DEVELOPMENT AND FORMULATION OF COCONUT–RAGI MILK PUDDING: NUTRITIONAL AND SENSORY EVALUATION OF A GLUTEN-FREE DESSERT

Dr. A. Ravinder[1], Chaitanya Aparna Reddy K[2], Pradeepthi T[3]

[1] Assistant Professor, Department of Food Technology & Management, Loyola Academy Degree & P.G. College, Alwal, Secunderabad, Telangana, India

[2], [3] Master's in Food Technology & Management, Loyola Academy Degree & P.G. College, Alwal, Secunderabad, Telangana, India

ABSTRACT

Coconut–ragi milk pudding is a gluten-free, vegan dessert developed to address the nutritional needs of lactose-intolerant consumers and to promote millet-based value addition. Finger millet (*Eleusine coracana*) is rich in calcium, iron, magnesium, crude fibre, while coconut milk contributes healthy fats, particularly medium-chain triglycerides (MCTs), which are associated with improved lipid metabolism. In the present study, ragi milk and coconut milk were blended with natural sweeteners (jaggery and dates) and processed through filtration, homogenization, and pasteurization to obtain a smooth pudding. Formulation optimization identified a 50:50 ragi milk:coconut milk ratio as the most acceptable. Proximate composition (per 100 g) showed moisture 58.6 ± 0.654 g, ash 0.68 ± 0.054 g, fat 4.24 ± 0.269 g, crude fibre 2.86 ± 0.161 g, and reducing sugars 4.47 ± 0.117 g, and micronutrients analysis showed calcium, magnesium, Iron contents of 115.25±0.65, 65.5±0.79, and 2.265±0.29 mg/100g, respectively as determined by AOAC methods. Sensory evaluation using a 9-point hedonic scale with 80 consumer panelists indicated high acceptability, with mean scores of 8/9 for smooth mouthfeel and nutty flavour. The results demonstrate that coconut–ragi milk pudding is a nutritionally rich, sensory-acceptable, gluten-free dessert suitable for vegan and lactose-intolerant populations.

Keywords: *Coconut–ragi pudding; gluten-free; vegan dessert; lactose intolerance; proximate analysis; sensory evaluation; hedonic scale.*

.

1.0 Introduction

Traditional South Indian desserts occupy a prominent place in Indian cuisine and are integral to festivals, religious ceremonies, and family celebrations. These products are typically prepared using indigenous ingredients such as coconut, jaggery, cereals, and spices, which impart natural sweetness, characteristic flavour, and cultural significance. In recent years, growing consumer awareness of health, sustainability, and food intolerances has increased interest in reformulating traditional desserts into nutritionally enhanced, gluten-free, and plant-based alternatives without compromising sensory quality.

1.1 Coconut

Coconut (*Cocos nucifera L.*), belonging to the family Aceraceae, is an economically and nutritionally important tropical fruit. The edible endosperm yields coconut milk; a creamy liquid widely used in traditional Indian cookery as well as in beverages and confectionery. Coconut is regarded as an auspicious fruit in Indian culture and is valued for its versatility and health-promoting properties. India contributes approximately 31–34% of global coconut production, with Kerala, Karnataka, and Andhra Pradesh being the major producing states. Coconut cultivation thrives in tropical climates (27 ± 5 °C), with annual rainfall of around 200 cm and well-drained sandy or loamy soils. Coconut milk serves as a popular dairy substitute and is rich in medium-chain triglycerides (MCTs), which support energy metabolism, thermogenesis, and cholesterol regulation, in addition to exhibiting antimicrobial activity.

1.2 Finger Millet (Ragi)

Finger millet (*Eleusine coracana*) is a traditional cereal crop widely grown in arid and semi-arid regions of India. It is often referred to as the "poor man's milk" due to its affordability and exceptionally high calcium content, comparable to or exceeding that of dairy products. Ragi is rich in calcium (≈344 mg/100 g), iron, dietary fibre, and polyphenols, making it nutritionally superior to many commonly consumed cereals such as rice and wheat. Its health benefits include improved bone health, better glycaemic control through slower carbohydrate digestion, cholesterol reduction, and antioxidant, anti-diabetic, and antimicrobial activities. With the rising global demand for gluten-free foods, finger millet has gained renewed importance as a functional ingredient in food product development.

