

Original Research Article

Preparation of Finger Millet Kheer

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ABSTRACT

The present study was carried out on “Studies on preparation of finger millet kheer”. The research was conducted in the laboratory of Department of Animal Husbandry and Dairy Science, College of Agriculture, Vasantnao Naik Marathwada Krishi Vidyapeeth, Parbhani during the year 2016-17. Kheer was prepared from buffalo milk with constant level of sugar 7 per cent weight of milk and different level of finger millet powder (2, 4 and 6 per cent by weight of milk). On an average finger millet kheer content moisture per cent range from 58.13 to 63.58 highest in T1 and lowest in T0 ; fat 15 to 8.85 per cent; protein 6.79 to 7.44 per cent; carbohydrate 22.43 to 24.88 per cent ; ash 1.43 to 1.41 per cent and total solid 41.43 to 41.88 per cent, respectively. It was observed that overall acceptability score was in decreasing trend from T0 to T3 were 8.58 to 6.46, respectively. As the level of finger millet powder in kheer increases the overall acceptability score decreases. The highest score for overall acceptability was found to be 8.25 (like very much) and lowest score was found to be 6.46 (like slightly). Cost of control kheer was found to be lowest for T0 as Rs.84.30 per lit. The highest cost was recorded for treatment T3 as Rs 108.60 per lit. The cost for treatment T1 and T2 were Rs. 91.40 and Rs. 100 per lit, respectively. As the level of finger millet powder in kheer increases the cost of production increases.

Keywords

Kheer, finger millet, buffalo milk

Introduction

Milk is an almost an ideal food. It has high nutritive value. It supplies body -building proteins, bone forming minerals and health giving vitamins and furnishes energy-giving lactose and milk fat. Besides supplying certain essential fatty acids, it contains the above nutrients in an easily digestible and assailable form. All these properties make milk an important food (De, 2009).

Today's consumers were increasingly seeking functional foods, value addition, health and medicinal interventions in the milk product. Due to the today's upward consumer awareness and interest to follow healthy nutrition and value addition in

achieving their health benefits from food beyond their basic nutrition, the market for value added foods had expanded manifolds.

Different cereals like wheat, maize, sorghum, ragi, are fortified with different dairy products like kheer, lassi, laddu etc. Among the different cereals ragi is the common name of finger millet in southern part of India (and also known as Nachani in northern part of India). Ragi or Nachani is often ground to a fine powder and sold and popularly known as ragi flour. Finger millet is rich in protein, calcium, fiber and iron. Major portion of finger millet powder is carbohydrate 71.3 to 89.5%, the fat percent

is quite less i.e. 1.3 to 2.7 % which is good. Protein content ranges from 5.8 to 12.8 % and fiber content ranges from 3.5 to 3.9 %. Finger millet powder contains 350 mg calcium and 3.9 mg iron. Finger millet also provides good number of essential amino acids (EAA) which are essential for human body. Few of the key EAAs in ragi are valine, methionine, isoleucine, threonine and tryptophan. (<http://blackherbals.com>). Realizing the health benefits of finger millet, it is decided to undertake the research work on preparation of kheer blended with finger millet powder. Hence, taking into consideration the medicinal and nutritional value of finger millet, it was therefore decided to undertake the research project on “Studies on preparation of Finger millet kheer”

Materials and Methods

Buffalo milk was procured from buffalo unit maintained at Department of Animal Husbandry and Dairy Science College of Agriculture, Vasantrya Naik Marathwada Krishi Vidyapeeth, Parbhani. Milk was standardized to 6 per cent fat and 9 per cent SNF.

Treatment details

T0= 97.5 parts of buffalo milk by weight + 2.5 Parts of Rice (control)

T1= 98 parts of buffalo milk by weight + 2 Parts of finger millet powder

T2= 96 parts of buffalo milk by weight + 4 Parts of finger millet powder

T3= 94 parts of buffalo milk by weight + 6 Parts of finger millet powder

Milk was standardized by using Pearson's square method.

Flow diagram for preparation of finger millet kheer

Finger millet kheer was prepared with standardized method separately for each treatment as shown in following flow chart.

