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Development of Milk-based *Thabdi* by using Peanut as an Ingredient

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ABSTRACT

Background: *Thabdi* is a milk-based sweet delicacy, produced and consumed widely in the Saurashtra region of Gujarat State. It is characterized with brown colour, granular texture and caramelized flavour. Peanuts being globally popular oil seed crop is considered as good source of fat, protein, carbohydrates, essential amino acids, minerals and other growth-promoting elements. In present study, peanut was included as ingredient for development of milk-based peanut *thabdi.*

Methods: Brief method of milk-based peanut *thabdi* preparation included heat desiccation of milk till pre-pat formation stage, further heating with clarified milk fat (*ghee*) to get desired granular texture, followed by heating with added sugar and roasted peanut powder till desired brown colour is obtained. Fat/solid-not-fat (SNF) ratio of milk, peanut and sugar levels were optimized using response surface methodology.

Result: The fat/SNF ratio of milk 1.11, 21% heat-treated and ground peanut (% w/w of milk solids, dry basis) and 80% sugar (% w/w of milk solids, dry basis) level were found to be optimum with a desirability of 0.92. Optimized *thabdi* samples indicated better acceptability with overall acceptability score of 8.54±0.03 compared to market samples. The product remained acceptable on 21st day with overall acceptability score of 7.21±0.10, when packed and stored at 7±2°C.

Key words: Heat-desiccated product, Peanut, *Thabdi,* Traditional dairy products.

INTRODUCTION

In India, traditional milk products are estimated to account for nearly half of milk produced and their market is growing rapidly (Bandyopadhyay *et al*., 2006). Traditional dairy products are characterized with a distinct flavour, texture and appearance, which are important to consumers in terms of cultural, social and religious reasons (Pal and Raju, 2010). *Thabdi* is a traditional heat-desiccated milk product that is particularly popular in Gujarat, having granular texture and caramelized flavour. *Thabdi* has potential to popularize in other parts of the country, as food processors are looking to diversify product range and hence attracted interest of researchers. Characterization study for *thabdi* was conducted by Patel *et al.* (2012), who observed wide range of quality characteristics of *thabdi* samples being sold in market. Process standardization for preparation of *thabdi* or *thabdi peda* was attempted by Hirpara *et al.* (2015), Krupa *et al.* (2013) and Modha *et al.* (2015). Hirpara *et al.* (2020) later attempted to incorporate *ghee* residue (a byproduct of clarified milk fat manufacture) in *thabdi* preparation.

Peanuts are a globally significant oilseed crop that is a good source of protein, oil, fiber and various health-promoting elements. Peanuts are a good source of fat, protein, carbohydrates, essential amino acids, minerals and other growth-promoting elements. The phytonutrient content of peanuts, which includes resveratrol, phenolic acids, isoflavonoids and phytosterols, has also recently been reported to play significant role in human health and wellbeing (Toomer, 2018). Peanuts, if consumed daily, can aid in prevention of malnutrition (Pelto and Armar-Klemesu, 2011). Food researchers look into of options for creating new value-added products with enhanced nutritional properties without compromising with sensory quality in order to meet consumer expectations. The peanut powder supplemented *burfi* was optimized by Yadav *et al.* (2018). Sejani *et al.* (2022) studied the effect of defatted peanut flour on the composition of the *thabdi peda*. The present study was undertaken to design a technique for the manufacture of milk-based *thabdi using* peanuts as an ingredient.

