

Sensory Analysis of Gulab Jamun Incorporated with Malted Sorghum Flour

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Abstract

Growing interest in conventional dairy products of all the traditional Indian sweets, Gulab Jamun is a popular one made with khoa. The major components of Gulab Jamun (GJ) are Refined Wheat Flour (RWF) and khoa. The present study was designed to develop a value-added GJ by replacing refined wheat flour with Malted Sorghum flour (MSF) at different levels and to assess the organoleptic quality of the developed GJ through sensory analysis. Four treatment groups with incorporating Malted Sorghum flour at levels of 10%, 20%, 30%, and 40% with RWF naming T₁, T₂, T₃ and T₄ respectively were prepared and compared with the control GJ [40% RWF and 60% Khoa]. The T₄ variety [40% MSF and 60% khoa] was found to be highly acceptable by the 20 semi-trained panel members followed by T₁, T₃ and T₂.

Key words: Gulab jamun, Malted sorghum flour, Malted jowar flour, Khoa, Refined wheat flour

Gulab jamun is a popular khoa-based sweet and originally it was made with a mixture of khoa (a heat-desiccated intermediary milk product), Refined Wheat Flour (*Maida*) and baking powder. It got the name Gulab Jamun as it looks like monsoon fruit "Jamun" and is flavored with "rose water". Gulab jamun is a beloved traditional Indian sweet that is originally crafted from a combination of khoa (a heat-desiccated milk product), refined wheat flour and baking powder. The sweet's name is derived from its resemblance to the monsoon fruit "Jamun" and its distinctive flavor, which is often enhanced with rose water. Traditionally known as Jowar in India, Sorghum is heat and drought resistant making it suitable for cultivation in semi-arid or tropical regions, and is the world's fifth important crop [4-6]. Sorghum has higher levels of carbohydrates followed by protein and fat. It is also rich in phenolic compounds especially phenolic acids, flavonoids, and tannins [1]. Sorghum supplies important minerals, vitamins, protein, and micronutrients essential for optimal health, growth, and development [2]. It is important for us to start relishing our traditional foods to reap their incredible nutrient profile. Sorghum grain has similar physicochemical properties of wheat flour. Hence the present study was undertaken to develop value-added Gulab jamun by adding malted sorghum to formulate fiber rich Gulab jamun.

MATERIALS AND METHODS

The present study was conducted in 3 phases

Purchase of ingredients

The ingredients required for the study such as refined wheat flour, jowar, khoa, ghee, oil, milk, cardamom and sugar were procured from the local market.

Preparation of malted jowar flour

The sprouting and malting process of jowar was followed as per the procedure given by [3]. Jowar was cleaned and dust was removed then soaked in water overnight. Tie the soaked jowar into muslin cloth for 3 days. Dried the sprouted jowar at room temperature, grinded to make a fine powder in the mill and sieved it.

Preparation of dough

Malted jowar flour, refined wheat flour and khoa were measured and made into a soft dough with required quantity of milk. The dough was kneaded without cracks. The variation (Table 1) was given below:

Preparation of sugar syrup

An equally measured amount of sugar and water is added and kept for boiling (10 to 15 minutes). Keep it cool once the sugar concentration reaches 60-degree Brix. The preparation of sugar syrup was followed by a procedure given by [5].

Preparation of Gulab jamun

Uniform size balls will be made from previously prepared dough and fried in ghee/ oil under low flame (at 130-degree Celsius for 10 to 15 minutes). The fried balls will be soaked in hot sugar syrup for at least 2 hours as per procedure given by [7].

Table 1 Variation table

Variations	Khoa	Refined wheat flour	Malted jowar flour
Control (T ₀)	60	40	-
T ₁	60	30	10
T ₂	60	20	20
T ₃	60	10	30
T ₄	60	-	40

Sensory evaluation

Sensory evaluation was conducted using a nine-point hedonic scale by twenty semi-trained panel members with good health and an interest in sensory evaluation were selected from our Department of Home Science. The scoring system was mostly based on appearance, color, texture/consistency, flavor, and overall acceptability.

RESULT AND DISCUSSION

The organoleptic evaluation of Gulab jamun was evaluated and mentioned in (Table 2). The table presents sensory attribute data for a product evaluated at five different time points: T₀, T₁, T₂, T₃, and T₄. The attributes measured include appearance, taste, texture, colour, and overall acceptability. Each value is presented as a mean with a standard deviation (\pm SD). Here is a detailed description of the data:

Table 2 Mean sensory score of the formulated Gulab jamun

Sensory attributes	T ₀	T ₁	T ₂	T ₃	T ₄
Appearance	8.9 \pm 0.27	9 \pm 0	9 \pm 0	9 \pm 0	9 \pm 0
Taste	8.6 \pm 0.62	8.9 \pm 0.24	8.6 \pm 0.88	8.8 \pm 0.49	8.9 \pm 0.32
Texture	8.3 \pm 0.75	8.9 \pm 0.31	8.6 \pm 0.83	8.7 \pm 0.54	8.9 \pm 0.32
Colour	8.9 \pm 0.30	9 \pm 0	9 \pm 0.11	9 \pm 0	9 \pm 0
Overall acceptability	8.8 \pm 0.41	8.9 \pm 0.40	8.6 \pm 0.84	8.8 \pm 0.52	9 \pm 0.31

CONCLUSION

The sensory analysis of Gulab Jamun with Malted Jowar Flour offers a new and original take-off on this famous Indian delicacy. The use of malted jowar flour added a delicate nuttiness and earthiness to the Gulab Jamun, which improved the sensory experience. The malted jowar flour influenced the texture of the Gulab Jamun, giving it a delicious chewiness that balances the typical softness of this dish. This sensory investigation shows that Gulab Jamun can be made more

Appearance: The T₁, T₂, T₃, and T₄ treatments were superior in the appearance aspect with the mean score of (9 \pm 0) followed by the control T₀ with the mean score of (8.9 \pm 0.27).

Taste: T₁ and T₄ were significantly superior over the rest of treatments with the mean score of (8.9 \pm 0.24) followed by T₃ (8.8 \pm 0.49) and T₂ (8.6 \pm 0.88) and T₀ has the lowest sensory score of (8.6 \pm 0.62).

Texture: The T₁ and T₄ treatment has the highest mean score of (8.9 \pm 0.32) followed by T₃ (8.7 \pm 0.54) and T₂ (8.6 \pm 0.83) and T₀ has the lowest mean score of (8.9 \pm 0.31).

Color: The experimental treatment of all 4 treatments were scored equally with the mean score of (9 \pm 0) and followed by T₀ (8.9 \pm 0.30) similar to appearance. Mean score of overall acceptability of T₄ was found to be higher (9) followed by T₁ (8.9 \pm 0.40), T₃ (8.8 \pm 0.52) and T₂ (8.6 \pm 0.84).

From (Table 2), it was clear that the T₄ variation prepared with MJF (40%) and Khoa (60%) was found to be the highest when compared to other treatment groups. The data indicates a high and consistent level of sensory quality for the product, particularly in terms of appearance and color, with some minor variations in taste, texture, and overall acceptability over the observed time points.

nutritious while still maintaining its traditional soft texture and flavor. The sensory analysis demonstrates that Gulab Jamun made with malted jowar flour retains its traditional appeal while offering enhanced flavor and texture. This innovative approach to a classic dessert not only preserves its beloved characteristics but also improves its nutritional profile. The successful integration of malted jowar flour into Gulab Jamun showcases the potential for reimagining and refining traditional dishes through creative culinary techniques, paving the way for healthier and more diverse food options.

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