Sensory evaluation

Sensory evaluation of *finger millet kheer* was carried out by a panel of judges using 9-point Hedonic scale

Chemical Analysis

The samples of finished product from various treatment combinations were chemically analyzed for moisture (ISI Handbook of Food Analysis, 1964), fat (Gerber's method described in ISI: 1224 (part II) 1981), Protein (Kjeldahl method as described in AOAC 1981), Protein content of *kheer* was determined by the Kjeldahl method as described in AOAC (1981), Carbohydrate content was estimated by subtraction method i.e. Carbohydrate = Total solids - (fat + protein + ash), The total ash content of *kheer* sample was determined by method given by IS 1479 part II: (1961), Total solids was determined as per IS 1479 (Part-II) 1961 procedure,

Results and Discussion

Chemical analysis

The samples of finger millet *kheer* the finished product were subjected for the proximate analysis viz. moisture, fat, protein, carbohydrate, ash and total solids. The results obtained were moisture content of the finished product was found to be between 58.58 to 58.13 per cent, It was also observed that the moisture content was in decreasing order from treatment T1 to T3. Fat content in finger millet *kheer* formulated

products ranged between 8.15 to 9.25 per cent from the treatment T3 to T1. carbohydrate content of finished product was ranged between 18.87 to 24.88 per cent. Whereas, the high value of carbohydrate content was recorded for T3 treatment i.e., 24.88 per cent. The increasing trend of ash content was observed from 1.36 to 1.41 for treatment T1 to T3. The mean total solids content of the finished product were found to be from 41.43 to 41.88 per cent. The highest total solids content was recorded for treatment T3 i.e. 41.88. The lowest total solids contents was recorded for treatment T1 i.e. 36.43.

Sensory evaluation of finished product

The acceptability of the finger millet *kheer* was measured in terms of sensory attributes such as flavour, colour and appearance and mouth feel using 9 point hedonic scale by a panel of five expert judges.

It was observed that treatment T0 was significantly superior over all the treatment combinations. Treatment T3 which had the lowest mean score than control *kheer*.

The treatment T0 had scored comparatively highest mean overall score than the T1, T2 and T3 treatments. The lowest overall acceptability score i.e. 6.46 was found in treatment T3 which was due to increased level of finger millet powder which decreased flavour, colour and appearance and body and texture, hence overall acceptability score given by the judges was less as compared to T0 treatment.

Cost of Production

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

It may be seen from the Table 11 that the cost of production of 1kg *kheer* ranged from Rs 84.30 to Rs 108.6 the cost of production of different treatment combinations was Rs.84.30, Rs.91.40, Rs.100 and Rs.108.60 for treatment T0, T1, T2 and T3 respectively. The highest cost was recorded in treatment T3 while lowest cost of production recorded in T0 where in 2.5 per cent rice was blended.

It can be concluded that as the cost of finger millet *kheer* was increased as the blending of finger millet powder increased as compared to treatment T0 i.e. control *kheer*. The study indicated that good quality *kheer* can be prepared from finger millet powder viz. 2, 4 and 6 per cent for treatment T1, T2 and T3, respectively.

The *kheer* prepared from finger millet powder has characteristics similar to that of *kheer* prepared from whole buffalo milk and rice (T0).

The moisture content in finger millet *kheer* were found to be 58.58, 63.58, 61.45 and 58.13 per cent for treatments T0, T1, T2 and T3 respectively. The moisture content of finger millet *kheer* decreases with increasing the level of finger millet powder. This might be due to the lower moisture content in finger millet powder. Manojkumar *et al.*, (2015) Mentioned the average moisture content of finished product ranges from 66.89 (T4) to 69.90 (T1). The values for the moisture content varied significantly ($p < 0.05$).

The decrease in moisture content was due to less moisture content of carrot shreds (60-65%) as compared to milk. The values recorded for moisture content in the present research work were comparable with the values observed by the above mentioned research workers.

Table.1 Moisture content of finger millet *kheer* (per cent)

Replication → Treatment ↓	Moisture	Fat	Protein	Carbohydrate	Ash	Total solids	
T0	58.58	10.79	6.79	22.43	1.43	41.43	
T1	63.58	9.25	7.18	18.65	1.36	36.43	
T2	61.45	8.85	7.34	20.99	1.38	38.55	
T3	58.13	8.15	7.44	24.88	1.41	41.88	
S.E. + 0.330		C.D. at 5% 0.467					

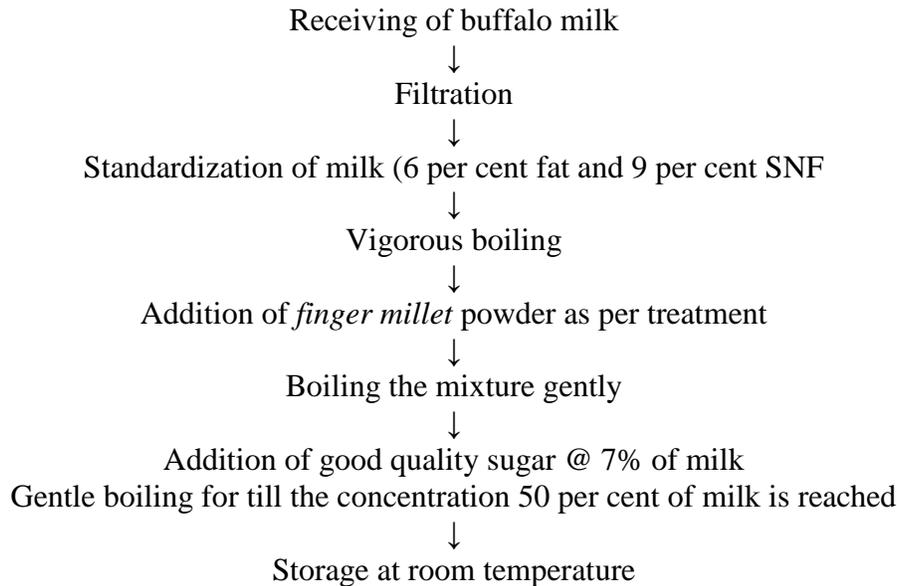
Table.2 Overall score for finger millet *kheer*