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MATERIALS AND METHODS

The research work carried out at College of Dairy Science, Amreli, Gujarat, India during 2019-2021. Milk, peanuts (Variety- Gujarat 20) and sugar were purchased from the local markets of Amreli district. The average length and width (n = 50) of grains were the grain were 14.48±0.32 mm and 8.21±0.12 mm, respectively. For processing of peanuts, heating 800 g of sand was heated in stainless steel *karahi* (round bottom shallow pan) till temperature reached 105±2°C in. Raw peanuts (300 g) were added to sand and heated at 105±2°C for 4 min with continuous stirring. Heat-treated peanuts were separated from sand and ground using domestic mixer-grinder after removal of testa and germ. *Thabdi* was prepared adopting the procedure described by Hirpara *et al.* (2015) with modifications. Fat/SNF ratio of milk was adjusted as per formulation indicated in experimental design matrix (Table 1). Milk was subjected to boiling in open pan and desiccation continued till pre-pat formation (2 fold concentration) stage. The mass was maintained for 10 min. Desiccation continued with the addition of ghee at a rate of 1.2% (% w/w milk basis) till grains are observed. Ground sugar and peanut powder were added as per experimental design matrix (Table 1) and desiccation was continued until desired colour is obtained. The product was then emptied in stainless steel tray and spread to the desired thickness and cut into cuboid shapes.

Response surface methodology tool of Design-Expert (V-10) software was used to study the effect of fat/SNF ratio, peanut and sugar level on the sensory quality of milk-based peanut *thabdi* and their levels were optimized using numerical optimization technique. Lower and higher levels for fat/SNF ratio, peanut and sugar level were 0.6 and 1.5, 21 and 80 (%w/w milk solids, dry basis) and 45 and 80% (%w/w milk solids, dry basis), respectively for design of experiments. Experimental design matrix as suggested by Design-Expert (V-10) is presented in Table 1. The optimized formulation of milk-based peanut *thabdi* obtained as a result of numerical optimization was prepared, vacuum packed in 75 μ LDPE pouch and stored at 7±2°C. Packed samples were evaluated at regular intervals of 0, 7, 14, 21 and 28 days for changes in physicochemical, microbiological and sensory qualities. The moisture, fat (Mojonnier method), protein (Microkjeldahl method), ash and acidity of milk-based peanut *thabdi* was estimated by adopting procedure mentioned in SP: 18 Part XI (1981). The pH was measured using a pH meter (Oakton, Model PC 2700) by dissolving 1 g of sample in 10 ml warm distilled water. The method outlined by Thomas *et al.* (1954) was used to determine the free fatty acids (FFA). Using a water activity meter (Novasina, Switzerland), the water activity (aw) of milk-based peanut *thabdi* samples was measured at a temperature of 25°C. Microbiological examination such as standard plate count, coliform count and yeast and mould count was enumerated using SP-18 Part XI (1981) procedures. Texture profile analysis of milk-based peanut *thabdi* and market samples of *thabdi* was carried out using a TA-XT plus Texture Analyzer (Stable Microsystem). Compression was applied to the samples using a P/25 cylindrical probe and characteristics such as hardness, cohesiveness, springiness, resilience and gumminess were measured. The pre-test and test speeds were maintained at 1.0 mm/s. Post-test speed remained constant at 5.00 mm/sec. The probe was allowed to travel in the samples to a depth of 8.00 mm. Sensorial assessment of the milk-based peanut *thabdi* was performed using 9 points hedonic scale (9=like extremely; 1=dislike extremely). Sensory evaluation was performed by eight panelists and tested for colour and appearance, body and texture, flavour and overall acceptability. For optimization, the mean scores of the eight panelists for specific attributes were considered as responses. Design-Expert software was used to analyse the data obtained during optimization trials. Significant differences between mean values were assessed by analysis of variance (ANOVA) tests at p-value of 0.05.

RESULTS AND DISCUSSION

Milk-based peanut *thabdi* was prepared using different formulation, as suggested by the Design-Expert software and effect of Fat/SNF ratio, peanut and sugar levels on sensory quality is presented in Table 1. Regression equation to predict the sensory responses are presented in Table 2.

