



Nutritional and Health Significance of Traditional Millet-Based Foods: A Study from the Fateh Parvat Region, Uttarkashi (Uttarakhand)

Manoja Chauhan¹ • Dr Anita Sati¹ • Ankita Bisht²

¹Department of Home Science, HNB Garhwal University. (A Central University), Srinagar Garhwal, Uttarakhand, India-246174

²Department of Home Science, HNB Garhwal University, BGR Campus, Pauri Garhwal- 246001, Uttarakhand, India

*Corresponding Author Email Id: abbisht241@gmail.com

Received:10.04.2026; Revised: 13.5.2026; Accepted: 26.5.2026

©Society for Himalayan Action Research and Development

Abstract: This study examines the nutritional value and health benefits of traditional food items from the Fateh Parvat region of Uttarkashi, Uttarakhand. The study was conducted on 30 households using purposive sampling. Nutritional values were estimated using standard ICMR (2021) food composition tables. The study focuses on indigenous dishes such as Mandua Siddu, Ragi Roti, Chaulai Roti, and Ogale-based preparations, analysing their contribution to health and well-being. Data were collected using structured household surveys, Focus Group Discussions (FGDs), and Participatory Rural Appraisal (PRA) methods to understand dietary practices and traditional knowledge. The findings show that these foods are nutrient-rich, providing approximately 250–310 kcal of energy, 5–9 g of protein, 220–330 mg of calcium, 3.9–5.8 mg of iron, and 5–7 g of fibre per 100 g. These nutrients support digestion, immunity, bone health, and maternal nutrition. However, factors such as urbanisation, changing agricultural practices, and shifting food preferences are leading to a decline in traditional dietary patterns. The study emphasises the urgent need to preserve and promote indigenous food systems through awareness, policy support, and nutrition education.

Keywords: Traditional Cuisine Millets • Nutritional Value • Health Benefits • Uttarakhand • Indigenous Foods

Introduction

In recent years, the Government of India has taken significant steps to promote millets for their nutritional and environmental benefits, declaring 2018 as the National Year of Millets and supporting the United Nations' designation of 2023 as the International Year of Millets. These initiatives aimed to increase awareness about millets as sustainable, climate-resilient, and nutrient-rich food sources. Millets have traditionally been a staple in Indian diets, especially in the Himalayan region of Uttarakhand. Grains such as Mandua (finger millet), Jhangora (barnyard millet), and Kauni (foxtail millet) are rich in fibre, protein, vitamins, and essential minerals like calcium, iron, and magnesium. Their low glycaemic index and high nutritional value make them beneficial for digestion, heart health, diabetes management, and overall well-being. Traditional food systems in Uttarakhand are closely linked to local agrobiodiversity,

climatic conditions, and cultural practices. However, modernisation, changing food habits, and reduced agricultural diversity have led to a decline in the consumption of millet-based foods.

Previous studies (ICMR 2021; NIN 2020) highlight the nutritional superiority of millets over refined grains and their role in preventing lifestyle diseases. They also emphasise the cultural importance of traditional diets in maintaining community identity and ecological balance. Thus, there is a need to document and promote traditional millet-based foods to ensure nutritional security, sustainable agriculture, and preservation of indigenous knowledge systems.

Millets are also climate-resilient crops that require less water and fewer inputs, making them suitable for sustainable agriculture. They play an important role in reducing malnutrition, improving food security, and supporting smallholder farmers. However,



greater investment in research, value chain development, and consumer awareness is needed (Bhushan et al, 2024).

Due to their high nutritional value and their ability to grow in dry, poor soils, millets are considered a solution to agricultural and nutritional challenges in India. They contribute to food security and the achievement of the Sustainable Development Goals (SDGs) (Majumdar et al., 2025; Malik et al., 2024). Additionally, millets are gluten-free and rich in antioxidants and bioactive compounds, which help regulate blood sugar, improve heart and digestive health, and strengthen immunity (Kumar et al., 2024; Pallavi et al., 2024).

Methodology

Study Area and Sample Selection: The present study was conducted in the Fateh Parvat region of the Uttarkashi district, particularly in different villages of Mori Block. A total of 30 households were selected for the study through purposive sampling, focusing on families with knowledge and experience in traditional food practices. The respondents mainly belonged to the 26–45-year age group. The study was conducted from August to October 2025 to assess the nutritional value and health effects of traditional foods consumed in the region.

