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STANDARDIZATION OF A METHOD FOR PREPARATION OF *Ksheer Khurma*

Shital Sahebrao Deosarkar* and Ashok Mahnoharrao Patil

Deptt. of Dairy Science, Chhatrapati Shivaji College, Udgir Distt. Latur

*MAFSU, College of Dairy Technology, Warud, Pusad 445204

Abstract: The present investigation was undertaken to standardize the method for preparation of *Ksheer Khurma*, a traditional milk-based vermicelli dessert, by optimizing the levels of roasted vermicelli, dates, sugar, and dry fruits. Standardized buffalo milk was used as the base ingredient, and four treatment combinations varying in vermicelli concentration were evaluated for physicochemical, sensory, textural, and microbiological characteristics. Significant ($P < 0.05$) differences were observed among treatments for viscosity, total solids, sweetness, and overall acceptability. *Ksheer Khurma* prepared with 4% roasted vermicelli, 8% dates, 6% sugar, and 4% mixed dry fruits recorded the highest overall acceptability score (8.76 ± 0.08) on a 9-point hedonic scale. The optimized product contained 28.84% total solids, 5.82% fat, 4.21% protein, and exhibited acceptable microbiological quality during refrigerated storage for seven days. The study demonstrated that standardized preparation conditions can improve product consistency, sensory quality, and commercialization potential.

Keywords: *Ksheer Khurma*, *Sheer Khurma*, *Vermicelli*, *Traditional dairy products*, *Standardization*, *Value addition*, *Milk dessert*

Introduction

Traditional dairy desserts constitute an important segment of the Indian food industry and represent a significant avenue for value addition of milk. *Ksheer Khurma*, also known as *Sheer Khurma*, is a traditional vermicelli-based milk dessert prepared by cooking roasted vermicelli in milk along with dates, sugar, nuts, and aromatic spices. The term "*Sheer Khurma*" is derived from Persian words meaning "milk and dates" and is widely associated with festive celebrations across South Asia. The product is traditionally prepared at household level with considerable variations in ingredient composition, processing conditions, and consistency. Such variability often affects sensory quality, shelf life, and consumer acceptability, emphasizing the need for standardization of the preparation process.

Milk-based traditional desserts are increasingly attracting consumer interest owing to their nutritional value and cultural significance. Development of scientifically standardized methods for traditional products can facilitate their commercialization and enhance market potential. Standardization also ensures product uniformity, improved quality control, and scalability of production. Despite the popularity of *Ksheer Khurma*, scientific literature on optimization of formulation and processing parameters remains scarce. Therefore, the present investigation was undertaken to standardize the method for preparation of *Ksheer Khurma* by optimizing the levels of vermicelli, dates, sugar, and dry fruits.

Materials and Methods

Procurement of Raw Materials: Fresh buffalo milk was procured from the university dairy farm. Vermicelli (*seviyan*), dates, sugar, almonds, cashew nuts, pistachios, raisins, cardamom, and ghee were obtained from local markets.

Standardization of Milk : Buffalo milk was standardized to contain Fat: 6.0%, Solids-not-fat: 9.0%. The milk was filtered and pasteurized at 72°C for 15 s before use.

Experimental Design: The concentration of roasted vermicelli was optimized while maintaining constant levels of dates, sugar, and dry fruits.

Table 1. Treatment Details

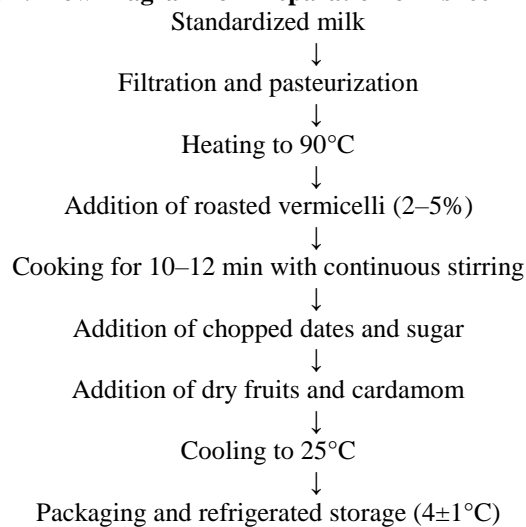
Treatment	Vermicelli (%)	Dates (%)	Sugar (%)	Mixed Dry Fruits (%)
T ₁	2	8	6	4
T ₂	3	8	6	4
T ₃	4	8	6	4
T ₄	5	8	6	4

Percentages were calculated on the basis of milk volume.

Preparation of *Ksheer Khurma*

The standardized procedure adopted for *Ksheer Khurma* preparation is illustrated below.