Effect of the fat/SNF ratio of milk, peanut and sugar level on sensory attributes of milk-based peanut *Thabdi*

Colour and appearance

The regression analysis of the colour and appearance score presented in Table 3 reveals that the coefficient of determination (R^2) for the quadratic model of colour and appearance was 0.86. The adequate precision value was found to be 10.60 appreciably higher than the minimum desirable 4 (for high prediction ability), indicating that this model was highly significant ($p<0.01$). The effect of peanut and sugar levels were found to be significant on colour and appearance at $p<0.05$ and $p<0.01$ level of significance, respectively. The effect of the sugar and peanut level on the colour and appearance score of milk-based peanut *thabdi* is shown in Fig 1a. An increase in the level of peanut initially leads to an increase in the colour and appearance score, but at higher levels, the colour and appearance score decreased. The sugar level had major influence on the development of desired colour and appearance of milk-based peanut *thabdi.* Increase in sugar content lead to increase in colour and appearance score of milk- based peanut *thabdi* (Fig 1a). Krupa *et al.* (2013) noticed a constant increase in the colour and appearance score of *thabdi* when the amount of sugar added to *thabdi* was increased from 6% to 10% and also observed that extended heating period may indicated detrimental effect on the colour and appearance of *thabdi.* Increase in 5-hydroxymethyl furfural (HMF) concentration was reported by previous workers with increase in sugar levels, probably as a result of maillard browning and caramelization occurring during production.

Body and texture

The body and texture scores of milk-based peanut *thabdi* ranged from 7.00 to 8.83. The coefficient of determination (R^2) for the quadratic model was 0.72. The regression analysis of the data presented in Table 3 reveals adequate precision value of 9.82. The effect of sugar level on the body and texture scores was highly significant ($p<0.01$). Modha *et al.* (2015) reported that increased sugar and fat levels improved body and texture scores on a linear level, resulting in a soft body and smooth granules in *thabdi peda*. A similar trend was observed in our study for the milk-based peanut *thabdi.* Minimum and maximum scores

Table 1: Effect of fat/SNF ratio, peanut and sugar levels on the sensory attributes of milk based peanut *thabdi.*

Experiment number	Variables			Sensory scores			Overall acceptability
	Fat/SNF ratio of milk	Peanut level	Sugar level	Colour and appearance	Body and texture	Flavour	
1	1.05	50.50	91.93	9.00	8.70	8.70	8.80
2	0.60	80.00	45.00	8.00	8.00	8.33	8.17
3	1.81	50.50	62.50	8.50	8.60	8.70	8.50
4	1.50	80.00	45.00	7.50	8.17	7.50	7.50
5	0.29	50.50	62.50	8.00	8.33	8.17	8.00
6	1.05	50.50	62.50	8.40	8.00	8.00	8.00
7	1.05	50.50	62.50	8.00	8.00	8.00	8.00
8	1.50	21.00	80.00	8.67	8.00	8.83	8.67
9	1.50	21.00	45.00	7.67	7.50	8.00	7.83
10	1.05	50.50	62.50	8.00	8.00	8.00	8.00
11	1.05	50.50	33.07	7.50	7.50	7.80	7.80
12	1.05	50.50	62.50	8.00	8.00	8.00	8.00
13	1.05	50.50	62.50	8.10	8.20	8.10	8.20
14	1.50	80.00	80.00	7.83	8.17	7.33	7.50
15	1.05	50.50	62.50	8.00	8.00	8.00	8.00
16	0.60	80.00	80.00	8.33	8.17	8.67	8.50
17	0.60	21.00	45.00	7.67	7.00	7.83	7.67
18	0.60	21.00	80.00	8.33	8.83	8.67	8.67
19	1.05	100.11	62.50	6.67	7.67	7.33	7.17
20	1.05	0.89	62.50	7.83	8.17	8.50	8.67

Table 2: Regression equation for prediction of sensory quality of milk-based peanut *thabdi.*

Sensory response	Equation
Colour and appearance	$6.65 - 0.48A + 0.05B - 0.005C - 0.01AB + 0.005AC - 0.0002BC + 0.39A^2 - 0.0003B^2 + 0.0003C^2$
Body and texture	$3.81 + 1.30A + 0.029B + 0.07C + 0.005AB - 0.024AC - 0.0005BC$
Flavour	$4.93 + 1.53A + 0.039B + 0.04C - 0.02AB - 0.008AC - 0.0004BC$
Overall acceptability	$5.07 + 1.26A + 0.03B + 0.04C - 0.02AB - 0.008AC - 0.0004BC$

Where: A = Fat/SNF ratio of milk; B = Peanut level; C = Sugar level.

