

## Original Research Article

### Studies on Effect of Fat Levels on Quality of Peda

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#### ABSTRACT

Dietary fat is a topic of intense discussion, mostly from the point of view of energy reduction. In a recent study, fat content was the most important motivator in the choice of calorie-reduced dairy products. In the present investigation an attempt has been made to study the chemical and sensory evaluation of *peda* at different treatment combinations. Results related to proximate composition, mean chemical composition, sensory attributes of *peda* control (T<sub>1</sub>) and *peda* with different level of milk fat viz. 4.5, 3, and 1.5 per cent (T<sub>2</sub> T<sub>3</sub> and T<sub>4</sub>) are as, from the results it was observed that, use of different level of milk fat viz. 6, 4.5, 3, and 1.5 per cent decrease in moisture from 19.76 to 18.54% and fat 18.36 to 12.53%, increase in protein from 14.38 to 17.70%, total sugar 44.68 to 47.95%, total solid 80.25 to 81.46 and ash 2.83 to 3.29% in finished product. Control *peda* rated highest score for colour and appearance (8.63), body and texture (8.75), sweetness (8.75), flavour (8.63) and overall acceptability (8.75) than *peda* prepared from different milk fat. The score was significantly higher than the *peda* with different level of milk fat that is 4.5, 3, and 1.5 per cent. However, control *peda* and *peda* with 4.5 per cent level of milk fat was rated good and acceptable. The cost of production (per kg) of control *peda* (T<sub>1</sub>) and *peda* prepared different fat level of milk that is 4.5, 3, 1.5 per cent, T<sub>2</sub> T<sub>3</sub> and T<sub>4</sub>, were Rs. 180.63, Rs.183.55, Rs. 192.97, and Rs. 194.68, respectively.

#### Keywords

Effect of fat levels on chemical composition, Sensory evaluation and cost of *peda*

## Introduction

India rank first in the world with record production of 146.31 million tons of milk per annum with per capita availability 302 gm/day (2015-16).

Out of the total milk produced in India, 46 per cent is consumed as liquid milk, 4 per cent converted into western milk products such as milk powders, processed butter and processed *cheese* and remaining 50 per cent is converted into traditional dairy products such as *Ghee/ Makhan* (clarified *butter*), *Dahi* (*Yoghurt*-like), *Khoa* (Partially desiccated milk product) and *Chhana* and

*Paneer* (unprocessed *cottage cheese*). Out of these 7 per cent of milk is used for the manufacture of *khoa* based sweets as *peda*, *burfi*, *kalakand*, *milkcake* etc. (*Handbook on Technology of Indian Milk Products*).

Buffalo milk is preferred over cow and goat for preparation of milk products such as *paneer*, *basundi*, *khoa* and *khoa* based sweets (*Peda*, *burfi*, *kalakand*, *gulabjamun* etc.) because it gives soft and uniform body with smooth, compact and homogenous texture to finished products.

*Khoa* occupies a prominent place in traditional dairy products sector. *Khoa* is the product obtained from cow, buffalo, goat or sheep milk/milk solids or a combination thereof by rapid drying of milk having fat content should not be less than 20 per cent of the finished product (PFA, 2002).

Varieties of *khoa* are produced in the market such as *pindi*, *dhap* and *danedar* and used for preparation of *peda*, *burfi*, *gulabjamun* and *kalakand* respectively (De, 1980).

### **Materials and Methods**

Buffalo milk required for the study was procured from the Dairy of Natural Milk Pvt, Ltd, Latur and standardized as per treatment.

### **Treatment details**

T<sub>1</sub> - Buffalo milk of 6 per cent fat + 30 per cent sugar.

T<sub>2</sub> - milk of 4.5 per cent fat + 30 per cent sugar.

T<sub>3</sub> - milk of 3 per cent fat + 30 per cent sugar.

T<sub>4</sub> - milk of 1.5 per cent fat + 30 per cent sugar.

The different levels were tried and compared with control (T<sub>1</sub>).

Milk was standardized by using pearson's square method.

### **Flow diagram for preparation of peda**

The *Peda* was prepared with standardized method separately for each treatment as shown in following flow chart

### **Sensory evaluation**

Sensory evaluation of ginger *pedha* was carried out by a panel of judges comprising "9 point Hedonic scale".