Data Collection Methods:

- (i) Structured questionnaires to collect data on dietary habits and food preferences.
- (ii) Focus Group Discussions (FGDs) with women, older people, and youth.
- (iii) Participatory Rural Appraisal (PRA) tools, such as seasonal calendars and food mapping.
- (iv) Key informant interviews with local healers and older women.

Data Analysis: Data were analysed using simple statistical methods such as averages and percentages. Nutritional values were calculated using the ICMR (2021) food composition tables. Nutritional Analysis: Reference from standard food composition tables (ICMR 2021) used to calculate

approximate values of local dishes. **Research Gap:** Although several studies highlight the nutritional and environmental benefits of millets, there is limited region-specific research focusing on the Fateh Parvat area of Uttarkashi district. Most existing literature emphasises general millet consumption without documenting local recipes, cultural practices, or their combined health impacts. This study attempts to fill this gap by integrating field-based data, traditional knowledge, and nutritional analysis of indigenous dishes.

Objectives of the Study

- (i) To document the traditional food items of the Fateh Parvat region in Uttarkashi.
- (ii) To analyse the nutritional composition of selected traditional dishes.
- (iii) To examine the health benefits of millet-based and indigenous foods.
- (iv) To understand changing dietary patterns and challenges affecting traditional food systems.

Limitations of the study

- (i) The study is based on a small sample size of 30 households.
- (ii) It is limited to a specific geographical region (Fateh Parvat).
- (iii) Nutritional values are approximate and based on standard food composition tables.
- (iv) Seasonal variations in diet were not fully captured.

Results and Discussion

Socio-Economic Profile of Respondents (N=30): The socio-economic profile indicates that most women belong to the 26–45 years age group and are actively involved in household and agricultural activities. The majority have primary to secondary education, while fewer are illiterate or highly educated. Agriculture is the main occupation, followed by household work, with limited involvement in business and service sectors. Most households fall under the low to middle-



income group (₹10,000–20,000 per month). Joint family systems are predominant, and most respondents have marginal or small landholdings, reflecting dependence on subsistence farming. A majority follow a vegetarian diet and rely on self-produced food. Nutrition awareness is generally moderate and

largely based on traditional knowledge. Overall, the respondents represent a rural, agriculture-based community with strong ties to traditional food practices. The nutritional composition of selected traditional dishes is presented in Table 1

Table 1: Nutritional Composition of Key Dishes (per 100g approx.)

Dish	Calories (kcal)	Protein (g)	Calcium (mg)	Iron (mg)	Fibre (g)	Key Health Benefits
Mandua Siddu	280	6.5	320	4.5	6	Bone strength, immunity
Mandua Baadi	310	7	300	5	5.5	Maternal nutrition, energy
Ragi Roti	250	5.8	330	3.9	7	Digestion, sustained energy
Chaulai Roti	270	9	220	5.5	6	Anaemia prevention, protein source
Ogale ke Pole	295	6	280	4.2	5	Warmth, winter food
Ogale ki Baadi	300	7.2	240	5.8	6.5	Postpartum care, immunity

(Values are approximate based on ICMR Food Composition Tables, 2021 and field dietary recall data)

This table highlights the nutrient profile of traditional dishes from the Fateh Parvat region, including Mandua Siddu, Mandua Baadi, Ragi Roti, Chaulai Roti, Ogale ke Pole, and Ogale ki Baadi. Regular consumption of these dishes can significantly support maternal nutrition, immunity, and energy balance.

Traditional dishes made from various millets and their Nutritional Value (RDA 2020, NIN ICMR 2021)

Koda/Mandua Siddu: Siddu is a traditional dish from the Fateh Parvat region of Uttarkashi. It is prepared at home during

various festivals or when guests arrive. The Mandua flour is kneaded and left to rest. Bhangjira (Perilla seed), sweet potato and sesame seeds are lightly roasted, then ground with jaggery, coconut, and walnuts. Small balls are made from ragi flour, filled with this mixture, shaped into rotis, and steamed. Siddu is served with ghee and honey. This dish is rich in nutrients essential for the body. It is calcium-rich and supports bone development, particularly for children and lactating mothers. The combined composition enhances both macro- and micronutrient content (Table 2).

Table 2: Koda/Mandua Siddu Nutritional Value (per 100g approx.)