Table 3: ANOVA of fat/SNF ratio, peanut and sugar levels on the sensory quality of milk-based peanut *thabdi.*

Source	Colour and appearance	Body and texture	flavour	Overall acceptability
Model	6.65**	2.408**	2.856**	2.846**
A-Fat/SNF ratio of milk	0.48	0.006	0.064	0.032
B-Peanut level	0.506*	0.008	0.878**	0.997**
C-Sugar level	1.727**	1.495**	0.820**	1.084**
AB	0.222	0.031	0.781**	0.420*
AC	0.014	0.281	0.031	0.031
BC	0.125	0.587*	0.281	0.281
Adequate precision value	10.60	9.82	9.14	9.06
R^2	0.86	0.72	0.74	0.75

**Significant at $p< 0.01$; *Significant at $p<0.05$.

for body and texture score were obtained for experiment number 17 and 18, respectively (Table 1). Increasing sugar levels increased the body and texture scores of milk-based peanut *thabdi* (Fig 1b). The interaction between sugar and peanut levels was significant ($p<0.05$).

Flavour

Flavour is undoubtedly the most essential criterion for determining acceptance of a new product to consumers. The flavour score of milk-based peanut *thabdi* ranged from 7.33 to 8.83. The regression analysis of the data presented in Table 3 revealed that the coefficient of determination (R^2) for the quadratic model was 0.74. Furthermore, the statistical analysis indicated that the model fitted the observed data well with adequate precision value of 9.14 and model was highly significant ($p<0.01$). Peanut and sugar levels significantly ($p<0.01$) affected the flavour score of milk-based peanut *thabdi.* Maximum flavour score of 8.83 was found for the experiment number 8 in Table 1. Modha *et al.* (2015) reported during study on *thabdi peda* noted that owing to enhanced sweetness and caramelized flavour, sugar has a linear positive influence on the flavour score of *thabdi peda.* Fig 1c also revealed that as sugar levels increased, the flavour score of the milk-based peanut *thabdi* formulation also increased.

Overall acceptability

The coefficient of determination (R^2) for the quadratic model was 0.75 (Table 3). The adequate precision value was found to be 9.06 which was appreciably higher. The minimum (7.17) and maximum (8.80) overall acceptability score was obtained for the formulation indicated in experiment number 19 and 1, respectively. The effect of peanut and sugar levels on the overall acceptability score of milk-based peanut *thabdi* were highly significant ($p<0.01$). The effect of peanut and sugar levels on the overall acceptability score of milk-based peanut *thabdi* is shown in Fig 1d. Similar trends were also for *thabdi peda* samples by Modha *et al.* (2015), who observed that positive influence of milk fat and sugar level on the overall acceptability of *thabdi peda.*

Optimization of milk-based peanut *thabdi*

Optimization was aimed at achieving the best levels of factors such as Fat/SNF ratio of milk, peanut and sugar levels based on maximizing reponses obtained for sensory scores. A Fat/SNF ratio of milk 1.11, 21% heat-treated and ground peanut level (% w/w of milk solids, dry basis) and 80% sugar level (% w/w of milk solids, dry basis) were found to be optimum as a result of numerical optimization with a desirability of 0.920. The optimized milk-based peanut *thabdi* had a total solids content of 82.58±0.2%, moisture content of 17.42±0.2%, fat content of 28.5±0.36%,

