# Exploring the Aesthetic Values Of Finger Millet- Ragi (Eleusine Coracana L): A Multifaceted Perspective

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**Abstract**
Ragi, or finger millet (Eleusine coracana), is an ancient cereal grain that has been farmed for thousands of years, mostly in Asia and Africa. It is a staple food in many areas due to its well-known nutritional value and health advantages. Finger millet has been increasingly popular across the globe in recent times owing to its remarkable nutritional content and adaptability in culinary uses. With a focus on finger millet's antioxidant qualities, health advantages, and culinary applications, this thorough assessment offers a detailed analysis of the grain's nutritional makeup. Among the small millets, ragi, commonly referred to as finger millet (Eleusine coracana), is one of the most significant grains and is cultivated over the largest area. In terms of protein (6–8%) and fat (1-2%), finger millet is similar to rice. However, it has higher mineral and micronutrient levels than both rice and wheat. It provides a primary source of dietary carbs for a significant portion of the population. In addition to the main food components, ragi provides many health advantages and is a rich source of important micronutrients. The present demand for the well-being of society is to develop value-added food items based on ragi that can enhance nutritional value and be favorable for good health.
This paper attempts a comprehensive review to explore the nutritional composition of finger millet, highlighting its macronutrient and micronutrient content, antioxidant properties, health benefits, and culinary applications. The review also discusses the importance of finger millet in promoting overall health and well-being, making it a valuable addition to a balanced diet.

**Keywords:** Ragi, Finger Millet, Aesthetic Values, Visual Appeal, Cultural Symbolism, Nutrition

**Introduction:**
Apart from its culinary and nutritional value, ragi, or finger millet, is a beautiful grain that is highly regarded for its nutrient-denseness and health benefits. The year 2023 was proclaimed by the UN to be the "Year of Millet," and what makes it unique is that it incorporates Indian "cereals." Navne, Sama, Sajje, Araka, Korale, Baragu, Ragi, and maize are grown in most of the world's nations, but India accounts for the majority of their growth, while most of these are grown in Karnataka. India is the largest producer of ragi globally, with Karnataka, Tamil Nadu, Andhra Pradesh, and Maharashtra being the major producing states. According to the Food and Agriculture Organization (FAO), India is the largest producer of ragi globally, with Karnataka, Tamil Nadu, Andhra Pradesh, and Maharashtra being the major producing states. (Source: FAOSTAT - http://www.fao.org/faostat/en/#data/QC) In 2020, India produced over 7 million metric tons of ragi. (Source: FAOSTAT - http://www.fao.org/faostat/en/#data/QC) Ragi is also cultivated in other countries such as Uganda, Ethiopia, Nigeria, and Kenya.

**Cropping Sequence, Challenges and Measures[a]:**

In the month of April or May, one deep ploughing with mould board plough , followed by ploughing with wooden plough twice is generally practiced. Seeds are very small (400 seeds / g) and take 5 -7 days to germinate. Hence good seeds, land preparation helps in better germination, minimize weeds problem and effective soil moisture conservation. In Uttaranchal where frequent ploughing operations are difficult to carry out effective digging and turning of soil, land smoothening, providing inward slope with a shallow drain helps in taking out excess rain water. Depending on soil type, weather condition and duration of variety, 8-14 irrigations are necessary.
Light soils: Irrigate the crop once in 6-8 days
Heavy soils: once in 12-15 days.
Northern Bihar: Potato-paddy-finger millet cropping sequence is highly remunerative than other cropping sequences for garden land.
Southern Karnataka or Deccan plateau: Finger millet-potato-maize or finger millet-onion-finger millet are highly remunerative cropping.

**Weed and Disease Control[b]:**
In ragi crop weeds can be effectively managed by cultural and mechanical measures;

- Line sowing: 2-3 inter cultivations and one hand weeding
- Broadcast crop: 2 effective hand weeding will minimize weeds
- In assured rainfall and irrigated areas: Pre-emergence spray: Isoproturon @ 0.5 kg a.i./ha. (Rainfed areas), Oxyflurofen @ 0.1 lta.i /ha (Irrigated areas)
- Post-emergent spray: 2, 4-D sodium salt @ 0.75 kg a.i./ha Spraying around 20-25 days after sowing effectively control weeds.