Ingredient (per 100g dish)	Calories (kcal)	Protein (gm)	Fat (gm)	Carbohydrates (gm)	Fibre (gm)	Calcium (mg)	Iron (mg)	Magnesium (mg)	Phosphorus (mg)	Potassium (mg)	Zinc (mg)	Sodium (mg)
Ragi (80gm)	256.8	5.72	1.53	53.45	8.94	129.6	6.41	116.8	168	354.4	2.02	3.8
Perilla seed (5gm)	5.86	1.6	4	1.9	0.02	22.6	0.95	0.4	21.2	-	0.42	-
Walnut (20gm)	5.02	3	13	2.6	1.34	19.6	0.4	31.6	69.2	88.2	0.61	-
Almond (10gm)	60.98	1.84	5.84	0.30	1.30	22.8	0.45	31.8	44.6	69.9	0.35	0.15
Coconut (5gm)	31.23	0.36	3.16	0.40	0.79	1.6	0.15	4.86	10.15	36.95	0.07	0.83
Jaggery (25gm)	88.51	0.46	0.04	21.21	-	26.75	1.15	28.75	18.63	122	0.11	6.34
Cashew (10gm)	58.32	1.87	4.52	2.54	0.38	3.4	0.59	30.7	50	63.5	0.53	0.9
Sesame	28.25	0.9	2.5	1.15	0.6	4.85	0.38	17.15	30.7	23.4	-	-



(5gm)												
Ghee (5gm)	44.91	0.00	4.99	0.00	0.02	-	-	-	-	-	0.12	-
Total	579.88	15.75	30.07	83.55	13.37	231.2	10.4	262.06	412.48	758.35	4.23	12.02
RDA 2020 pregnant Women/day Nutritional Value Intake	2,010 kcal	36.0 gm	-	-	-	800 mg	21 mg	370 mg	-	-	12.0mg	-

Source: Primary Data Collection 2025

The data indicate that, per 100 g, it provides approximately 579.88 kcal of energy, 15.75 g of protein, and 13.37 g of fibre, along with high levels of calcium (262 mg), iron (10.4 mg), and potassium (758 mg). The inclusion of nuts and seeds significantly enhances the mineral and healthy fat content. Compared to the RDA (2020), Mandua Siddu provides approximately 34% of daily energy, 44% of protein, 33% of calcium, and nearly 50% of iron requirements, making it highly beneficial for pregnant and lactating women.

Koda/Mandua ki Baadi: A traditional dish of the mountains, especially prepared when a

woman is about to give birth. Water is heated in an iron pan; jaggery is added and boiled, then flour is gradually added while stirring. A little ghee is added to prevent sticking. The Bari is then eaten with ghee or buttermilk. It contains calcium, protein, and iron, making it highly nutritious for pregnant and postpartum women. It provides warmth, energy, and iron. It is also a part of festive traditions. The nutritional composition of Ragi Baad is presented in Table 3.

Table 3: Koda/Mandua (Ragi) ki Baadi Nutritional Value (per 100g approx.)

Ingredient (per 100g dish)	Calorie kcal	Protein gm	Fat gm	Carbohydrate gm	Fiber gm	Calcium mg	Iron mg	Magnesium (mg)	Phosphorus (mg)	Potassium (mg)	Zinc (mg)	Sodium (mg)
Ragi (70gm)	192.63	5.01	1.34	46.77	7.82	113.4	5.61	102.2	147	310.1	1.77	3.32
Jaggery (20gm)	296	0.37	0.03	16.97	-	21.4	21.4	23	14.90	97.6	0.09	5.07
Ghee (5gm)	44.91	0.00	4.99	0.00	0.02	-	-	-	-	-	-	0.12
Honey (10gm)	30.4	0.03	-	8.2	-	0.6	0.04	-	-	-	-	0.4
Total	563.94	5.41	6.36	71.94	7.84	135.4	27.05	125.2	161.9	407.7	1.86	8.91
RDA 2020 Pregnant Women/day Nutritional Value Intake	2,010 kcal	36.0 gm	-	-	-	800 mg	21 mg	370mg g	-	-	12.0m g	-

Source: Primary Data Collection 2025

It provides approximately 563.94 kcal of energy, 5.41 g of protein, and 7.84 g of fibre per 100g. It is rich in iron (27.05 mg), which helps prevent anaemia. Compared to RDA (2020), it fulfils about 28% of daily iron requirements and provides moderate amounts

of calcium and magnesium. However, protein contribution is relatively lower, indicating the need for complementary protein sources.