Figure 1. Flow Diagram for Preparation of Ksheer Khurma



Product Preparation: Vermicelli was roasted in ghee at 120°C for 2–3 min until light golden brown. Milk was heated to 90°C and concentrated to approximately 85% of its original volume. Roasted vermicelli was added gradually and cooked with continuous stirring. Chopped dates, sugar, and dry fruits were added after partial softening of vermicelli. The mixture was cooked until the desired consistency was achieved and flavored with cardamom powder. The finished product was cooled and stored under refrigeration.

Analytical Methods: The prepared samples were analyzed for Total solids (%), Fat (%), Protein (%), Ash (%), Titratable acidity (% lactic acid), pH, Viscosity (cP). Standard AOAC (2016) methods were followed. Viscosity was determined using a Brookfield viscometer at 25°C.

Sensory Evaluation : Sensory evaluation was conducted by a panel of ten semi-trained judges using a 9-point hedonic scale. The attributes evaluated are Color and appearance, Flavor, Body and texture, Sweetness and Overall acceptability,

Microbiological Analysis

Samples were analyzed for Standard plate count, Yeast and mold count and Coliform count. The microbiological quality was evaluated at 0, 3, and 7 days of refrigerated storage.

Statistical Analysis: The experiment was conducted using a Completely Randomized Design (CRD). Data were analyzed using one-way ANOVA and treatment means were compared at P<0.05.

Results and Discussion

Physicochemical Characteristics

Table 2. Physicochemical Characteristics of Ksheer Khurma

Parameter	T ₁	T ₂	T ₃	T ₄
Total solids (%)	25.62±0.18	27.24±0.22	28.84±0.20	30.12±0.24
Fat (%)	5.84±0.06	5.83±0.08	5.82±0.07	5.80±0.06
Protein (%)	4.08±0.04	4.16±0.05	4.21±0.04	4.26±0.05
Ash (%)	0.96±0.02	1.02±0.02	1.08±0.03	1.12±0.03
pH	6.54±0.02	6.50±0.03	6.46±0.02	6.42±0.03
Acidity (% LA)	0.18±0.01	0.19±0.01	0.20±0.01	0.21±0.01

Total solids and protein content increased significantly with increasing vermicelli concentration.

Viscosity

Table 3. Viscosity of Ksheer Khurma

Treatment	Viscosity (cP)
T ₁	1,845±42
T ₂	2,164±48
T ₃	2,486±52
T ₄	2,918±58

Increasing vermicelli concentration significantly increased viscosity due to starch gelatinization and water absorption.

Sensory Evaluation

Table 4. Sensory Scores of Ksheer Khurma

Treatment	Color and Appearance	Flavor	Body and Texture	Overall Acceptability
T ₁	8.24±0.10	8.32±0.12	8.18±0.14	8.22±0.11
T ₂	8.46±0.08	8.58±0.10	8.54±0.12	8.52±0.10
T ₃	8.74±0.08	8.82±0.06	8.72±0.10	8.76±0.08
T ₄	8.30±0.12	8.22±0.14	8.08±0.16	8.18±0.12

Treatment T₃ received the highest overall acceptability score owing to its optimum consistency, balanced sweetness, and desirable mouthfeel. Higher vermicelli concentration (T₄) resulted in excessive thickness and reduced sensory acceptability.

Microbiological Quality

Table 5. Standard Plate Count During Storage

Storage Period (Days)	T ₃ (log cfu/g)
0	2.14±0.06
3	2.68±0.08
7	3.24±0.10

No coliform organisms were detected throughout storage. The product remained microbiologically acceptable for up to seven days under refrigeration.

Discussion

The concentration of vermicelli significantly influenced the physicochemical and sensory characteristics of Ksheer Khurma. Increased vermicelli levels enhanced total solids, protein content, and viscosity owing to hydration and starch gelatinization. Dates contributed natural sweetness, dietary fiber, and characteristic flavor, while dry fruits improved nutritional quality and sensory appeal. The optimum level of vermicelli was found to be 4%, which provided desirable consistency without adversely affecting mouthfeel.

Industrial Significance: Standardized *Ksheer Khurma* offers the following advantages commercialization of a traditional dairy dessert, Enhanced product consistency and quality, Opportunities for organized dairy sector diversification, Development of ready-to-eat and ready-to-serve products and Increased utilization of milk during festive seasons

Conclusion

The present investigation successfully standardized a method for preparation of *Ksheer Khurma*. The formulation containing 4% roasted vermicelli, 8% dates, 6% sugar, and 4% mixed dry fruits was identified as the optimum treatment based on physicochemical, sensory, and microbiological characteristics. The developed product exhibited excellent acceptability and remained stable for seven days under refrigerated conditions. Further studies on packaging technologies, shelf-life extension, and development of low-sugar variants are recommended.

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