Finger millet is affected by a variety of diseases of which blast caused by Pyriculariagriseais the major problem. The disease is quite severe in kharif crop at all the growth stages. The losses caused will be more if the disease appears in the nursery and on the ears affecting the neck and fingers. By growing resistant varieties like GPU 28, GPU 26 and GPU 48 betters yields can be gained. In recent years, brown spot caused by Drechsleranodulosa is gaining importance. Its damage could be severe if the crop is subjected to drought or nutrition deficiency. The disease can be effectively managed by proper nutrition and water management. Need based spraying of Mancozeb or Saaf (0.2%) can be resorted to.
***Source for a & b: https://apeda.gov.in/milletportal/Production.html***

**Ragi crop yield: Statistics**

| CROP: RAGI | Area (A) in lakh ha, Production (P) in Lakh tonnes and Yield (Y) in Kg/ha | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| State/ UT | 2017-18 | | | 2018-19 | | | 2019-20 | | | 2020-21 | | | 2021-22* | | | Normal | | |
| | A | P | Y | A | P | Y | A | P | Y | A | P | Y | A | P | Y | A | P | Y |
| Andhra Pradesh | 0.35 | 0.45 | 1277 | 0.32 | 0.43 | 1348 | 0.34 | 0.45 | 1320 | 0.33 | 0.40 | 1197 | 0.30 | 0.30 | 1000 | 0.33 | 0.40 | 1233 |
| Bihar | 0.04 | 0.04 | 994 | 0.03 | 0.03 | 1071 | 0.03 | 0.02 | 796 | 0.03 | 0.03 | 934 | 0.02 | 0.02 | 779 | 0.03 | 0.03 | 927 |
| Chhattisgarh | 0.05 | 0.01 | 250 | 0.08 | 0.02 | 214 | 0.06 | 0.01 | 253 | 0.05 | 0.02 | 302 | 0.03 | 0.01 | 300 | 0.05 | 0.01 | 257 |
| Gujarat | 0.12 | 0.11 | 896 | 0.12 | 0.10 | 804 | 0.12 | 0.10 | 862 | 0.10 | 0.13 | 1205 | 0.10 | 0.19 | 1899 | 0.11 | 0.12 | 1106 |
| Himachal Pradesh | 0.02 | 0.02 | 1056 | 0.02 | 0.02 | 1060 | 0.02 | 0.02 | 1170 | 0.01 | 0.00 | 842 | 0.01 | 0.00 | 842 | 0.01 | 0.01 | 1050 |
| Jammu & Kashmir | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Jharkhand | 0.19 | 0.18 | 972 | 0.14 | 0.11 | 805 | 0.15 | 0.13 | 875 | 0.19 | 0.16 | 874 | 0.19 | 0.17 | 878 | 0.17 | 0.15 | 885 |
| Karnataka | 7.78 | 12.86 | 1653 | 5.27 | 6.78 | 1285 | 6.41 | 11.64 | 1816 | 7.85 | 13.70 | 1745 | 8.49 | 11.33 | 1334 | 7.16 | 11.26 | 1573 |
| Kerala | 0.00 | 0.00 | 1272 | 0.00 | 0.00 | 1208 | 0.00 | 0.00 | 1225 | 0.00 | 0.00 | 1435 | 0.00 | 0.00 | 1661 | 0.00 | 0.00 | 1355 |
| Madhya Pradesh | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0 | 0.00 | 0.00 | 0.00 |
| Maharashtra | 0.93 | 1.06 | 1145 | 0.80 | 0.93 | 1164 | 0.82 | 0.87 | 1061 | 0.82 | 0.94 | 1151 | 0.74 | 0.93 | 1264 | 0.82 | 0.95 | 1154 |
| Odisha | 0.43 | 0.33 | 767 | 0.37 | 0.25 | 690 | 0.36 | 0.26 | 731 | 0.41 | 0.33 | 796 | 0.55 | 0.44 | 795 | 0.42 | 0.32 | 760 |
| Tamil Nadu | 0.87 | 3.21 | 3714 | 0.79 | 2.56 | 3257 | 0.85 | 2.75 | 3247 | 0.83 | 2.89 | 3481 | 0.74 | 2.21 | 2972 | 0.81 | 2.72 | 3346 |
| Telangana | 0.01 | 0.01 | 1137 | 0.01 | 0.01 | 977 | 0.02 | 0.03 | 1581 | 0.01 | 0.01 | 1343 | 0.01 | 0.02 | 1853 | 0.01 | 0.02 | 1412 |
| Uttarakhand | 1.03 | 1.41 | 1367 | 0.92 | 1.10 | 1194 | 0.84 | 1.20 | 1430 | 0.89 | 1.30 | 1459 | 0.86 | 1.27 | 1478 | 0.91 | 1.26 | 1383 |
| West Bengal | 0.12 | 0.14 | 1130 | 0.03 | 0.03 | 895 | 0.03 | 0.04 | 1464 | 0.06 | 0.06 | 1073 | 0.05 | 0.06 | 1176 | 0.06 | 0.07 | 1133 |
| Other# | 0.02 | 0.03 | 1634 | 0.01 | 0.02 | 1345 | 0.01 | 0.02 | 1503 | 0.01 | 0.02 | 1488 | 0.01 | 0.02 | 1189 | 0.01 | 0.02 | 1450 |
| All India | **11.95** | **19.87** | **1662** | **8.91** | **12.39** | **1390** | **10.04** | **17.55** | **1747** | **11.59** | **19.98** | **1724** | **12.11** | **16.96** | **1401** | 10.92 | 17.35 | 1589 |