### **Analysis**

The samples of finished product from various treatment combinations were chemically analyzed for moisture (ISI: 2785, 1964), fat (ISI: 1224, Part II, 1977), Protein by Micro Kjeldahl's method (1940), the protein content was obtained by multiplying per cent nitrogen of sample by factor of 6.38 and ash (A.O.A.C 1975), total solid (IS: 1479 part II 1961), Total sugars by the volumetric (Lane-Eynon) method as a described in ISI (1981).

### **Results and Discussion**

#### **Chemical composition**

The mean chemical composition of *peda* (T<sub>1</sub>) and *peda* prepared from different fat level of milk viz. 4.5, 3, 1.5 per cent (T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>) varied treatment wise. It is due to the use of different fat milk for preparation of *peda*. Moisture content in *peda* was observed in range of 19.76 to 18.54%. The highest moisture was observed for T<sub>1</sub> and lowest for T<sub>4</sub>, fat content of *peda* was observed 18.36 to 12.53%. The highest fat was observed for T<sub>1</sub> and lowest for T<sub>4</sub>, protein content in *peda* was observed 14.38 to 17.70%. The highest protein was observed for T<sub>4</sub> and lowest for T<sub>1</sub>, total sugar content was observed 44.68 to 47.95%. The highest was observed for T<sub>4</sub> and lowest for T<sub>1</sub>, total solids content in *peda* was observed 80.25 to 81.46 %. The highest was observed for T<sub>4</sub> and lowest for T<sub>1</sub>, ash content of *peda* was observed 2.83 to 3.29%. The highest was observed for T<sub>4</sub> and lowest for T<sub>1</sub> mean

chemical composition of *peda* is given in table 1.

The similar findings were observed by Sivakumar *et al.*, (2010), Kandeepan *et al.*, (2010), Krupa Hirpara *et al.*, (2016)

### **Sensory Properties**

Mean overall acceptability score decreased from treatment T<sub>1</sub> to T<sub>4</sub>. Mean overall acceptability score was observed 8.75, 8.13, 7.73 and 7.25, respectively.

The treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, found significant different. This might be due to the level of fat in milk used for preparation of *peda*.

The results indicated that the overall acceptability score had decreasing trend with decrease in fat per cent of milk used. Mean overall acceptability score given in table 2.

### **Cost of production**

The cost of the ingredients used in the preparation of *peda* was rated as per the rates (2015-2016) in the prevailing market given in table 3.

The cost of production (per kg) of control *peda* (T<sub>1</sub>) and *peda* prepared different fat level of milk that is 4.5, 3, 1.5 per cent, T<sub>2</sub> T<sub>3</sub> and T<sub>4</sub>, were Rs. 180.63, Rs. 183.55, Rs. 192.97, and Rs. 194.68, respectively. The cost of production of 1 kg *peda* of different fat level of milk for T<sub>2</sub> treatment was Rs. 183.55 which increased to Rs. 192.97 (T<sub>3</sub>) and Rs. 194.68 (T<sub>4</sub>).

Control *peda* scored highest score for all sensory attributes as compared to *peda* prepared with different fat levels of milk that is 4.5, 3, and 1.5 per cent.

Among the *peda* prepared with different fat level of milk viz. 4.5, 3, 1.5 per cent *peda* prepared with 4.5 percent fat milk had highest score than 3 and 1.5 per cent fat milk *peda*.

Decrease in fat per cent of milk decreased fat and moisture.

Protein, total solid, total sugar and ash Per cent increased with decrease in fat level of milk in treated product as compared to control.

Decreased in level of fat the cost of *peda* increased this is due to the decrease in recovery of khoa obtained. Hence the treatment T<sub>2</sub> is superior as compare to control.

The similar findings were observed by Varma *et al.*, (2005) who found that, as the fat level in milk increase the body and texture score of milk cake prepared from cow milk increases significantly.

Sivakumar *et al.*, (2010), during preparation of low fat sweetened *dahi* by addition of soya protein Isolate and carrot juice.

They observed decrease in moisture content of low fat sweetened *dahi* as the level of carrot juice increases.

Amir Hosein *et al.*, (2013), observed that, as the fat content of yogurt decreased by using sesamum oil as fat replacer, the sensory score for colour and appearance was decreased.