1.3 Jaggery

Jaggery (Gud) is a traditional natural sweetener obtained by concentrating sugarcane juice through thermal processing. Unlike refined sugar, jaggery retains minerals such as iron, calcium, magnesium, potassium, and phosphorus, along with organic acids and phenolic compounds. India is one of the largest producers and consumers of jaggery, which is extensively used in traditional desserts. The mineral content of jaggery supports haemoglobin synthesis, bone health, muscle and nerve function, and blood pressure regulation, while its phenolic compounds contribute mild antioxidant and anti-inflammatory effects.

1.4 Dates

Dates (*Phoenix dactylifera L.*) are ancient fruits cultivated for over 7,000 years, originating in the arid regions of the Middle East. Date palms are grown in more than 40 countries and thrive in hot, dry climates with access to groundwater and tolerance to salinity. Nutritionally, dates are rich in natural sugars (glucose and fructose), dietary fibre, potassium, magnesium, calcium, and iron, providing quick energy and supporting digestive, metabolic, and cardiovascular health. Owing to their natural sweetness and nutrient density, dates are increasingly used as alternatives to be refined sugar in traditional foods.

1.5 Cardamom

Cardamom (*Elettaria cardamomum*) is a valued spice in Indian cuisine, imparting a sweet, floral aroma to desserts and beverages. The essential oils present in cardamom, rich in compounds such as terpinol acetate and cineole, contribute both flavour and therapeutic properties. Traditionally used in Ayurveda, cardamom is known for its digestive, antioxidant, anti-inflammatory, and antimicrobial effects, and may support cardio metabolic health when consumed as part of a balanced diet.

1.6 Coconut–Ragi Milk Pudding

Coconut–ragi milk pudding is a traditional-style South Indian dessert prepared using ragi milk, coconut milk, and natural sweeteners such as jaggery and dates. It is typically served chilled and possesses a soft pudding-like or cuttable jelly consistency. The product is naturally gluten-free and dairy-free, making it suitable for lactose-intolerant individuals and consumers following vegan diets. The synergistic combination of ragi and coconut milk enhances the nutritional profile by providing calcium, iron, dietary fibre, healthy fats, and antioxidants, thereby supporting bone health, gut health, and glycaemic control.

1.7 Objectives of the Study

The present study was undertaken with the following objectives:

- To develop a gluten-free dessert suitable for lactose-intolerant populations
- To formulate a micronutrient-rich product with potential benefits for bone health
- To promote veganism and sustainability through plant-based ingredients
- To enhance sensory attributes (taste and texture) comparable to conventional desserts
- To encourage millet utilization through value-added, family-friendly food products

2.0 Literature Review

Puddings are a category of semi-solid, sweetened or Savory food products that are widely consumed across the world, with formulations varying from dairy-based to plant-based matrices. Traditionally, milk or cream serves as the primary liquid component, often combined with starches or flours to achieve the characteristic gel-like consistency. The growing demand for functional foods, plant-based alternatives, and gluten-free diets has prompted extensive research into the development of non-dairy puddings enriched with bioactive components and nutrient-dense ingredients.

2.1 Traditional and Plant-Based Puddings

Conventional puddings rely on dairy milk as a source of protein and fat, providing desirable textural and sensory qualities. Chee and Gwee (1997) highlighted the importance of milk fat and protein interactions in achieving smooth, creamy textures in milk-based desserts. However, lactose intolerance, dairy allergies, and the rise of veganism have motivated the exploration of plant-based milk substitutes for pudding formulations (Tulashie et al., 2023). Plant-based alternatives such as coconut milk, almond milk, and soy milk provide not only comparable mouthfeel but also unique nutritional benefits, including medium chain triglycerides (MCTs), polyphenols, and dietary fiber.

2.2 Millets as Functional Ingredients

Millets, particularly finger millet (ragi, *Eleusine coracana*), have gained attention for their nutritional and functional attributes. Ragi is a rich source of calcium, iron, magnesium, dietary fiber, and polyphenolic antioxidants, making it suitable for fortifying gluten-free and lactose-free products (Shobha & Ravishankar, 2013; Mehra, 2020). Several studies have demonstrated the use of ragi in bakery products, porridges, and snack formulations, highlighting its potential to enhance bone health, glycaemic control, and gut health (Srinivasan et al., 2020; Shinde et al., 2019). Incorporation of ragi into pudding formulations can therefore improve nutritional density while maintaining desirable texture and acceptability.

