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Studies on sensory evaluation of Bhandara chinnor rice (*Oryza sativa*) Kheer

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Abstract

In the present study, the cow milk was standardized to 4 per cent fat. The kheer was prepared by addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) by weight of milk. The results of four treatments with five replications were statistically analyzed by using completely randomized design (CRD). The data obtained after sensory evaluation for flavour, body and texture, colour and appearance and overall acceptability and chemical analysis of fat, total solids, protein, ash, moisture were subjected to statistical analysis. The flavour score of kheer prepared with addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) were recorded as 7.30, 7.52, 8.40 and 6.60, respectively. The body and texture score of kheer prepared with addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) were recorded as 7.40, 7.60, 8.48 and 6.66, respectively. The colour and appearance score of kheer prepared with addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) were recorded as, 7.50, 7.70, 8.60 and 6.74, respectively. The mean scores for overall acceptability of kheer prepared with addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) were recorded as 7.44, 7.64, 8.70 and 6.72, respectively. Kheer prepared with addition of 2.5 per cent of Bhandara chinnor rice and 8 per cent sugar (T₃) was found superior sensory quality over the treatments T₁, T₂ and T₄.

Keywords: kheer, Bhandara chinnor rice, sensory attributes

Introduction

Milk is considered as most satisfactory ideal and almost complete food endowed by nature, which is also referred as 'Bank of Nutrients'. It is also essential food for the newly born young ones and equally important for supply of most essential element like calcium, phosphorus along with other numerous essential major and minor components. During earlier days the payment of milk was done only on fat basis, but the understanding of nutritional aspects of various constituents of milk other than fat.

Kheer is an Indian dessert prepared by partially dehydration of whole milk in a karahi over a direct fire together with sugar usually rice or occasionally semolina. Kheer is a heat desiccated cereal based sweetened and concentrated milk confections. Kheer is popular product throughout India and enjoyed by all the section of the societies because of its good taste, high nutritional values and relatively low cost. Kheer also contains substantial amount of non dairy ingredients such as rice, sugar, shabudana, almond, cardamom and pistachio etc., (Borad *et al.*, 2017)^[3].

Kheer is considered to be a nutritious food for people of all ages and is characterized by sweet, nutty and pleasant flavour that is highly acceptable to the Indian diet. It is closely resembles 'Rice pudding' a popular dessert in the United State and in the North and Central Europe (Kadam *et al.*, 2013 and Bhusnar *et al.*, 2016)^[4, 2].

Bhandara chinnor rice is one of the traditional rice variety of Bhandara district. It is specially famous for its aroma, fragrance and nutritional value. It is an indigenous variety of Maharashtra. Its grain is short, fat free and gluten free with high protein content and white appearance. It Contents 5.99 mg Fe / 100 gram. Na 14.67 mg, Mg 188.68 mg, K 502.70 mg, Ca 76.84 mg, Mn 5.5 mg, Cu 0.94 mg and Zn 5.30 mg / 100 g.

Materials and Methods

The research work was carried out at the Section of Animal Husbandry and Dairy Science, College of Agriculture, Nagpur during the year 2023-2024. During the entire study fresh, clean, whole cow milk was obtained from Dairy farm of Animal Husbandry and Dairy Science section, College of Agriculture, Nagpur. The milk was strained through clean muslin cloth and transferred into well cleaned and sterilized flat bottom stainless steel vessel. Dry and clean Bhandara chinnor rice soaked in water for 3 hrs. used for preparation of kheer.

Fresh cow milk was standardized at 4 per cent fat and 8.5 per cent SNF and then it was taken in an iron karahi and heated on gentle fire. At the same time of boiling, milk was stirred with the help of stainless steel ladle in a circular manner. For adequately cooking and concentrating the initial kheer mixture, it was boiled and reduced to 40 per cent volume. Thus, table servable kheer contained 1.5, 2, 2.5 and 3 per cent Bhandara chinnor rice paste in Bhandara chinnor rice based kheer.

Treatment details

T₁ = 98.5 parts of cow milk + 1.5 parts of Bhandara chinnor rice

T₂ = 98.0 parts of cow milk + 2.0 parts of Bhandara chinnor rice

T₃ = 97.5 parts of cow milk + 2.5 parts of Bhandara chinnor rice

T₄ = 97.0 parts of cow milk + 3.0 parts of Bhandara chinnor rice

Note: 8 per cent sugar was common in all treatments.

Sensory evaluation of kheer

The quality of Bhandara chinnor rice kheer was judged by sensory evaluation in respect of flavour, body and texture, colour and appearance and overall acceptability by a trained panel of judges on a 9 point hedonic scale as prescribed by Nelson and Trout (1964)^[5].

Statistical analysis

The experiment was laid out in Completely Randomize Design with four treatments in five replications. The data obtained were analyzed statistically according to method described by Snedecor and Cochran (1994)^[8].

Results and Discussion

The sensory properties of Bhandara chinnor rice kheer with different treatment combinations. The samples were subjected to find out sensory attributes of kheer such as flavour, body and texture, colour and appearance and overall acceptability. It indicates that increased in the levels of Bhandara chinnor rice resulted in better flavour, body and texture, colour and appearance and overall acceptability of kheer up to a certain limits.