*4th Advanced Estimates
*Source: Directorate of Millets development, Jaipur, Note: A=Area, P=Production and Y=Yield*

**Administration of *Kunapa jala:***

According to Surapala, "Vrikshayurveda" an age-old science of plant life that addresses the production and healthy growth of a variety of plant species, the ancient agricultural method still holds significant value in the fields of horticulture and agriculture. It addresses plant pest and disease control, seed storage, germination, sowing, plant propagation, manuring, and other related topics. The text of Vrikshayurveda penned by Surapala circa 1000 AD contains references to the usage of a biofertilizer known as "Kunapa jala" (KJ) for plant sustenance. The information about KJ can also be found in Upavana vinoda, a 13th-century anthropological anthology titled "Sharangadhara Paddhati" and authored by Acharya Sharangadhara**.** This needs further investigation and experimentation for its application.

**Consumption Patterns:**
Ragi is a staple food in many parts of South India, particularly in Karnataka, where it is consumed in various forms such as porridge (ragi mudde), dosa, idli, and roti. (Source: Indian Journal of Nutrition and Dietetics, Volume 53, Issue 2, 2016) Traditional communities in Africa, such as the Hausa people in Nigeria and the Kikuyu people in Kenya, also consume ragi as a staple food. (Source: Food and Agriculture Organization)

- **Ragi Mudde:** Ragi mudde is a traditional dish from Karnataka, made by cooking ragi flour with water to form a thick dough-like consistency. It is typically served with sambar or other vegetable curries.

- **Ragi Dosa:** Ragi dosa is a nutritious variation of the traditional South Indian dosa, made by fermenting a batter of ragi flour, urad dal (black gram), and rice. It is crispy, flavorful, and often served with chutney and sambar.

- **Ragi Idli**: Ragi idli is a healthier alternative to regular idli, made by fermenting a batter of ragi flour, urad dal, and rice. It is steamed to perfection and served with chutney and sambar.

- **Ragi Roti:** Ragi roti is a flatbread made from ragi flour, grated vegetables, and spices. It is popular in Karnataka and other parts of South India and is typically served with chutney, pickle, or yogurt.

- **Ragi Porridge:** Ragi porridge, also known as ragi kanji or ragi malt, is a nutritious breakfast option made by cooking ragi flour with milk or water and sweetening it with jaggery or sugar. It is often flavored with cardamom, nuts, and dried fruits.
- **Ragi Ladoo:** Ragi ladoo is a healthy and delicious snack made by roasting ragi flour with ghee (clarified butter), mixing it with jaggery or sugar, and shaping it into small balls. It is a popular treat during festivals and celebrations.

- **Ragi Upma:** Ragi upma is a savory dish made from ragi flour, semolina (rava), vegetables, and spices. It is cooked similar to traditional upma and makes for a wholesome and satisfying breakfast or snack.
- These are just a few examples of ragi-based food items commonly consumed in India. Each dish offers a unique taste and texture while providing the nutritional benefits of ragi.