2.3 Coconut Milk in Dessert Formulations

Coconut milk, derived from grated coconut kernel, is widely used as a dairy alternative in South Asian desserts. It provides creamy texture, rich flavor, and functional lipids, particularly MCTs, which are associated with improved lipid metabolism, energy expenditure, and antimicrobial effects (Patil & Benjakul, 2018; Karunasiri et al., 2020). Coconut milk has been incorporated into various plant-based desserts, showing high consumer acceptability while serving as a functional ingredient that complements cereals and natural sweeteners.

2.4 Natural Sweeteners

Traditional puddings are often sweetened with refined sugar, but natural sweeteners like jaggery (*Gud*) and dates offer additional nutritional and functional benefits. Jaggery contains minerals such as iron, calcium, and magnesium, along with phenolic compounds, which contribute to antioxidant and anti-inflammatory properties (Karunasiri et al., 2020). Dates provide natural sugars, dietary fiber, vitamins, and minerals, serving as a nutritionally superior sweetening option while enhancing texture and flavor (Ibrahim et al., 2021). Studies have reported successful incorporation of dates as sugar alternatives in traditional and millet-based desserts, improving health attributes without compromising sensory quality (Emirates Journal of Food and Agriculture, 2013).

2.5 Functional and Sensory Properties of Puddings

The success of pudding products depends on both their nutritional profile and sensory appeal. Sensory parameters such as smoothness, mouthfeel, color, flavor, and overall acceptability are crucial for consumer preference. Research indicates that plant-based puddings combining coconut milk with cereals or pulses can achieve textural and flavor profiles comparable to conventional milk puddings (Ajgaonkar & Shekar, 2020). The synergistic use of ragi and coconut milk not only enhances fiber, mineral, and antioxidant content but also maintains desirable sensory attributes, making them suitable for health-conscious and gluten-intolerant populations (Shobha & Ravishankar, 2017; Zeba & Fatima, 2024).

3.0 Materials and Methods

3.1 Materials

Whole ragi (finger millet) grains (500 g) were procured from the local market. Fresh mature coconuts were used to obtain coconut kernel (300 g), yielding approximately 500 mL of thick coconut milk. Potable water (1 L) was used for soaking, grinding, and dilution. Sugarcane jaggery (300 g) served as the natural sweetener, while dates pulp (200 g) was used as an additional sweetening and flavour-enhancing ingredient. Cardamom powder (1–2 tsp) was added for flavour, and a pinch of salt was incorporated to balance taste. Dry fruits such as cashew nuts, almonds, and pistachios were used as toppings.

3.2 Equipment and Glassware

The equipment used for preparation included a grinder/blender, muslin cloth, sieve, thick-bottom pan, weighing balance, thermometer, and spatula. Laboratory glassware such as Petri dishes, crucibles, measuring cylinders, conical flasks, and burettes were used for analytical purposes. A Soxhlet apparatus was employed for the determination of total fat content.

3.3 Process Flow

Preparation and soaking → Milk extraction → Filtration → Dilution → Sweetener preparation → Homogenisation and thickening → Addition of sweeteners → Cooking (15–20 min) → Setting → Garnishing and refrigeration

3.4 Methodology

3.4.1 Preparation and Soaking

Good-quality whole ragi grains were cleaned, washed thoroughly, and soaked in chilled potable water for 6–8 h. Fresh mature coconuts were selected, and the white kernel was separated and washed using potable water.

3.4.2 Milk Extraction

The soaked ragi grains were ground with potable water using a blender to obtain a fine paste. The paste was filtered through a muslin cloth to extract ragi milk and separate the insoluble residue. Similarly, the coconut kernel was chopped, ground into a fine paste, and coconut milk was extracted using a muslin cloth.

3.4.3 Filtration

Both ragi milk and coconut milk were further filtered through a sieve to remove any remaining coarse particles or impurities.

3.4.4 Dilution

Potable water was added to the extracted milk to achieve a uniform and desirable consistency suitable for dessert preparation.

3.4.5 Sweetener Preparation

Sugarcane jaggery was dissolved in warm water to obtain a smooth syrup and strained to remove extraneous matter. Dates were soaked in warm water, blended into a fine paste, and filtered to obtain clarified dates pulp.

