ISSN Print: 2664-844X
ISSN Online: 2664-8458
NAAS Rating (2025): 4.97
IJAFS 2025; 7(12): 436-438
www.agriculturaljournals.com
Received: 05-10-2025
Accepted: 08-11-2025

AA Deshmukh
M.Sc. Schlor, Department of AHDS, COA, VNMKV, Parbhani, Maharashtra, India

GK Londhe
Professor and Head, M.Sc. Schlor, Department of AHDS, COA, VNMKV, Parbhani, Maharashtra, India

SD Bhandare
M.Sc. Schlor, Department of AHDS, COA, VNMKV, Parbhani, Maharashtra, India

BB Pothale
M.Sc. Schlor, Department of AHDS, COA, VNMKV, Parbhani, Maharashtra, India

Corresponding Author:
AA Deshmukh
M.Sc. Schlor, Department of AHDS, COA, VNMKV, Parbhani, Maharashtra, India

Studied on Preparation of *Burfi* Incorporated with Makhana (Euryale Ferox Salisb) Flour

AA Deshmukh, GK Londhe, SD Bhandare and BB Pothale

DOI: https://www.doi.org/10.33545/2664844X.2025.v7.i12f.1073

Abstract
Burfi is the most popular Khoa based indigenous sweet, commonly prepared in the country. The present study was undertake to develop value added *burfi* with makhana flour for better nutritional profile. Value added *Burfi* was prepared from Khoa using buffalo milk. The control (T_1) and makhana at 2% (T_2), 4% (T_3) and 6% (T_4) levels based on weight of milk. The formulated samples were evaluated for their sensory quality, textural parameters, physico-chemical properties and its production cost to determine the most suitable formulation. The textural properties of *burfi* differed significantly among treatments. Hardness, springiness andgumminess increased from T_1 to T_4, indicating a firmer and more elastic product at higher treatment levels. In contrast, cohesiveness decreased, while adhesiveness became more negative, showing increased stickiness. All variations were statistically significant ($p \leq 0.05$), confirming that treatments had a marked effect on the texture of *burfi*.

Keywords: *Burfi*, roasted makhana flour, sensory evaluation, storage conditions, texture profile

Introduction
India is the world's leading milk producer, with an annual production of about 239 million tonnes and a per capita availability of 459 g per day (PIB, GOI, 2024). Nearly 45.7% of the milk produced is consumed in liquid form, while a substantial proportion of the remaining milk is utilized in the manufacture of traditional dairy products such as khoa, *burfi*, gulabjamun andpeda (Pal *et al*., 2006) [7]. Buffalo milk is commonly preferred for khoa-based sweets because of its higher fat and protein content, which contributes to superior texture and flavor (Aggarwal *et al*., 2018) [1]. *Burfi* is one of the most widely consumed khoa-based indigenous sweets, characterized by a white to light cream color, firm body andsmooth to slightly granular texture, with sugar and other ingredients added in varying proportions to suit consumer preferences. Although milk is considered a nearly complete food, it is deficient in certain micronutrients such as iron, copper, dietary fiber andsome vitamins. Hence, fortification or substitution with nutrient-dense ingredients is essential to improve the nutritional quality of traditional dairy products like *burfi*. Makhana (Euryale ferox Salisb.) seeds are widely consumed across India and are valued for their nutritional, medicinal, industrial andreligious importance. They contain about 11.6% high-quality, easily digestible protein, are low in fat andare rich in carbohydrates (approximately 75.04%). Makhana seeds are also a good source of minerals such as calcium and magnesium and provide essential amino acids, including glutamic acid, arginine, leucine, valine andaspartic acid (Nath and Chakraborty, 1985) [6]. Despite being relatively low in dietary fiber, makhana has been reported to help lower blood cholesterol levels (Jha *et al*., 1991) [3] and is traditionally used as a nutritive tonic for postnatal weakness, as well as an expectorant and cardiac stimulant. The calorific value of makhana is about 362 kcal/100 g in raw form and 328 kcal/100 g after popping andit contains appreciable amounts of vitamins A and C (Khadatkar *et al*., 2020) [5]. Additionally, foxnut exhibits antioxidant, anti-aging andantidiabetic properties (Tahseen *et al*., 2020). The present study addresses the limitation of traditional *burfi*, which lacks dietary fiber and essential micronutrients andwhose regular consumption may have adverse long-term health implications. Incorporation of makhana flour into *burfi* may improve its nutritional, functional andhealth-promoting attributes without adversely affecting sensory quality. The specific objectives of the investigation was: to study the textural properties of the developed *burfi*.

Material and Methods

Studied on Preparation of *Burfi* Incorporated with Makhana (*Euryale Ferox Salisb*) Flour, was carried out at the Department of Animal Husbandry and Dairy Science, VNMKV, Parbhani, in the year 2024-2025.

Procurement of essential ingredients: Ingredients such as buffalo milk, makhana and sugar were purchased from the local markets of Parbhani.

Development of *Burfi*: The process of preparing Makhana *Burfi* begins with the receipt of fresh buffalo milk, which is then filtered and standardized. The milk undergoes continuous vigorous heating at 55-60°C in an open pan with constant stirring and scraping to prevent burning and ensure uniform consistency. As the milk reduces and thickens into a viscous, pasty consistency, known as the 'pat' stage, roasted makhana flour is added at 2%, 4% and 6% rate based on weight of milk. The mixture is further cooked with khoa until well combined, then allowed to cool to around 30°C. At this stage, sugar constituting 30% of the weight of khoa is incorporated. The sweetened mixture is spread evenly into a greased stainless-steel tray to cool and set. Once firm, it is cut into rectangular pieces, packaged appropriately andstored at room temperature for distribution and consumption.