Treatments	Flavour	Colour and appearance	Body and texture	Overall acceptability
T0	8.75	8.50	8.50	8.58
T1	8.25	8.25	8.25	8.25
T2	7.00	7.75	7.50	7.41
T3	6.25	6.25	6.88	6.46
S.E. + 0.157		C.D. at 5% 0.514		

Table.3 Cost structure of finger millet *kheer*

Sr. No	Particulars	Rate Rs	T1		T2		T3		T4	
			Qty. (gm/ml/Kg)	Amt. Rs	Qty. (gm/ml/Kg)	Amt. Rs	Qty.(gm/ml/Kg)	Amt. Rs	Qty. (gm/ml/Kg)	Amt. Rs
1	Buffalo milk	50	975	48.75	980	49	960	40	960	47
2	Rice	50	----	1.25	---	---	---	---	---	---
3	Finger millet powder	160	25	---	20	9.60	40	19.20	60	28.80
4	Sugar	40	70	2.80	70	2.80	70	2.80	70	2.80
5	Cardamom	1500	1.00	1.50	---	----	---	----	---	----
6	Labour charges	120/8 hrs	---	15	---	15	---	15	---	15
7	Fuel charges	150/hrs	---	5	---	5	---	5	---	5
8	Miscellaneous	---	----	10	---	10	---	10	---	10
9	Total coast per liter of milk	----	----	84.30	----	91.40	----	100	----	108.60

Flow-diagram for manufacture of finger millet *kheer*



It was recorded that the average fat content for treatment for T0, T1, T2, and T3 were 10.79, 9.25, 8.85 and 8.15 per cent respectively. The fat content in (T0) *kheer* was highest as 10.79 per cent and that of lowest observed in treatment T3 (8.15).

It might be due to the less amount of fat in finger millet. Narwade *et al.*, (2003) prepared *kheer* from safflower milk blended with buffalo milk with different level of sugar and reported the fat content was 11.60 per cent. Manojkumar *et al.*, (2015) the values for fat content varied significantly ($p < 0.05$). The fat content decreased from 7.23 (T1) to 5.99 (T4). The decrease in fat content was there as the carrot shreds contain less fat than milk. The values recorded for fat content in the present research work were comparable with the values observed by the above mentioned research workers.

The protein content was found higher in treatment T0 (6.79) followed by treatment T1 (7.18) T2 (7.34) and T3 (7.44). The protein content of finger millet *kheer*

increases with increasing the level of finger millet powder. This might be due to the protein content in finger millet powder. Chaudhary (1989) reported the protein content of *kheer* as 5.44 per cent. Narwade *et al.*, (2003) prepared *kheer* from safflower milk blended with buffalo milk with different level of sugar and reported the protein content as 5.30 per cent. The values recorded for protein content in the present research work were comparable with the values observed by the above mentioned research workers.

The carbohydrate content of finger millet *kheer* for different T0, T1, T2 and T3 treatments found as 22.43, 18.65, 20.99 and 24.88 respectively. The highest carbohydrate content was in treatment T3 i.e. 24.88. Gaikwad *et al.*, (2016) observed the total sugar content in T0, T1, T2, T3, T4 and T5 were 24.56, 25.18, 26.04, 26.96, 27.94 and 29.24 per cent respectively. The values recorded for carbohydrate content in the present research work were comparable with the values observed by the above mentioned research workers.

The ash content of *kheer* for different treatments T0, T1, T2 and T3 were 1.43, 1.36, 1.38 and 1.41 respectively. The ash content was highest in T3 followed by T0, T1 and T2. The ash content of finger millet *kheer* increases with increasing level of finger millet powder. Jha (2000) observed the ash content in *kheer* mix powder as 2.64 per cent. Manoj kumar *et al.*, (2015) the values for ash content increased from 1.54 (T1) to 2.00 (T4). The increase in ash content might be due to high mineral content in carrot shreds as compared to milk. The values recorded for ash content in the present research work were comparable with the values observed by the above mentioned research workers.

The score for total solids content was ranged in between 36.43 to 41.88 per cent. The highest total solids content was in T3 (41.88) per cent, whereas lowest total solids content was in treatment T1 i.e. 36.43

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