3.4.6 Homogenisation and Thickening

Ragi milk and coconut milk were combined in a thick-bottom pan and homogenised to ensure uniform distribution of nutrients and flavour components. The mixture was heated gently with continuous stirring to prevent lump formation and sticking to the bottom of the pan.

3.4.7 Addition of Sweeteners

Prepared jaggery syrup and dates pulp were added to the milk mixture and stirred continuously for approximately 10 min to ensure uniform sweetness.

3.4.8 Cooking

Cooking was continued until the desired pudding consistency was achieved. The total cooking time ranged between 15 and 20 min under gentle heating conditions.

3.4.9 Setting

The cooked pudding was poured into plastic moulds or containers, levelled, and allowed to cool at room temperature for 20–30 min to facilitate proper setting.

3.4.10 Garnishing and Refrigeration

Chopped dry fruits were used for garnishing to enhance sensory appeal. The prepared pudding was stored under refrigerated conditions until consumption.

3.4.11 Proximate Analysis

To evaluate the nutritional profile of the gluten-free dessert, proximate analysis was carried out in accordance with standard methods prescribed by the Association of Official Analytical Chemists **(AOAC)**. The analysis included the determination of moisture content, total ash, crude fiber, total fat, reducing sugars, total sugars, and calcium content.

Moisture content was determined using the hot air oven drying method. Total ash was estimated by incineration of the sample in a muffle furnace. Crude fiber content was analyzed by acid and alkali digestion followed by gravimetric estimation. Total fat content was determined using the Soxhlet extraction method. Reducing sugars and total sugars were quantified using standard titrimetric procedures. Calcium content was estimated by volumetric analysis following wet digestion of the sample. All analyses were performed in triplicate, and the results were expressed as mean values.

3.4.12 Sensory Evaluation

Sensory evaluation was carried out using 30 consumer panelists employing a 9-point hedonic scale. The samples were evaluated for appearance, flavour, texture, colour, and overall acceptability. Panelists were instructed to score each attribute ranging from 1 (disliked extremely) to 9 (liked extremely).

4.0 Results and Discussion

The results of proximate analysis and sensory evaluation of the developed gluten-free dessert are presented in Table 1, and Figures 1.

Table 1: Proximate Composition of Gluten-Free Dessert

S.No.	**Parameters**	**Content/100g**
1	Moisture(gm)	58.6±0.65
2	Ash(gm)	0.68±0.05
3	Fat(gm)	4.24±0.26
4	Crude fiber(gm)	2.86±0.16
5	Reducing sugar(gm)	4.47±0.11
6	Calcium(mg)	115.25±0.65
7	Magnesium(mg)	65.5±0.79
8	Iron (mg)	2.26±0.29

The proximate composition of the developed gluten-free dessert is presented in Table 1. The moisture content was found to be 58.6 ± 0.65 g/100 g, indicating a relatively high moisture level. This contributes to the soft texture and fresh sensory attributes of the dessert; however, elevated moisture may influence shelf life and therefore necessitates appropriate storage conditions.

The ash content of the product was 0.68 ± 0.05 g/100 g, reflecting the presence of mineral constituents. The observed ash value is comparable to those reported for similar traditional desserts, suggesting adequate mineral retention from the raw materials used in formulation.

The fat content was recorded as 4.24 ± 0.27 g/100 g, which can be considered moderate. This level of fat contributes positively to palatability and mouthfeel while maintaining a comparatively lower fat profile than conventional milk-based desserts, making the product suitable for health-conscious consumers.

Crude fiber content was found to be 2.86 ± 0.16 g/100 g, indicating a meaningful dietary fiber contribution. The presence of fiber enhances the nutritional quality of the dessert and may offer digestive health benefits, particularly for gluten-intolerant individuals who are often at risk of consuming fiber-deficient diets.

The reducing sugar content was 4.47 ± 0.12 g/100 g, contributing to acceptable sweetness and flavor characteristics. The controlled level of reducing sugars supports palatability while minimizing excessive sugar intake.

Micro nutrients was estimated as calcium, magnesium, Iron were 115.25±0.65, 65.5±0.79, and 2.265±0.29 mg/100gm, respectively.