Koda/Mandua (Ragi) ki Roti: Koda ki Roti is a staple, usually served with green vegetables and butter. It is made thicker than



wheat rotis and cooked thoroughly. Since ancient times, people of the region have relied on this dish for energy and nutrition. A thick, energy-dense flatbread served with butter or leafy vegetables. Rich in fibre, iron, and complex carbohydrates, it prevents constipation and sustains energy for farmers and labourers. The findings reveal the nutritional value of Ragi Roti. Per 100 g, it

provides 192.63 kcal of energy, 5.01 g of protein, and 7.82 g of fibre (Table 4). It contains moderate levels of calcium (113.4 mg) and iron (5.61 mg). It contributes approximately 24% of daily iron requirements and supports digestion due to its high fibre content. Therefore, it is suitable for regular consumption.

Table 4: Koda/Mandua (Ragi) ki Roti Nutritional Value (per 100g approx.)

Ingredient (per 100g dish)	Calorie kcal	Protein gm	Fat gm	Carbohydrates gm	Fiber gm	Calcium mg	Iron mg	Magnesium (mg)	Phosphorus (mg)	Potassium (mg)	Zinc (mg)	Sodium (mg)
Ragi (70gm)	192.63	5.01	1.34	46.77	7.82	113.4	5.61	102.2	147	310.1	1.77	3.32
Total	192.63	5.01	1.34	46.77	7.82	113.4	5.61	102.2	147	310.1	1.77	3.32
RDA 2020 pregnant Women /day Nutritional Value Intake	2,010 kcal	36.0 gm	-	-	-	800 mg	21 mg	370mg	-	-	12.0mg	-

Source: Primary Data Collection 2025

Chaulai ki Roti or Chaute ki Roti (Local Name): Made from Chaulai (amaranth) flour, kneaded carefully with water (since it sticks easily). The dough is rested, then shaped into

rotis with wet hands. This roti is nutrient-rich and gluten-free. This gluten-free roti is high in protein and minerals. It is particularly recommended for anaemia and bone health.

Table 5: Chaulai ki Roti or Chaute ki Roti Nutritional Value (per 100g approx.)

Ingredient (per 100g dish)	Calorie kcal	Protein gm	Fat gm	Carbohydrate gm	Fiber gm	Calcium mg	Iron mg	Magnesium (mg)	Phosphorus (mg)	Potassium (mg)	Zinc (mg)	Sodium (mg)
Amaranth (70gm)	356.22	9.28	3.89	43.02	5.22	113.4	5.61	189	288	289	1.76	1.96
Total	284.97	9.28	3.89	43.02	5.22	113.4	5.61	189	288	289	1.76	1.96
RDA 2020 Pregnant Women /day Nutritional Value Intake	2,010 kcal	36.0 gm	-	-	-	800 mg	21 mg	370 mg	-	-	12.0 mg	-

Source: Primary Data Collection 2025

Table 5 focuses on Chaulai (amaranth). Per 100 g, it provides 284.97 kcal of energy and 9.28 g of protein, making it the richest source of protein among the dishes studied. It also contains significant levels of iron and magnesium. It fulfils about 26% of daily protein and 27% of iron requirements (RDA,

2020), making it highly effective in preventing anaemia and supporting muscle health.

Ogale Ke Pole: A pancake-type dish prepared by mixing flour, salt, and hot water into a thick batter. This is spread on a hot pan, fried on both sides, and served with ghee, honey, or milk. It is culturally consumed during winter



for warmth and energy, and is suitable for the hilly climate. Table 6 indicates the nutrient profile of Ogale ke Pole. It provides moderate energy (approximately 236 kcal), along with good amounts of protein (8 g) and fibre (6 g).

It is rich in magnesium, which supports muscle and nerve function. However, the calcium and iron content are relatively low; therefore, it should be combined with other nutrient-rich foods.

Table 6: Ogale Ke Pole Nutritional Value (per 100g approx.)

Ingredient (per 100g dish)	Calories (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Fibre (g)	Calcium (mg)	Iron (mg)	Magnesium (mg)	Phosphorus (mg)	Potassium (mg)	Zinc (mg)	Sodium (mg)
Buckwheat (60g)	206	7.98	2.04	42.9	6.0	10.8	2.28	138.6	208.2	276	1.44	0.6
Honey (10g)	30.4	0.03	0	8.2	0	0.6	0.04	0	0	0	0	0.4
Total	236.4	8.01	2.04	51.1	6.0	11.4	2.32	138.6	208.2	276	1.44	1.0
RDA 2020 Pregnant Women/day Nutritional Value Intake	2,010 kcal	36.0 gm	-	-	-	800 mg	21 mg	370 mg	-	-	12.0 mg	-

Source: Primary Data Collection 2025

Ogale ka Baadi: Prepared in a similar way to Kode ki Baadi. Flour is added to boiling jaggery water, stirred, and cooked. Small rounds are made with a hollow centre, into which ghee is poured before eating. Prepared with amaranth flour, jaggery, and ghee, this dish is nutrient-dense and is often given to new mothers. Table 7 presents the proximate and micronutrient composition of Ogale Ki Baadi, a traditional food prepared in the Fateh Parvat region of Uttarkashi, Uttarakhand. Per 100 g, it provides 132.74 kcal of energy and 9.34 g of protein, along with a good amount of fibre (7.02 g) and essential minerals such as magnesium, phosphorus, and potassium.

