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Studies on sensory evaluation and cost of production of rice kheer

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Abstract

The present study was conducted at laboratory of Department of Animal Husbandry and Dairy Science, Post Graduate Institute, M.P.K.V, Rahuri. Kheer is a traditional Indian dairy product. It occupies a special position in Indian diet due to high nutritional and sensory properties. Treatment combinations were used (T₀) 5% of boiled Basmati rice powder, Govindbhog rice powder 3.5% (T₁), 4% (T₂) and 4.5% (T₃) with constant 8% sugar level. The samples of kheer prepared were evaluated of sensory evaluation such as flavour, body and texture and colour and appearance using 9 point hedonic scale by a panel of five semi-trained judges. The data were analyzed by using completely randomized block design. The overall sensorilly score of rice kheer in treatment T₀, T₁, T₂ and T₃ were 8.50, 8.63, 7.50 and 6.75, respectively. Treatment T₁ (3.5 percent rice powder) in cow milk was preferred by the judges than the control sample as far as flavour character is concerned. The mean score for body and texture of kheer for treatment T₁ was highest (8.50) than others. It was noticed that the treatment T₁ was significantly superior over treatments T₂ and T₃. The overall score of rice kheer in treatments T₀, T₁, T₂ and T₃ were 8.25, 8.75, 7.75 and 7.25, respectively. Addition of 3.5 percent Govindbhog rice powder in cow milk was preferred by the judges than the control sample as far as colour and appearance is concerned. The lowest overall acceptability score (6.96) was for treatment T₃ which was due to increase level of rice powder which decreased flavour, colour and appearance and body and texture, hence overall acceptability score was less as compared to T₁ treatment. The cost of production of 1kg kheer ranged from Rs.66.40 to Rs. 67.00. The cost of production of different treatment combinations was Rs.67.00, Rs.65.60, Rs.66.00 and Rs.66.40 for treatment T₀, T₁, T₂ and T₃ respectively. It is concluded from the present studies that, the good quality of Kheer can be prepared by using 3.5 percent Govindbhog rice powder with 8 percent sugar.

Keywords: Kheer. Rice, cow 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 assimilable form. All these properties make important food (De, 2009) [3]. Kheer is a traditional Indian dairy product. It occupies a special position in Indian diet due to high nutritional and sensory properties, from the ancient time. The Hindu kheer is derived from the Sanskrit word 'Ksheer' for milk and 'Kshrika' for any dish prepared with milk (Aneja *et al.* 2002) [1]. Kheer is popular all over the country, as a pre-eminent milk delicacy. It has been associated with festivities and celebrations from the time immemorial. Kheer is known by different names in didderent parts of the country, such as 'Kheer' is North Western region, 'Payasam' Southern region, 'Payas' in Eastern region, 'Phirni' in Northen region and 'Kheech' in Mewar region of Rajasthan (Thompkinson, 1995) [7].

Kheer has been known to mankind since times immemorial. It was used as sweet dish at all the ceremonial occasions and festivals and is relished by all age groups and thought to be a very nutritious food. It is closely resembles "rice pudding" a popular deserts in the United States and in North and Central Europe (Patel and Singh, 2002) [6].

There are several method of kheer preparation by using various based products such as Pulse based kheer (Bengal gram kheer, Green gram kheer), Cereal based kheer (Rice kheer, Pal kheer, Wheat kheer, Rice suji Kheer, Gogdi kheer, Avalakki kheer), Tuber crop based kheer (Sabakki kheer, Kaddu ki kheer, Movina kheer), Fruit based kheer (Mango kheer, Jackfruit kheer), Seed based kheer (Poppy seed kheer). (Unnikrishanan 2000) [8].

Rice is the staple food crop of Asian regions including India.

West Bengal state if India is known as bowl of rice because it constitute major food item and is being cultivated in major portion of agricultural field. India being center of origin of rice, can boast of large number of local varieties and land races. According to an estimate, we have more than 50,000 varieties of rice. Rice is one of the most important foods crops of Asia, including India and is feeding more than 3 billion people.

Rice provides 23% of global human per capita energy and 16% per capita protein. Rice protein ranks high in nutritional quality among cereals, though protein content is modest. Unmilled rice (brown rice) provides 4.3 to 18.2% protein, averaging 9.5% based on 17,587 cultivars in the IRRI germplasm (Rice Almanac), majority of Asians who eat rice, the total intake is 2,531 calories per person per day, with 35% coming from rice, which is considerably high (Anjan Kumar Sinha).

Rice is a good source of complex carbohydrates and is rich in several other essential nutrients. Rice is a good source of energy as the complex carbohydrates present in rice take time to break down. Also, diabetics can safely consume it as the starch present has very low carbohydrate content. Eating rice daily in moderation helps the body to fight several diseases.

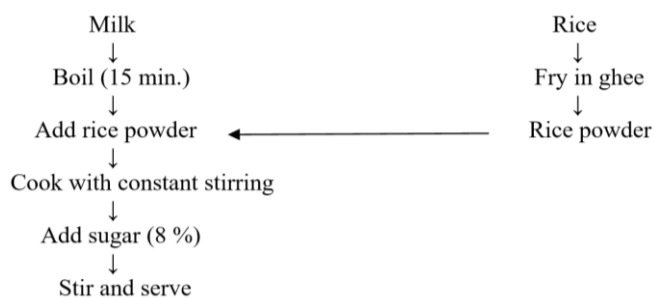
Materials and Methods

The kheer was prepared from composite sample of crossbred cow milk, Govindbhog rice and 8% constant sugar level for all the treatments. Kheer prepared by basmati rice 5% used as a control (T₀), kheer with 3.5% Govindbhog rice (T₁), kheer with 4% Govindbhog rice (T₂), kheer with 4.5% Govindbhog rice (T₃) used for experimental study.