Anil Kumar *et al.*, (2014), prepared milk cake by using different fat milk viz.4%, 5% and 6% and reported that, as the level of fat in milk increases it also significantly increases body and texture score for milk cake.

**Table.1** Mean chemical composition of *peda*

Chemical constituents (%)	Moisture	Fat	Protein	Total solid	Total sugar	Ash
T <sub>1</sub>	19.76	18.36	14.38	80.25	44.68	2.83
T <sub>2</sub>	19.36	16.24	15.85	80.64	45.58	2.98
T <sub>3</sub>	19.13	14.31	16.60	80.88	46.78	3.19
T <sub>4</sub>	18.54	12.53	17.70	81.46	47.95	3.29

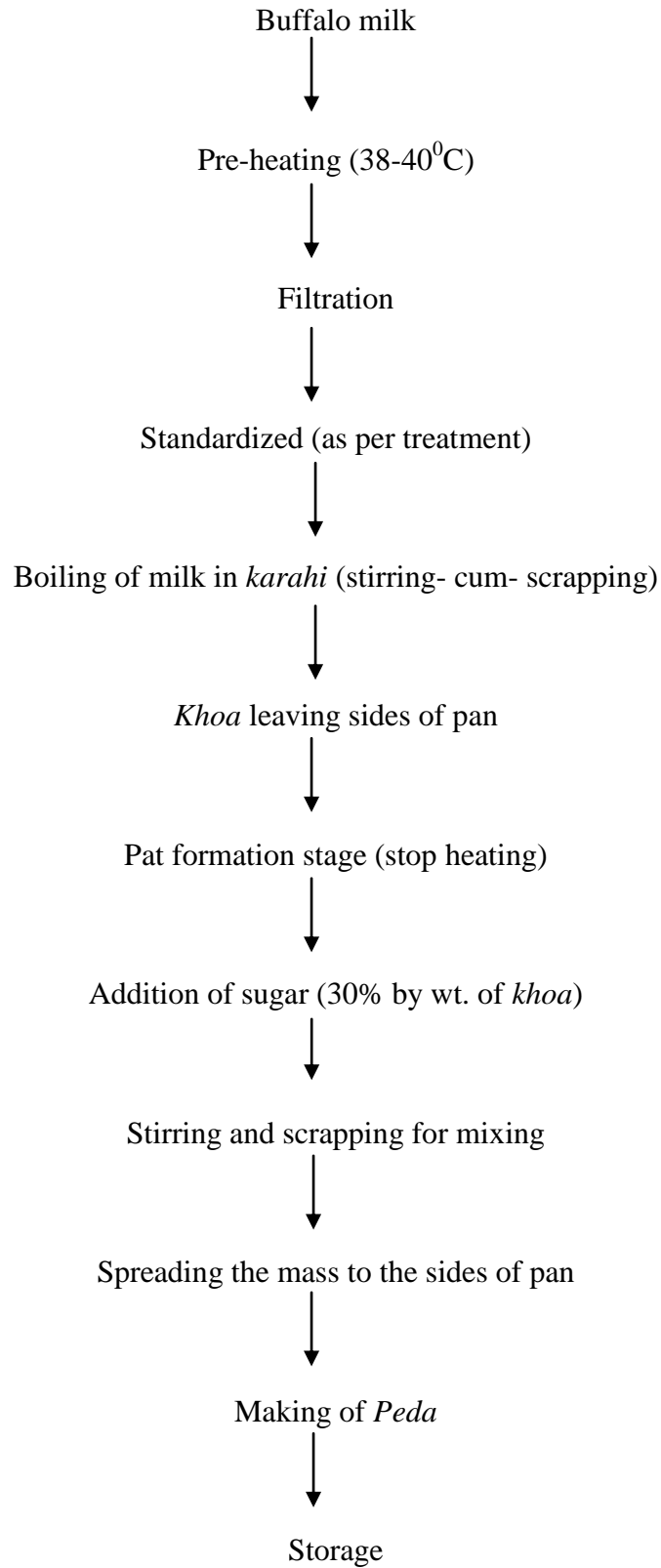
**Table.2** Overall acceptability score of *peda* prepared using different fat level