Although its contribution to calcium and iron is moderate, it supports metabolic functions and digestion. It contributes significantly to magnesium intake (43% of the RDA), making it beneficial for overall health.

Key Findings of the Study

The study reveals that traditional foods of the Fateh Parvat region are nutrient-dense and play an important role in health and well-being. These dishes provide essential nutrients such as protein (5–9 g), calcium (220–330 mg), iron (3.9–5.8 mg), and dietary fibre (5–7 g) per 100 g, contributing significantly to daily nutritional requirements.

Table 7: Ogale Ki Baadi Nutritional Value (per 100g approx.)

Ingredient (per 100g dish)	Calorie (kcal)	Protein (gm)	Fat (gm)	Carbohydrates	Fiber (gm)	Calcium (mg)	Iron (mg)	Magnesium	Phosphorus	Potassium	Zinc (mg)	Sodium (mg)
Buckwheat (70gm)	57.43	9.31	2.38	50.05	7	12.6	2.66	161.7	242.9	322	168	0.7
Honey (10gm)	30.4	0.03	-	8.2	-	0.6	0.04	-	-	-	-	0.4
Ghee (5gm)	44.91	0.00	4.99	0.00	0.02	-	-	-	-	-	-	0.12
Total	132.74	9.34	7.37	58.25	7.02	13.2	2.7	161.7	242.9	322	168	0.59



RDA 2020 Pregnant Women/day Nutritional Value Intake	2,010 kcal	36.0 gm	-	-	-	800 mg	21 mg	370 mg	-	-	12.0 mg	-
---	---------------	------------	---	---	---	-----------	----------	-----------	---	---	------------	---

Source: Primary Data Collection 2025

Foods such as Mandua Siddu and Mandua Baadi provide substantial energy and iron, making them particularly beneficial for pregnant and lactating women, helping prevent anaemia and weakness. Ragi-based foods are excellent sources of calcium, supporting bone health and child development, while their high fibre content promotes digestion. The low glycaemic index and presence of antioxidants in millet-based foods also help regulate blood sugar levels and support heart health. Chaulai Roti serves as an important source of plant-based protein. These diets are environmentally sustainable, as millets require fewer inputs and less water, thereby supporting food security in hilly regions. However, their consumption is declining due to urbanisation and changing lifestyles. Despite this, traditional food practices remain closely linked to cultural identity and are largely preserved by women, who act as custodians of indigenous knowledge.

Dishes such as Mandua Siddu and Ragi Roti are rich in dietary fibre and calcium, supporting digestive health and bone strength (ICMR-NIN, 2020; Longvah et al., 2017; Kumar et al., 2024). Chaulai-based foods contain higher levels of protein and iron, making them effective in preventing anaemia and supporting muscle health (Pallavi & Kalita, 2024; ICMR-NIN, 2020).

Regular consumption of these foods helps maintain energy levels and metabolic functions. Their low glycaemic index also helps regulate blood sugar levels and reduce the risk of lifestyle diseases such as diabetes and cardiovascular disorders (Majumdar et al 2024).

Traditional foods are deeply embedded in cultural practices and are associated with festivals and life-cycle events. Women play a central role in preserving and transmitting this knowledge across generations (Mallick et al 2024). However, a gradual shift towards processed foods, driven by urbanisation and changing dietary habits, has led to a decline in their consumption (Kumar et al 2024).

Overall, promoting traditional millet-based diets can enhance nutritional security, prevent micronutrient deficiencies, and support sustainable food systems in hilly regions.

Conclusion

“The study strongly recommends integrating traditional millet-based foods into modern dietary practices for sustainable health outcomes.” The study concludes that traditional foods of the Fateh Parvat region are nutritionally rich, culturally significant, and environmentally sustainable. Millet-based dishes such as Mandua Siddu, Ragi Roti, and Chaulai Roti provide essential nutrients, including calcium, iron, protein, and fibre, which are crucial for maternal and overall health. These foods not only support digestion, immunity, and bone health but also contribute to sustainable agricultural practices due to their climate-resilient nature.