Ragi is primarily cultivated and consumed in certain regions of the world, particularly in South Asia and parts of Africa. In these regions, especially in India, Karnataka, Tamil Nadu, Andhra Pradesh, and Maharashtra are some of the major ragi-producing states. Similarly, countries like Uganda, Ethiopia, Nigeria, and Kenya also have significant ragi cultivation.

**Nutritional Content and Health Benefits:**
Ragi is highly nutritious and is considered a "superfood" due to its rich content of calcium, iron, dietary fiber, protein, and antioxidants. According to the Indian Council of Medical Research (ICMR), 100 grams of ragi contains approximately 344 calories, 71.5 grams of carbohydrates, 7.3 grams of protein, and 3.6 grams of dietary fiber. A study published in the Journal of Medicinal Food found that regular consumption of ragi can help lower blood sugar levels and reduce cholesterol levels. (Source: Journal of Medicinal Food, Volume 14, Issue 6, 2011)

**Nutritional Composition:** Ragi is rich in essential nutrients such as carbohydrates, dietary fiber, proteins, vitamins (especially B-complex vitamins like thiamine, riboflavin, and niacin), minerals (including calcium, iron, phosphorus, and potassium), and antioxidants.
In traditional medicine systems such as Ayurveda, ragi has been used for its various medicinal properties. It is believed to have cooling properties and is recommended for consumption during hot weather to alleviate conditions related to excess heat in the body.

**Antioxidant Activity:** Ragi contains phenolic compounds and flavonoids, which exhibit antioxidant activity. These antioxidants help protect the body from oxidative stress and reduce the risk of chronic diseases.

**Bone Health:** Ragi is an excellent source of calcium, which is essential for maintaining strong and healthy bones.

**Blood Sugar Regulation:** Ragi has a low glycemic index, making it suitable for individuals with diabetes or those looking to manage their blood sugar levels effectively. Ragi is also known for its high calcium content, making it beneficial for bone health and preventing conditions such as osteoporosis. (Source: International Journal of Food Sciences and Nutrition, Volume 66, Issue 4, 2015)

**Impact on Insulin Resistance:**
Research published in the Journal of Medicinal Food demonstrated that ragi consumption improved insulin sensitivity and reduced insulin resistance in diabetic rats. The study suggested that ragi could be beneficial in managing insulin resistance, a key factor in the development and progression of type 2 diabetes.

**Role in Weight Management:**
Obesity and overweight are significant risk factors for type 2 diabetes. Ragi's high fiber content can contribute to increased satiety and reduced calorie intake, aiding in weight management efforts among diabetic patients. [Reference: Hithamani, G., Srinivasan, K., & Mahadevamma, S. (2009). Finger millet polyphenols: Optimization of extraction and the effect of pH on their stability. Journal of Food Science and Technology, 46(4), 360–366.]

**Gut Health and Glycemic Control:**
Ragi's fiber content promotes digestive health by regulating bowel movements and maintaining gut microbiota balance. Improved gut health can contribute to better glycemic control and overall metabolic health in diabetic patients.

**Economic Significance:**
According to a report by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), ragi cultivation contributes significantly to the livelihoods of smallholder farmers, especially in rural areas of India and Africa. (Source: International Crops Research Institute for the Semi-Arid Tropics) The cultivation and processing of ragi generate income for farmers, traders, and agribusinesses involved in the value chain. (Source: International Food Policy Research Institute, Discussion Paper 01307, 2014)
Ragi has a growing market demand in India due to its nutritional value, health benefits, and suitability for cultivation in marginal and rain-fed areas. The demand for ragi-based products such as flour, flakes, and malt has been increasing, leading to favorable market prices for farmers who cultivate and sell ragi. (Source: Indian Institute of Millets Research - https://millets.res.in/). Ragi cultivation contributes to the rural economy by generating employment opportunities for agricultural laborers, traders, and agribusinesses involved in the value chain. According to a study published in the Indian Journal of Agricultural Economics, ragi cultivation has positive spillover effects on rural income and poverty reduction, especially in regions with limited access to irrigation and other resources. (Source: Indian Journal of Agricultural Economics, Volume 67, Issue 1, 2012) The Government of India has implemented various policies and schemes to promote ragi cultivation, provide financial assistance to farmers, and enhance market access for ragi-based products. Initiatives such as the National Food Security Mission (NFSM), Rashtriya Krishi Vikas Yojana (RKVY), and Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) provide support to ragi farmers through subsidies, credit facilities, and market linkages. (Source: Ministry of Agriculture and Farmers Welfare, Government of India) Ragi cultivation contributes to crop diversification in regions where water scarcity and climatic variability limit the cultivation of other crops. The cultivation of ragi helps mitigate the risk of crop failure and provides farmers with an alternative source of income during droughts or unfavorable weather conditions.
These statistics provide insights into the production, consumption, nutritional content, health benefits, and economic significance of ragi, sourced from reputable publications, research institutions, and government agencies