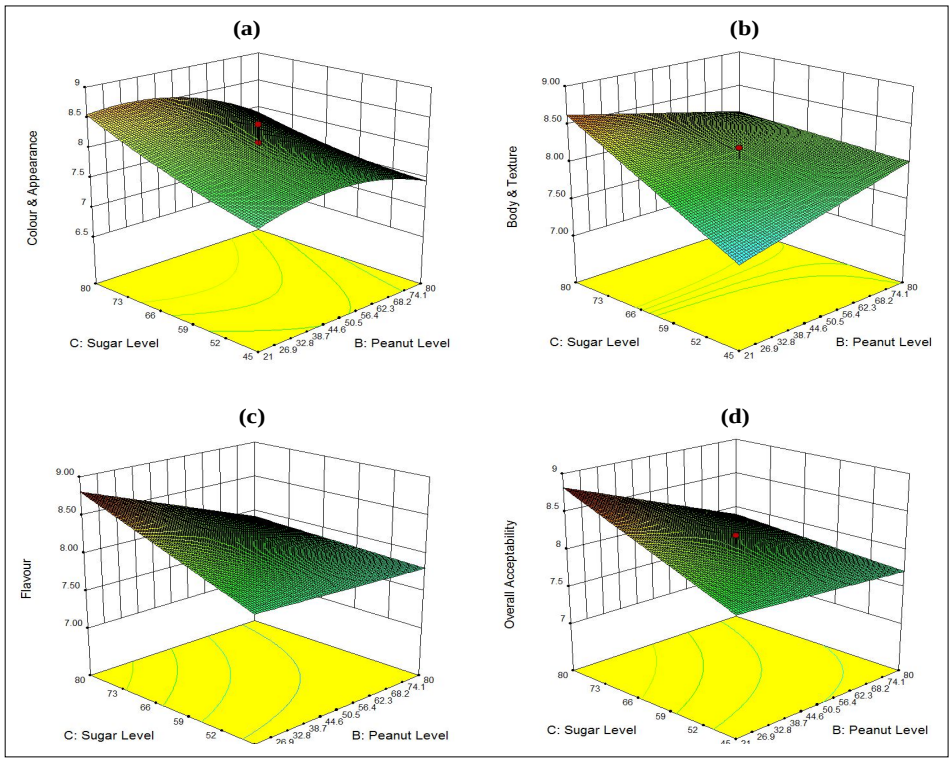


Fig 1: Response surface plot of sensory attributes: Colour and appearance score (a); Body and texture score (b); Flavor score (c); and overall acceptability score (d); as influenced by peanut level and sugar level.

protein content of 8.4±0.26%, ash content of 2.52±0.05% and carbohydrate content of 43.16±0.37% (Table 4). Optimized formulation of peanut powder-supplemented *burfi* suggested by Yadav *et al.* (2018) contained 10% peanut powder, 80% khoa and 20% sugar.

Compositional aspects

The comparison between the optimized formulations with two market samples (A and B) in terms of compositional parameters is given in Table 4. Market sample B contained the highest total solids (83.51 ±0.09%), ash (2.31±0.08%) and carbohydrates (49.5±0.47%), whereas market sample A contained the highest moisture (20.18±0.11%) and protein (13.5±0.28%). The optimized formulations had a higher fat level (28.5±0.36%) than the market samples (A and B), which might be due to use of peanut ingredient (Table 4).

Textural parameters

The texture of the popular market *thabdi* has firm to slightly loose grains with small pools of liquid fat or solid fat on the surface. Table 4 shows the comparison between the optimized formulations with two market samples (A and B) in terms of textural parameters. The hardness and springiness of the optimized product and market samples