4.1 Nutritive Comparison of Coconut Milk, Ragi Milk, and Cow Milk

The comparative nutritional composition of coconut milk, ragi milk, and cow milk is illustrated in Table 2 and Figure 1. The comparison highlights marked variations in macro- and micronutrient composition, reflecting their suitability for different dietary applications.

Table 2: Nutritive Comparison of Coconut Milk, Ragi Milk, and Cow Milk

Nutrients (per 100 gm)	Coconut milk	Ragi milk	Cow milk
Carbohydrates(gm)	5.5	72.6	12
Fiber(gm)	2.2	3.6	0
Vitamin c(gm)	2.8	44.62	25
Calcium(gm)	16.0	350	125
Protein(gm)	2.90	7.7	8
Fat(gm)	23.8	1.3	8
Energy (Kcal)	230	150	70
Sugar(gm)	3.3	0.6	5
Iron(mg)	0.3	4.6	0
Magnesium (mg)	37	154	11

Ragi milk exhibited the highest carbohydrate and dietary fibre content, indicating its potential as an energy-rich and fibre-enhanced ingredient, particularly beneficial for children and physically active individuals. Coconut milk showed comparatively lower carbohydrate content but higher fat and energy values, making it suitable for energy-dense food formulations.

The ash content, indicative of total mineral matter, was higher in ragi milk, suggesting superior mineral availability. Coconut milk and ragi milk demonstrated appreciable calcium content, supporting their use as plant-based calcium sources, while cow milk showed moderate calcium levels consistent with its traditional role in bone health.

Cow milk exhibited higher protein content compared to coconut milk, while ragi milk contributed moderate protein levels, indicating its potential as a complementary plant-based protein source. Coconut milk contained appreciable vitamin C, which was negligible in cow milk, enhancing its antioxidant potential. Additionally, ragi milk showed higher iron and magnesium contents, highlighting its importance in preventing micronutrient deficiencies, particularly anaemia.

Overall, the comparison demonstrates that ragi milk provides superior fibre and mineral content, coconut milk contributes higher energy and fat, and cow milk offers better protein balance, justifying the incorporation of coconut and ragi milk in the formulation of nutritionally enriched gluten-free desserts.

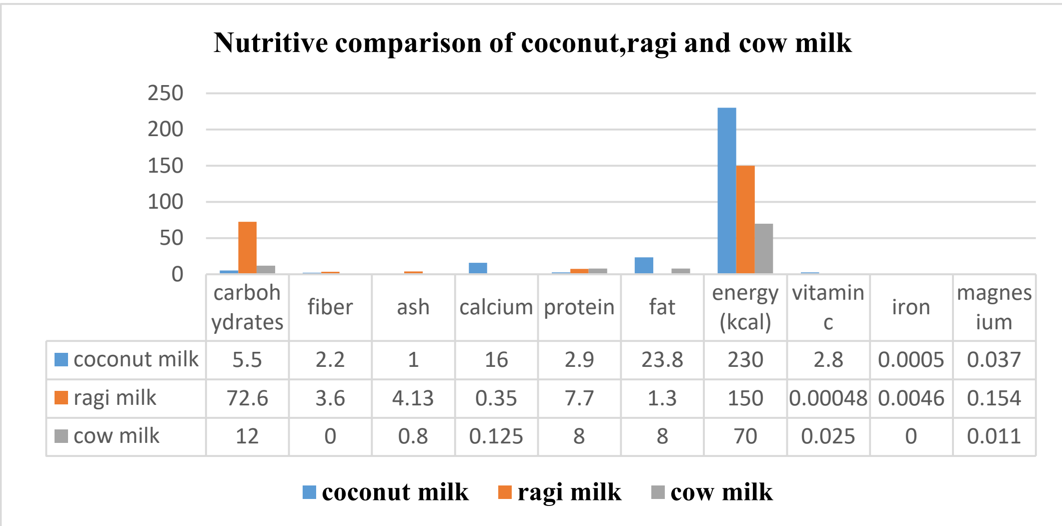

Figure 1: Graph of nutritive values comparison of Coconut milk, Ragi milk, and Cow milk

4.2 Sensory Evaluation of Coconut Ragi Pudding

The sensory evaluation results of coconut ragi pudding and conventional milk pudding are represented in the spider (radar) graph shown in Figure 2. The radar graph provides a visual comparison of multiple sensory attributes assessed simultaneously using a 9-point hedonic scale.

