
	10	15	20	25
Total solids	48.47	47.57	46.73	45.95
Fat	12.05	11.60	11.20	10.90
Protein	7.53	7.27	7.02	6.80
Total sugar	25.66	25.34	25.04	24.76
Ash	1.49	1.45	1.41	1.38
Acidity	0.278	0.270	0.261	0.253

1 Total solids

The observations pertaining to the total solids of milk pudding prepared with different levels of sapota pulp are tabulated in Table 2. The results indicate that the total solids content of milk pudding varied significantly among different levels of sapota pulp. The total solids content gradually decreased from 48.47 to 45.95 per cent with rising levels of sapota pulp.

The average percentage of total solids content at 10, 15, 20, and 25 per cent pulp level was 48.47, 47.57 46.73, 45.95 per cent respectively. This gradual decrease from T_1 to T_4 may be due to lower amount of total solids content in sapota pulp (23.82%). The highest total solids content was noticed at T_1 (48.47%) i.e. pudding prepared with 10 per cent sapota pulp while lowest at T_4 (45.95%) i.e. pudding prepared with 25 per cent sapota pulp.

Holmukhe (2002) used jackfruit pulp for preparation of pudding. T.S. content of jackfruit pulp was 23.92 and he also observed same trend in T.S. content of pudding (reduce from 70.69 to 63.32) with increase in level of jackfruit pulp. **[4]**

2. Fat

The data in respect of the fat content of milk pudding as influenced by different levels of sapota pulp are presented in Table 2. The average fat per cent of pudding at 10, 15, 20 and 25 per cent level was 12.05, 11.60, 11.20 and 10.90 respectively. It observed highest fat content was noticed at T_1 (12.05%) i.e. pudding prepared with 10 per cent sapota pulp and lowest at T_4 (10.90%) i.e. 25 per cent sapota pulp. Due to very low fat content of sapota pulp (0.96 per cent), its addition reduced fat of the final product. It may, however, be noted that the difference in the highest and lowest values for average fat content of pudding as influenced by sapota pulp was only 1.15.

Dhakane (2005) utilize karonda syrup at 4, 8 and 12% for preparation of pudding. The fat contents of karonda syrup were 1.33%. She observed that decreasing trend (9.18 to 8.10) with increasing level of karonda syrup because fat content of syrup less than base material. **[1]**

3. Protein

The data pertaining to the effect of different levels of sapota pulp on the protein content of milk pudding are presented in Table 2. The average protein percentage of pudding at 10, 15, 20 and 25 per cent level was 7.53, 7.27, 7.02 and 6.80 respectively. The variation in the lowest and highest value of protein content of pudding with respect to pulp level was 0.73. The highest protein content was noticed at T_1 (7.53%) i.e. pudding prepared with 10 per cent sapota pulp and lowest at T_4 (6.80%) i.e. 25 per cent sapota pulp. The decrease in the protein content of milk

pudding with the addition of sapota pulp could be attributed to its very low protein content (0.38 %).

Holmukhe (2002) utilize jackfruit pulp for preparation of pudding. Protein content of jackfruit pulp was 1.67. He prepared pudding with 5, 10, 15 and 20 per cent jackfruit pulp. He observed that protein content of pudding decrease (8.043 to 6.96%) with increase in level of jackfruit pulp. **[4]**

4 Total sugar

The observations in respect of total sugar content of milk pudding as influenced by different levels of sapota pulp are presented in Table 2. The total sugar content in milk pudding showed the gradual decrease from 25.66 to 24.76 per cent with the increasing level of sapota pulp. The decrease in sugar content of milk pudding may be due to the low amount of sugar content in sapota pulp (16.8 per cent).The difference between the highest and lowest value was low (0.90). The values were 25.66, 25.34, 25.04 and 24.76 at 10, 15, 20 and 25 per cent level of sapota pulp respectively.

Rajadhyax (1998) studied on preparation of milk pudding by utilizing tender coconut. He noticed sugar content of tender copra as 2.13% and also observed sugar content of pudding decreases (38.55 to 34.16) as level of tender copra increase at 5, 15 & 25% levels. **[13]**

5. Ash

The results presented in Table 2 indicate that ash content in milk pudding varied significantly among different levels of sapota pulp.

It would be seen from the data that the variation in ash content of pudding was significant. The ash content gradually decreased from 1.49 to 1.38 per cent with rising levels of sapota pulp. The average ash content of pudding was 1.43 per cent. The highest ash content was noticed at T_1 (1.49) i.e.10 per cent level of sapota pulp while lowest at T_4 (1.38) i.e.25 per cent level of sapota pulp. The difference between the highest and lowest value of ash content can influenced by different level of sapota pulp was 0.11.

6. Acidity

The data on titratable acidity of milk pudding as influenced by different levels of sapota pulp are tabulated in Table 2. The results indicated that average acidity of milk pudding at 10, 15, 20 and 25 per cent pulp level was 0.278, 0.270, 0.261 and 0.253 respectively. The acidity of the pudding decreased simultaneously with increase in the sapota pulp. The highest acidity level

was found at T_1 (0.278), while the lowest at T_4 (0.253). The difference between highest and lowest value was only 0.025.

Ghule (2015) mentioned average acidity of milk pudding from 0.27 to 0.33 per cent. He showed increasing trend because acidity of mango pulp was 0.41 more than the condensed milk 0.26. **[2]**

Conclusion

From the results of present investigation, it may be concluded that the sapota pulp could be successfully utilized for preparation of milk pudding using gelatin as a jelling agent. The most acceptable quality pudding i.e. (T_3) contained on an average 11.20 per cent fat, 46.73 per cent total solids, 7.02 per cent protein, 1.41 per cent ash, 25.04 per cent total sugar and 0.261 per cent acidity. The most acceptable quality pudding can be prepared by using 20 per cent sapota pulp which was found equally good.

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