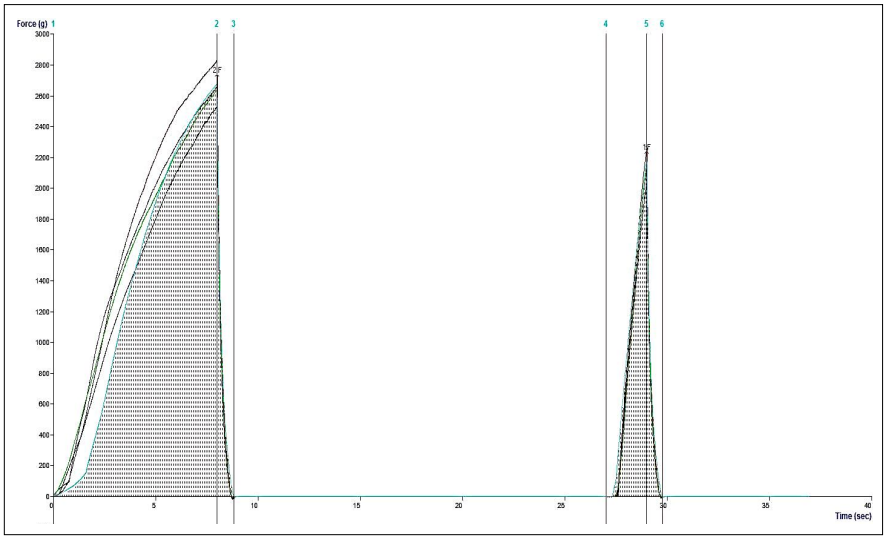


Fig 2: Textural profile analysis of milk-based peanut *thabdi.*

Table 4: Comparison of milk-based peanut *thabdi* with market samples in terms of compositional, textural and sensory quality.

Parameters	Market samples		Optimized formulation
	A	B	
Compositional attributes			
TS (%)	79.82±0.11^{a}	83.51±0.09^{c}	82.58±0.2^{b}
Moisture (%)	20.18±0.11^{a}	16.49±0.09^{c}	17.42±0.2^{b}
Fat (%)	24.83±0.24^{a}	19.42±0.35^{c}	28.5±0.36^{b}
Protein (%)	13.5±0.28^{a}	12.28±0.2^{c}	8.4±0.26^{b}
Ash (%)	2.25±0.06^{a}	2.31±0.08^{ab}	2.52±0.05^{b}
Carbohydrate (%)	39.25±0.55^{a}	49.5±0.47^{c}	43.16±0.37^{b}
Textural attributes			
Hardness (g)	427.196±19.56^{a}	3134.467±52.43^{c}	2706.218±42.73^{b}
Springiness (s)	0.257±0.006^{c}	0.157±0.11^{a}	0.208±0.13^{b}
Cohesiveness	0.25±0.10^{b}	0.151±0.03^{a}	0.168±0.11^{a}
Gumminess (g)	106.269±4.45^{a}	474.536±13.03^{b}	454.637±28.56^{b}
Resilience	0.064±0.004^{b}	0.037±0.009^{a}	0.045±0.003^{a}
Sensory quality			
Colour and appearance	8.46±0.04^{b}	7.96±0.07^{a}	8.54±0.03^{b}
Body and texture	8.48±0.08^{b}	7.9±0.08^{a}	8.34±0.08^{b}
Flavour	8.54±0.04^{b}	7.96±0.10^{a}	8.49±0.04^{b}
Overall acceptability	8.53±0.05^{b}	8.01±0.08^{a}	8.48±0.03^{b}

Values in each cell represent mean±SE, (n=3, 5, 8 for compositional, textural and sensory attributes, respectively).
Means with different superscript in a row vary significantly ($p<0.05$).

(A and B) were significantly different ($p<0.05$). Market sample A has the maximum springiness, cohesiveness and resilience, whereas market sample B has the maximum hardness and gumminess. Textural profile Analysis of milk-based peanut *thabdi* is shown in Fig 2.

Sensory characteristics

The popular market *thabdi* had brown to dark brown colour, rich nutty, cooked, ghee-like flavour and characteristic granular texture. The comparison between the optimized formulations with two market samples (A and B) for sensory quality is presented in Table 4. The sensory attributes of the optimized formulation of milk-based peanut *thabdi, viz*. colour and appearance, body and texture, flavour and overall acceptability, were significantly different ($p<0.05$) from those of market sample B. However, the optimized products were comparable to those of market sample A.