**Ragi as the symbol of culture:**
Ragi holds deep cultural symbolism in many societies where it is cultivated and consumed. In some cultures, ragi is revered as a symbol of fertility, abundance, and sustenance, representing the vital connection between humanity and the land. The cultivation and harvest of ragi are often accompanied by rituals and ceremonies that celebrate its significance in agricultural traditions. Moreover, ragi features prominently in cultural festivals, folklore, and mythology, reflecting its enduring cultural importance and symbolic value.

**Aesthetics:**
Ragi serves as a rich source of artistic inspiration across various mediums, including visual arts, literature, music, and performing arts. Artists draw inspiration from the visual aesthetics of ragi grains, incorporating their intricate patterns and textures into paintings, sculptures, and textile designs. Moreover, ragi inspires creativity in culinary arts, where chefs experiment with innovative presentations and culinary techniques to showcase the beauty of this humble grain. Furthermore, ragi features in poetry, literature, and music, where it evokes themes of nostalgia, tradition, and cultural identity.

**Ragi Tandira:**
Purandaradasa, a prominent figure in the Bhakti movement of Karnataka, composed numerous devotional songs, known as "kritis," in praise of Lord Krishna. One of his famous compositions is the "Ragi Tandira" kriti, which celebrates the virtues of finger millet (ragi) in a devotional context. The kriti extols the nutritional and spiritual significance of ragi while invoking the blessings of Lord Krishna. The "Ragi Tandira" kriti is characterized by its lyrical beauty, rhythmic structure, and melodic richness. In the composition, Purandaradasa emphasizes the humble nature of ragi, portraying it as a nourishing staple that sustains life and nourishes the body and soul. Purandaradasa employs vivid imagery and metaphorical language to describe the qualities of ragi and its role in sustaining life. He uses poetic imagery to convey the essence of devotion and gratitude towards the divine provider The kriti "Ragi Tandira" is often performed in classical music concerts and religious gatherings, where it resonates with audiences for its profound message and melodious rendition. It serves as a reminder of the importance of simplicity, humility, and gratitude in one's spiritual journey. Overall, the "Ragi Tandira" kriti by Purandaradasa beautifully encapsulates the reverence for ragi and its spiritual significance, highlighting the seamless integration of everyday life and devotion in Indian cultural traditions.

**Conclusion:**
The consumption of ragi aids in maintaining digestive health, promoting gut microbiota balance, and preventing gastrointestinal disorders. Additionally, ragi's low glycemic index makes it suitable for individuals seeking to manage blood sugar levels effectively, contributing to diabetes management and prevention. Its antioxidant-rich composition helps combat oxidative stress, reducing the risk of chronic diseases such as cardiovascular ailments and cancer. Furthermore, ragi's calcium content supports bone health, preventing conditions like osteoporosis. The versatility of ragi allows for various culinary preparations, making it accessible and adaptable to diverse dietary preferences. From traditional dishes like ragi mudde and ragi dosa to modern innovations like ragi-based snacks and beverages, ragi offers a flavorful and nutritious addition to the diet.

As global interest in functional foods and holistic health continues to rise, ragi emerges as a sustainable and nutritious solution, particularly in regions prone to food insecurity and malnutrition. Its cultivation promotes agricultural diversity and resilience, benefiting smallholder farmers and rural communities. In conclusion, the consumption of ragi represents a valuable dietary choice for individuals seeking to enhance their nutritional intake, support overall health, and embrace the benefits of a natural and sustainable food source.

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