Coconut ragi pudding exhibited higher scores for colour, which may be attributed to the natural pigmentation of ragi combined with coconut milk, resulting in an appealing appearance. This enhanced visual quality plays a significant role in initial consumer acceptance of plant-based desserts.

The sweetness and flavour scores of coconut ragi pudding were comparable to those of conventional milk pudding, indicating that the incorporation of ragi and coconut milk did not negatively influence taste perception. The balanced sweetness level contributed positively to consumer preference.

With respect to springiness, both samples showed similar and acceptable scores, suggesting that the texture of the coconut ragi pudding closely resembled that of the traditional milk pudding. Texture is a critical quality attribute for pudding-type products, and the results indicate satisfactory textural characteristics.

The **overall acceptability (OAA)** scores demonstrated that coconut ragi pudding was well accepted by the panellists and showed acceptance levels comparable to the conventional milk pudding. This confirms that the gluten-free formulation achieved desirable sensory quality.

Overall, the spider graph clearly illustrates that coconut ragi pudding possesses balanced sensory attributes and is sensorially comparable to conventional milk pudding *(source:Sayli , et al.,2025*) supporting its potential as a nutritious and consumer-acceptable gluten-free dessert.

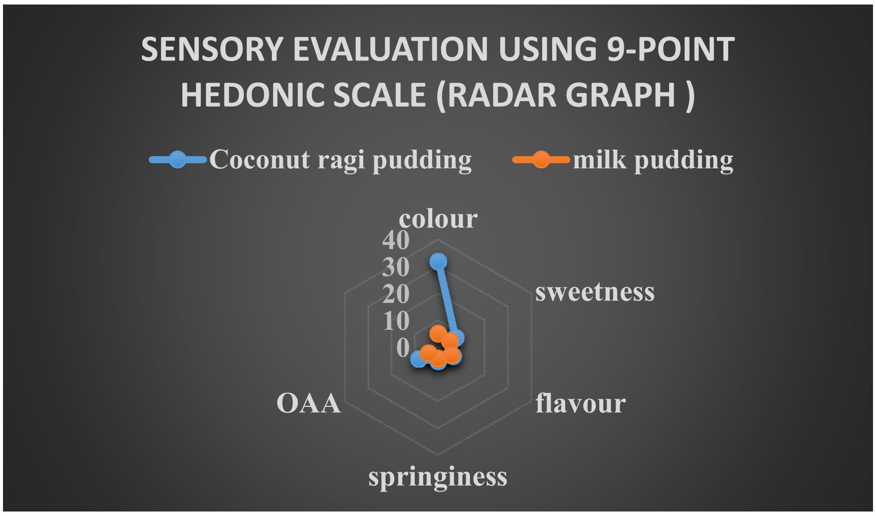

Figure 2: spider (radar) graph of sensory evaluation

5.0 Overall Interpretation

The combined results of proximate analysis, nutritive comparison, and sensory evaluation clearly demonstrate that the developed coconut ragi pudding possesses balanced nutritional composition, enhanced mineral and fibre content, and acceptable sensory attributes. The product can therefore be considered a nutritious and appealing alternative to traditional milk-based desserts, particularly for gluten-intolerant and health-conscious consumers

6.0 Conclusion

The present study successfully developed a gluten-free coconut ragi pudding with desirable nutritional and sensory attributes. Proximate analysis revealed that the product possessed moderate fat content, appreciable dietary fibre, controlled reducing sugars, and adequate mineral content, indicating a balanced nutritional profile. The comparatively high moisture content contributed to the soft texture and freshness of the dessert.

The nutritive comparison of coconut milk, ragi milk, and cow milk highlighted the advantages of plant-based milks, particularly ragi milk for its superior fibre and mineral content and coconut milk for its higher energy contribution. These findings justify the incorporation of coconut and ragi milk in the formulation of nutritionally enriched gluten-free desserts.

Sensory evaluation using a 9-point hedonic scale demonstrated that coconut ragi pudding was well accepted by panellists, with sensory scores comparable to conventional milk pudding. Overall, the developed product can be considered a nutritious, sensorially acceptable, and suitable alternative to traditional milk-based desserts, especially for gluten-intolerant and health-conscious consumers.