Effect of refrigerated storage on the physicochemical, sensory and microbial quality of milk-based peanut *thabdi*

Optimized milk-based peanut *thabdi* was prepared, vacuum packed in a 75 μ LDPE pouch and stored in a refrigerator at 7±2°C for 28 days. The data pertaining to changes in the physicochemical, sensory and microbial qualities of milk-based peanut *thabdi* are given in Table 5. The initial moisture content of the milk-based peanut *thabdi* was 17.42±0.202%. There was no significant decrease in moisture content at the end of 28 days of storage under refrigeration (Table 5). However, the water activity of the milk-based *thabdi* samples decreased significantly during storage. The findings for water activity by Londhe *et al.* (2012) also indicated that storing brown *peda* 30°C causes decrease water activity due to loss of moisture during storage.

The initial titratable acidity (% lactic acid) of milk-based peanut *thabdi* was 0.315 which increased to 0.387 after 28 days of storage (Table 5). A significant ($p<0.05$) increase in acidity was observed during refrigerated storage of the samples after 28 days of storage. At 30°C the acidity of brown *peda* were reported to increase considerably in various techniques of packaging (Londhe *et al*., 2012). According to Sharma *et al.* (2003), the acidity of *malai* peda increased during storage when packed in Poster Paper/Al-foil/LDPE. Sachdeva and Rajorhia (1982) also noted increased in acidity during the storage of *burfi*. The pH of the samples significantly ($p<0.05$) decreased after 7, 14 and 28 days of storage. Kumar *et al.* (1997) noted that the pH of *peda* dropped while during storage at a temperature of 20°C.

The free fatty acids (FFA) content of fresh milk-based peanut *thabdi* samples was 0.85 (% oleic acid), which increased significantly ($p<0.05$) after 21 days of storage at 7±1°C (Table 5). Comparable rise in free fatty acid concentration in brown *peda* samples during storage was also reported by Londhe *et al.* (2012). Increase in FFA of milk-based peanut *thabdi* samples could be attributed to the metabolic activity of microorganisms during storage (Samaržija *et al*., 2012). There was a significant ($p<0.05$) increase in the hardness (g) of the milk-based peanut *thabdi samples* from 2706 to 3080 during 28 days of storage under refrigeration, which could be attributed to the loss of moisture during storage which depends on the type of package and storage conditions.

Enumeration of standard plate count (SPC) and yeast and mould (Y and M) count of milk-based peanut *thabdi* samples revealed a significant increase from the initialcount of 3.57 and 1.23 log cfu/g to 4.37 and 3.97 log cfu/g, (Table 5), respectively when stored under refrigeration for 28 days.

Table 5: Physico-chemical, sensory and microbial changes of milk-based peanut *thabdi* during refrigerated storage.