The samples of rice kheer were evaluated for their flavour, colour and appearance, Body and texture and overall acceptability.

Product formulation

Flow-diagram for manufacture of Rice kheer



Proximate analysis

The sensory evaluation was carried out by using 9 point hedonic scale for the present investigation.

Results and Discussion

Sensory evaluation

Flavour

The rice kheer was subjected to sensory evaluation by semi trained panel of judges using 9 point hedonic scale. The critical difference (CD) was calculated and treatment differences were tested at 5 percent level of significance. It was observed that the overall score of rice kheer in treatment T₀, T₁, T₂ and T₃ were 8.50, 8.63, 7.50 and 6.75, respectively. Treatment T₁ (3.5 percent rice powder) in cow milk was preferred by the judges than the control sample as far as flavour character is concerned. It gives pleasant flavor of

Govindbhog variety rice which is a characteristic flavor of the used rice variety. But as the level of rice powder goes on increasing the flavor score goes on decreasing. This might be due to the masking of original flavor of the kheer Narwade *et al.* (2003) [5]. prepared kheer from safflower milk blended with buffalo milk with different level of sugar and the flavour score as 8.50 to 5.0.

Body and texture

The average sensory score for body and texture in treatment T₀, T₁, T₂ and T₃ were 8.25, 8.50, 7.50 and 6.88, respectively. The critical difference (CD) was calculated and treatment differences were tested at 5 percent level of significance. It was noticed that the treatment T₁ was significantly superior over treatments T₂ and T₃. The above observation clearly indicates that, the highest liking was towards the T₁. As far as body and texture concerned, treatment T₀, T₂ and T₃ were also acceptable for panel of judges. As level of rice powder goes on increasing the consistency of the kheer seems to be more thick than the normal kheer which ultimately resulted into the lowest sensory score for body and texture. Narwade *et al.* (2003) [5] prepared kheer from safflower milk blended with buffalo milk with different level of sugar and reported the body and texture score as 8.70 to 5.20.

Colour and appearance

Overall colour and appearance score of rice kheer in treatment T₀, T₁, T₂ and T₃ were 8.25, 8.75, 7.75 and 7.25, respectively. Blending of 3.5 percent rice powder in cow milk was preferred by the judges than the control sample as far as colour and appearance character are concerned. As level increases the natural purple colour is seen to be dark in the product so the score goes on decreasing in subsequent levels. The results recorded in the present investigation for colour and appearance was comparable with the findings of Kadam (1998) [4].

Overall acceptability

Overall score of acceptability of rice kheer for treatments T₀, T₁, T₂ and T₃ was 8.33, 8.62, 7.58 and 6.96 respectively. The critical difference (CD) was calculated and treatment differences were tested at 5 percent level of significance. It was observed that treatment T₁ was significantly superior over all treatment. T₃ which had the lowest mean score than T₁ kheer. The treatment T₁ had comparatively highest mean overall score than the T₀, T₂ and T₃. The lowest overall acceptability score i.e. 6.96 was found in treatment T₃ which was due to increase level of rice powder which decreased flavour, colour and appearance and body and texture, hence overall acceptability score was less as compared to T₁ treatment. Narwade *et al.* (2003) [5] prepared kheer from safflower milk blended with buffalo milk with different level of sugar and reported the overall acceptability score as 8.55 to 5.44.

Cost of production rice kheer

The cost involved for preparation of kheer on account of raw material used i.e. cost of cow milk, Basmati rice, Govindbhog rice, sugar, labour, fuel and miscellaneous charges etc were taken into account for calculating the cost of production of kheer for different treatments. The cost of production of 1kg kheer ranged from Rs. 66.40 to Rs. 67.00. The cost of production of different treatment combinations was Rs. 67.00, Rs. 65.60, Rs. 66.00 and Rs. 66.40 for treatment T₀, T₁, T₂

and T₃, respectively. The kheer prepared from Govindbhog rice powder has characteristics. Similar to that of kheer prepared from sole cow milk and Basmati rice (T₀). The study

indicated that good quality kheer can be prepared by using Govindbhog rice powder with cow milk with natural purple colour tinge to the finished product with a pleasant aroma.

Table 1: Cost of production of rice kheer

Sr. No.	Particular	Cost (Rs/lit/Kg)	T ₀		T ₁		T ₂		T ₃	
			Qty (/ml/kg)	Amount (Rs)	Qty (/ml/kg)	Amount (Rs)	Qty (/ml/kg)	Amount (Rs)	Qty (/ml/kg)	Amount (Rs)
1.	Cow milk	30.00	1000	30.00	1000	30.00	1000	30.00	1000	30.00
2.	Basmati rice	95.00	40	3.80	-	-	-	-	-	-
3.	Govindbhog rice	80.00	-	-	30	2.40	35	2.80	40	3.20
4.	Sugar	40.00	80	3.20	80	3.20	80	3.20	80	3.20
5.	Labour charges			15.00		15.00		15.00		15.00
6.	Fuel charges			5.00		5.00		5.00		5.00
7.	Miscellaneous charges			10.00		10.00		10.00		10.00
8.	Total cost/lit			67.00		65.60		66.00		66.40

Conclusion

Kheer of acceptable quality could be prepared from cow milk with Govindbhog variety rice and Basmati variety rice. Kheer prepared with 3.5 percent Govindbhog variety rice and 8 percent sugar were superior in respect of organoleptic quality. The cost of production of a most acceptable kheer i.e 3.5% govindbhog variety was 65.60/Kg.

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