References

1. Ajgaonkar, B., & Shekar, A. (2020). Formulation and shelf-life study of ragi-based frozen modaks. *International Journal of Creative Research Thoughts*, 8(5), 2320–2882.
2. Chee, G. C., & Gwee, C. N. (1997). Coconut milk: Chemistry and technology. *International Journal of Food Science and Technology*, 32(3), 189–201.
3. Dates as a substitute for added sugar in traditional foods: A case study with idli. (2013). *Emirates Journal of Food and Agriculture*, 25(11), 899–906
4. Ibrahim, F. S. A., Ayad, A. A., Williams, L. L., Ayivi, R. D., Gyawali, R., Krastanov, A., & Aljaloud, S. O. (2021). Date fruit: Chemical and nutritional compounds, functional effects, and food applications. *International Journal of Food Science and Technology*, 56(4), 1503–1513.
5. Jadav, K. D., & Mehta, B. M. (2017). Cardamom: Chemistry, medicinal properties, and applications in dairy and food industry. *Research and Reviews: Journal of Dairy Science and Technology*, **7**, 1–9.
6. Karunasiri, A. N., Gunawardane, M., & Perera, P. I. (2020). Antioxidant and nutritional properties of domestic and commercial coconut milk preparations. *International Journal of Food Science*, 3489605. https://doi.org/10.1155/2020/3489605
7. Kokani, R., Pournima, H. B., & Sakharam, K. S. (2018). Studies on utilization of ragi for preparation of malted ragi cookies. *Agricultural and Food Sciences*.
8. Mehra, M. (2017). Studies on development of process technology for preparation of burfi using ragi flour. *International Journal of Current Microbiology and Applied Sciences*, **6**(9), 2200–2207.
9. Mehra, M. (2020). Finger millet milk – A solution for lactose intolerance. *Journal of Pharmacognosy and Phytochemistry*, 9(5), 3145–3148.
10. Patil, U., & Benjakul, S. (2018). Coconut milk and coconut oil: Manufacture associated with protein functionality. *Journal of Food Processing and Preservation*, 42, e13536.
11. Saraswathi, S., & Henry, H. T. (2018). Beneficial effects of ragi on hematological parameters, BMI, and scholastic performance among anemic adolescent girls. *Journal of Nutrition and Health*, **7**(2), 101–108.
12. Shinde, D. B., Popale, S. R., & Broadway, A. A. (2019). Studies on preparation of nutritional ragi snacks packed with nitrogen flushing. *Journal of Pharmacognosy and Phytochemistry*, 8(2), 2194–2196.

13. Shobha, D., & Ravishankar, C. R. (2013). Finger millet (*Eleusine coracana* L.): Nutritional properties, processing, and health benefits. *Advances in Food and Nutrition Research*, 69, 1–20.
14. Shobha, D., & Ravishankar, C. R. (2017). Quality assessment and evaluation of ragi for development of multipurpose mix. *Mysore Journal of Agricultural Sciences*, 51(1), 113–119.
15. Shobha, D., & Ravishankar, C. R. (2024). Finger millet: A comprehensive review. *International Journal of Ayurvedic Medicine*, 15(1), 45–58.
16. Srinivasan, S., Henry, H. T., & Janardhanam, H. A. (2020). Nutritional and functional properties of millet-based products. *Journal of Pharmacognosy and Phytochemistry*, **9**(5), 3145–3148.
17. Srinivasan, S., Henry, H. T., & Janardhanam, H. A. (2025). Traditional millet-based delicacies. In *Relish of India* (pp. 73–78). New Delhi: Pen to Print Publishing LLP.
18. Tulashie, S. K., Amenakpor, J., Atisey, S., Odai, R., & Akpari, E. E. A. (2023). Development and nutritional evaluation of plant-based milk alternatives. *International Journal of Agriculture and Food Science*, 3(1), 29–32.
19. Yahyazadeh, R., Rahbardar, M. G., Razavi, B. M., Karimi, G., & Hosseinzadeh, H. (2021). The effect of *Elettaria cardamomum* on metabolic syndrome: A narrative review. *Iranian Journal of Basic Medical Sciences*, 24(11), 1462–1469.
20. Zeba, S. U., & Fatima, U. (2024). Formulation, nutrient estimation, and shelf-life analysis of non-dairy foxtail ice-cream pudding. *International Journal for Multidisciplinary Research (IJFMR)*, **6**(2).