	Storage interval				
	0 day	7 day	14 day	21 day	28 day
Physico-chemical quality					
Moisture (%)	17.42±0.202^{a}	17.41±0.102^{a}	17.37±0.034^{a}	17.3±0.027^{a}	17.12±0.032^{a}
Acidity (% lactic acid)	0.315±0.003^{b}	0.322±0.004^{b}	0.341±0.007^{b}	0.346±0.018^{b}	0.387±0.007^{a}
pH	6.48±0.015^{a}	6.38±0.026^{b}	6.31±0.031b^{c}	6.24±0.019^{c}	6.02±0.033^{d}
FFA (% oleic acid)	0.85±0.025^{c}	0.868±0.012^{c}	0.91±0.006b^{c}	0.968±0.009^{b}	1.045±0.03^{a}
Water activity (a_w)	0.81±0.002^{a}	0.809±0.001^{a}	0.796±0.002^{b}	0.787±0.001^{c}	0.783±0.001^{c}
Hardness (g)	2706.218±42.728^{e}	2782.495 ± 6.858^{d}	2867.718±9.165^{c}	2963.277± 12.573^{b}	3080.687±30.264^{a}
Sensory quality					
Colour and appearance	8.51±0.026^{a}	8.34±0.09^{a}	8.21±0.149^{a}	7.43±0.13^{b}	6.93±0.13^{c}
Body and texture	8.43±0.071^{a}	8.17±0.089^{a}	7.5±0.154^{b}	7.36±0.143^{b}	6.57±0.17^{c}
Flavour	8.47±0.036^{a}	8.36±0.051^{a}	7.69±0.078^{b}	7.29±0.101^{c}	6.5±0^{d}
Overall acceptability	8.47±0.029^{a}	8.29±0.101^{a}	7.64±0.092^{b}	7.21±0.101^{c}	6.43±0.071^{d}
Microbial quality					
Standard plate count (log cfu/g)	3.57±0.145^{b}	3.87±0.033^{b}	4.27±0.088^{a}	4.33±0.145^{a}	4.37±0.067^{a}
Yeast and mould count (log cfu/g)	1.23±0.133^{d}	1.77±0.088^{c}	2.07±0.088^{c}	2.6±0.265^{b}	3.97±0.067^{a}
Coliform count (log cfu/g)	nd	nd	nd	nd	nd

Values in each cell represent mean±SE, (n=3 for physico-chemical and microbial quality, n=4, 8 for hardness and sensory quality, respectively). $^{a\text{-}b\text{-}c\text{-}d\text{-}e}$ Means with different superscript in a row vary significantly ($p<0.05$).

Coliform count was not detected when the first dilution was plated on violet red bile agar (VRBA). Storage study of *burfi* at 30°C and 5°C by Sachdeva and Rajorhia (1982) reported increase in SPC and YandM count. The SPC as well as YandM during storage of brown *peda* was observed (Londhe *et al*., 2012). Rise in SPC during the storage of *burfi* was also observed by many researchers (Garg and Mandokhot, 1987; Misra and Kuila, 1988).

Changes in the sensory quality of milk-based peanut *thabdi* samples were significant when packed samples were stored at 7±2°C for 28 days (Table 5). The colour and appearance score of milk-based peanut *thabdi* significantly ($p<0.05$) decreased after 21 days of storage. The body and texture scores of milk-based peanut *thabdi* significantly ($p<0.05$) decreased after 14 days of storage. The flavour score of milk-based peanut *thabdi* significantly ($p<0.05$) decreased after 14 days of storage. The overall acceptability score of milk-based peanut *thabdi was* significantly ($p<0.05$) reduced from 8.47 to 7.43 at the end of 21 days of storage, which further reduced to 6.93. Hence, milk-based peanut *thabdi can* be acceptably stored in a 75 µ LDPE pouch at refrigerated temperature (7±2°C) for 21 days. Shelf life of malai *peda* as affected by modified atmosphere packaging (MAP) was examined by Sharma *et al.* (2003). Author reported that malai *peda* packed in Poster Paper/ Al-foil/LDPE and stored at 11°C and 52% RH, the product was acceptable for up to 31 days. Packaging techniques such as vacuum packaging and MAP were reported to enhance the shelf life of brown *peda* samples when compared to conventional packaging (Londhe *et al.,* 2012).

CONCLUSION

Peanuts were successfully incorporated as an ingredient in the preparation of milk-based peanut *thabdi.* Heat treatment of peanuts at 105±2°C for 4 min in sand improved the sensory quality of the product. *Thabdi* prepared using milk of 1.11 Fat/SNF ratio, 21% heat-treated and grinded peanut (% w/w of milk solids, dry basis) and 80% sugar (% w/w of milk solids, dry basis) were found to be optimum based on sensory scores, which remained stable up to 21 days when vacuum packed and stored at 7±2°C.

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Conflict of interest

All authors declare that they have no conflict of interest.

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