Flavour

Table 1: Flavour score of kheer as affected by different levels of Bhandara chinnor rice (9 points)

Sr no.	Treatments	Replications					Mean
		R-I	R-II	R-III	R-IV	R-V	
1	T ₁	7.50	7.30	7.40	7.20	7.10	7.30 ^c
2	T ₂	7.80	7.40	7.30	7.60	7.50	7.52 ^b
3	T ₃	8.20	8.60	8.50	8.30	8.40	8.40 ^a
4	T ₄	6.60	6.80	6.60	6.70	6.30	6.60 ^d
SE(m)±		0.077					
CD @ 5%		0.231					
Result		Sig					

The flavour score of kheer prepared with addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) were recorded as 7.30, 7.52, 8.40 and 6.60, respectively. Significantly, highest score (8.40 out of 9) was obtained by kheer prepared with 2.5 per cent of Bhandara chinnor rice (T₃) as compared to other treatments.

More or less similar results were recorded by Ashwini Mukhekar *et al.* (2019)^[1]. They recorded the overall sensory score of rice kheer in treatment T₀, T₁, T₂ and T₃ were as 8.50, 8.63, 7.50 and 6.75, respectively. Treatment T₁ (3.5 per cent rice powder) in cow milk was preferred by the judges than the control sample as far as flavour is concerned. It gives pleasant flavour of Govindbhog variety rice which is a characteristics flavour of the used rice variety. But as the level of rice powder goes on increasing the flavour score goes on decreasing. This might be due to the masking of original flavour of the kheer.

Body and texture

Table 2: Body and texture score of kheer as affected by different levels of Bhandara chinnor rice (9 points)

Sr no.	Treatments	Replications					Mean
		R-I	R-II	R-III	R-IV	R-V	
1	T ₁	7.60	7.40	7.20	7.60	7.20	7.40 ^c
2	T ₂	7.90	7.60	7.50	7.30	7.70	7.60 ^b
3	T ₃	8.40	8.70	8.30	8.40	8.60	8.48 ^a
4	T ₄	6.70	6.90	6.80	6.50	6.40	6.66 ^d
SE(m)±		0.087					
CD @ 5%		0.261					
Result		Sig					

The body and texture score of kheer prepared with addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) were recorded as 7.40, 7.60, 8.48 and 6.66, respectively. Significantly, highest score (8.48 out of 9) was obtained by kheer prepared with 2.5 per cent of Bhandara chinnor rice (T₃) as compared to other

treatments.

Praveen *et al.* (2021)^[7] also inferred that kheer prepared from different proportions of quinoa with different levels of rice viz., 5, 4, 3, 2, 1 and 0 per cent. It was observed that the body and texture score as 8.80 to 8.30.

Colour and appearance

Table 3: Colour and appearance score of kheer as affected by different levels of Bhandara chinnor rice (9 points)

Sr no.	Treatments	Replications					Mean
		R-I	R-II	R-III	R-IV	R-V	
1	T ₁	7.40	7.60	7.50	7.60	7.40	7.50 ^c
2	T ₂	7.70	7.90	7.60	7.80	7.50	7.70 ^b
3	T ₃	8.50	8.60	8.80	8.40	8.70	8.60 ^a
4	T ₄	6.90	6.80	6.60	6.80	6.60	6.74 ^d
SE(m)±		0.060					
CD @ 5%		0.182					
Result		Sig					

The colour and appearance score of kheer prepared with addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) were recorded as, 7.50, 7.70, 8.60 and 6.74, respectively. Significantly, highest score (8.60 out of 9) was obtained by kheer prepared with 2.5 per cent of Bhandara chinnor rice (T₃) as compared to other treatments.

The result recorded in the present investigation for colour and appearance are comparable with the finding of Prajapati *et al.* (2021) [6] noticed that the lowest score (6.50) for colour and appearance under T₄. Which was due to increased level of red rice in preparation of kheer.

Overall acceptability

Table 4: Overall acceptability score of kheer prepared with different levels of Bhandara chinnor rice (9 points)

Sr no.	Treatments	Replications					Mean
		R-I	R-II	R-III	R-IV	R-V	
1	T ₁	7.60	7.40	7.30	7.50	7.40	7.44 ^c
2	T ₂	7.70	7.60	7.80	7.60	7.50	7.64 ^b
3	T ₃	8.80	8.70	8.60	8.80	8.60	8.70 ^a
4	T ₄	6.80	6.70	6.80	6.70	6.60	6.72 ^d
SE(m)±		0.043					
CD @ 5%		0.130					
Result		Sig					

The mean scores for overall acceptability of kheer prepared with addition of Bhandara chinnor rice at 1.5 per cent (T₁), 2.0 per cent (T₂), 2.5 per cent (T₃) and 3.0 per cent (T₄) were recorded as 7.44, 7.64, 8.70 and 6.72, respectively. It was observed that, the treatment T₃ was significantly superior over all treatments T₁, T₂ and T₄. Treatment T₄ had the lowest mean score than all other treatment. The lowest overall acceptability score i.e. 6.72 was found in treatment T₄ which was due to increased level of Bhandara chinnor rice which decreased flavour, colour and appearance and body and texture. Hence, overall acceptability score significantly less as compared to T₁ treatment.

Prajapati *et al.* (2021) [6] revealed that the lowest overall acceptability score i.e. 6.90 was for treatment T₄ (6 parts of red rice) which was due to increased level of red rice which decreased flavour, colour and appearance and body and texture. Hence, overall acceptability score significantly less as compared to T₁ treatment.

Conclusion

According to results it was concluded from the present investigation that, the addition of 2.5 per cent Bhandara chinnor rice was optimum and standardize for preparation of acceptable quality kheer. The sensory quality of Bhandara

chinnor rice kheer in respect of flavour, body and texture, colour and appearance and overall acceptability of T₃ has highest score and better suitable for large scale production.

Conflict of Interest

Not available

Financial Support

Not available

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