Texture analysis

Texture profile of *burfi* was determined by using texture analyser (TAXT2i; M/s Stable micro systems; Software: Texture Expert Exceed, Version: 2.55), fitted with a 25 kg load cell and calibrated with 5 kg standard dead weight prior to use. *Burfi* was compressed twice in a reciprocating motion to obtain a two-bite texture profile curve using a double compression test. The various test parameters, used throughout the study, for whole, uncut *burfi* sample were P-75 compression probe, 1 mm/s probe pre-test speed, 0.5 mm/s test speed. 10 mm/s post-test speed, 7.5 mm distance (compression) and 25 ± 1 °C maintained sample temperature. The obtained texture profile curve (TPA) was used to determine the hardness, springiness, cohesiveness and gumminess of the tested market *burfi* samples.

Statistical analysis

Data collected from multiple experiments throughout the optimization process, was subjected to statistical analysis utilizing the statistical software SPSS with a completely randomized design (CRD).

Result and Discussion

Texture analysis

Table 1: Textural properties of *burfi*

Treatment	Hardness (Kg))	Cohesiveness	Adhesiveness (Kg. sec.)	Springiness (mm)	Gumminess (Kg)
T_1	1.004^d	0.0867^a	-0.02575^d	0.1135^d	0.26^d
T_2	1.234^c	0.0831^b	-0.03602^c	0.1214^c	0.36^c
T_3	1.423^b	0.0764^c	-0.12567^b	0.2243^b	0.87^b
T_4	3.923^a	0.0649^d	-0.1369^a	0.276^a	1.04^a
S.E. ±	0.01099	0.00031	0.000155	0.000138	0.001188
C.D. at 5%	0.0338	0.00097	0.000477	0.000426	0.003659

Hardness

Hardness is a key parameter in evaluating the texture of makhana flour *burfi*. The results indicated that an increase in the proportion of makhana flour led to a corresponding rise in the hardness of the product. As shown in Table 1, the T_1 treatment recorded the lowest hardness value (1.004), while the highest value was observed in T_4 (3.925). This increase in hardness can be attributed to the reduced moisture content and the greater quantity of makhana flour in the formulation

Cohesiveness

In makhana flour *burfi*, cohesiveness exhibited a declining trend from treatment T_1 to T_4, ranging between 0.0867 and 0.0649. This reduction could be associated with decreased moisture levels and a corresponding rise in total solids.

Adhesiveness

Adhesiveness, which contributes to the perceived stickiness during sensory evaluation, ranged from -0.0275 to -0.1369 in Makhana *burfi* depending on sugar concentration.

Springiness

The springiness of makhana flour *burfi* ranged from 0.1135 to 0.276. This variation was influenced by the proportion of makhana flour and sugar added, while maintaining a constant amount of *khoa*.

Gumminess

An increase in the proportion of makhana flour led to a corresponding rise in gumminess in the *burfi* samples, which ranged from 1.352 in treatment T_1 to 2.435 in T_4.

References

1. Aggarwal D, Raju PN, Alam T, Arora L. Advances in processing of heat-desiccated traditional dairy foods of the Indian sub-continent and their marketing potential. Food and Nutrition Journal. 2018;3(3):172.
2. Dey NN, Amin BK. Effect of nutritional, sensory and texture properties of jackfruit seed (*Artocarpus heterophyllus* Lam.) flour burfi. International Journal of Science and Qualitative Analysis. 2017;3(4):42-48.
3. Jha V, Barat GK, Jha UN. Nutritional evaluation of *Euryale ferox* Salisb. (makhana). Journal of Food Science and Technology. 1991;28(5):326-328.
4. Kapare PB. Studies on preparation of burfi blended with finger millet [master's thesis]. Parbhani: Vasantrao Naik Marathwada Krishi Vidyapeeth; 2017.
5. Khadatkar A, Gite LP, Gupta VK. Interventions to reduce drudgery of workers in the traditional method of harvesting makhana (*Euryale ferox* Salisb.) seed from ponds. Current Science. 2015;109(7):1332-1337.
6. Nath BK, Chakraborty AK. Studies on the amino acid composition of *Euryale ferox* Salisb. Journal of Food Science and Technology. 1985;22:293-296.

7. Pal D, Sabikhi L, Singh AK, Sharma K. Textbook of developments in traditional dairy products. Karnal: Centre of Advanced Studies, National Dairy Research Institute; 2006.
8. Pandey S, Poonia A. Studies on the preparation of antioxidant-rich ber (*Zizyphus mauritiana* Lamk.) powder burfi with coconut sugar as a natural sweetener. Indian Journal of Dairy Science. 2020;73(1):32-39.
9. Press Information Bureau, Government of India. Release of basic animal husbandry statistics 2024 on the occasion of National Milk Day 2024. New Delhi: PIB; 2024.
10. Satav YL, Narwade SG, Kadam RP, Syed IH. Effect of walnut powder incorporation on sensory, nutritional and textural quality profile of burfi. Asian Journal of Animal Science. 2014;9(2):129-133.
11. Shrivas AA, Pinto SV, Patel SM. Comparison of physico-chemical, microbiological and sensory quality of rava burfi and mawa burfi. Asian Journal of Home Science. 2017;12(2):522-530.
12. Tanuja, Pathak V, Goswami M. Development and quality evaluation of apple pomace incorporated burfi. Indian Journal of Dairy Science. 2017;70(2):162-166.
13. Tehseen S, Sarfraz F, Ateeq N, Ashfaq F, Yasmin I, Mehmood T. Foxnut (*Euryale ferox* Salisb.): A health fruit. Acta Scientific Agriculture. 2020;4(12):68-72.