Treatment	Replication				Overall Acceptability
	Colour & Appearance	Body and Texture	flavour	Sweetness	
T <sub>1</sub>	8.50	9.00	9.00	8.50	8.75 <sup>a</sup>
T <sub>2</sub>	8.00	8.25	8.25	8.00	8.13 <sup>b</sup>
T <sub>3</sub>	7.90	7.50	8.00	7.50	7.73 <sup>c</sup>
T <sub>4</sub>	7.50	7.50	7.00	7.00	7.25 <sup>d</sup>
<b>SE ±0.126</b>					
<b>CD at 5 % =0.390</b>					
Values with different superscripts are significantly different at P < 0.05					

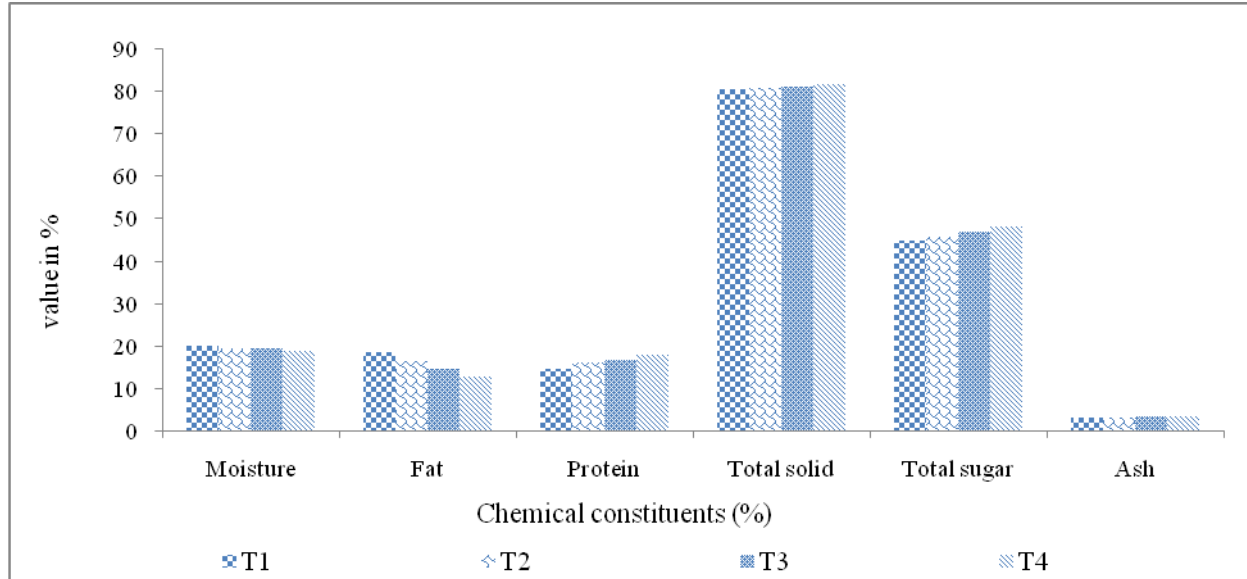
**Table.3** Cost structure of *peda*

Sr. No	Particulars	fat %	Rate Rs	T <sub>1</sub>		T <sub>2</sub>		T <sub>3</sub>		T <sub>4</sub>	
				Qty. Kg	Amt. Rs	Qty. Kg	Amt. Rs	Qty. Kg	Amt. Rs	Qty. Kg	Amt. Rs
1	Milk (lit)	6.0 4.5 3.0 1.5	40 36 34 30	4	160	4	144	4	136	4	120
2	Khoa obtained (kg)	-	-	1	-	0.900	-	0.800	-	0.700	-
3	Sugar (kg)	-	30	0.300	9.60	0.270	8.64	0.240	7.68	0.210	6.72
5	Miscellaneous Charges	-	-	-	10	-	10	-	10	-	10
6	Fuel charges	-	-	-	5	-	5	-	5	-	5
7	Labour charges	-	-	-	15	-	15	-	15	-	15
8	Product obtained (kg)	-	-	1.105	-	995	-	900	-	805	-
9	Total cost for obtained product	-	-	-	199.60	-	182.64	-	173.68	-	156.72
10	Total cost per kg	-	-	-	180.63	-	183.55	-	192.97	-	194.68

**Flow diagram for preparation of peda**



**Fig.1** Mean chemical composition of *peda*



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