However, modernisation, changing lifestyles, and reduced agricultural diversity are leading to a decline in their consumption. Therefore, promoting and preserving traditional food systems is essential for ensuring nutritional security, cultural continuity, and sustainable development in Himalayan regions. This study reinforces the importance of integrating



traditional knowledge with modern nutrition strategies for long-term sustainability of health.

Recommendations

- **Promotion of Traditional Foods:** Community-based awareness programs should be organised to promote the nutritional and cultural value of traditional dishes through local fairs, food festivals, and schools.
- **Integration into Nutrition Policy:** State and district-level nutrition and public health schemes (like ICDS, Mid-Day Meal, and Poshan Abhiyaan) should incorporate millet-based and amaranth-based recipes to improve the diet quality of women and children.
- **Support for Millet Cultivation:** Encourage farmers to grow local varieties of Mandua, Jhangora, Kodo, and Chaulai (Amaranth millet) through subsidies, procurement incentives, and value-chain development, ensuring both economic and nutritional sustainability.
- **Documentation and Dissemination:** Traditional recipes and preparation techniques should be systematically documented and disseminated through local women's groups, NGOs, and digital platforms to prevent loss of indigenous food knowledge.
- **Nutrition Education:** Nutrition education campaigns highlighting the role of millets, pulses, and traditional foods in preventing diseases like anaemia, diabetes, and osteoporosis should be introduced in rural and school curricula.
- **Research and Development:** Further interdisciplinary studies should be conducted on the bioavailability of nutrients, cooking methods, and functional health properties of traditional foods to promote their scientific validation and wider acceptance.

- **Empowerment of Women:** Since women hold the key to culinary traditions in the region, their active participation in training programs, cottage industries, and community kitchens should be encouraged for economic and social empowerment

Reviving traditional cuisines of the Fateh Parvat region provides a sustainable pathway for achieving nutritional security, health resilience, and cultural preservation in the Himalayan context. The combination of indigenous agricultural practices, local culinary knowledge, and modern nutritional awareness can significantly contribute to community well-being and the achievement of Sustainable Development Goals—SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), and SDG 12 (Responsible Consumption and Production).

Acknowledgements

The authors thank administration of Hemvati Nandan Bahuguna Garhwal University for institutional support.

Reference

- Bhushan S, Kanchan Bhamini U K, Sudha Rani, Sunil Kumar T. Sampathkumar, Bhosle Saurabh Sushil, Satish K. Sharma, & S. Anbarasan. (2024). "Millets: A Pathway to Nutrition Security for Sustainable Agriculture". *European Journal of Nutrition & Food Safety* 16 (9):161–70.
- ICMR-NIN Expert Group. (2020). Nutrient requirements for Indians: Recommended dietary allowances (RDA) and estimated average requirements (EAR) – 2020. Hyderabad, India: Indian Council of Medical Research–National Institute of Nutrition. <https://www.nin.res.in/>
- ICMR Expert Group. (2020). Recommended dietary allowances (RDA) and estimated Average Requirement (EAR) for Indians.



https://www.nin.res.in/RDA_Full_Report_2020.html

ICMR-NIN Expert Group. (2021). Nutrient requirements for Indians: Recommended dietary allowances (RDA) and estimated average requirements (EAR) – 2020. Hyderabad, India: Indian Council of Medical Research–National Institute of Nutrition.

<https://www.nin.res.in/annualreports/Annual%20Report%202021-22%20051023.pdf>

Kumar Anal, A., Singh, R., Rice, D., Pongtong, K., Hazarika, U., Trivedi, D., & Karki, S. (2024). Millets as supergrains: A holistic approach for sustainable and healthy food product development. *Sustainable Food Technology*, 2, 908–925.

Longvah T, Ananthan R, Bhaskarachary K & Venkaiah K (2017). Indian Food Composition Tables. National Institute of Nutrition (NIN), Indian Council of Medical Research (ICMR), Hyderabad, India.

<https://www.nin.res.in/ebooks/IFCT2017.pdf>

Mallick, A., Rajnish K, Mondal K, Hazra R & Samal AC (2024). Millet-Based Food Adoption for Environmental Sustainability and Nutritional Security. In *Ecosystem Management* (eds A. Banerjee, M.K. Jhariya, A. Raj and T. Mehergui).

Mazumder S, Bhattacharya D, Lahiri D, Moovendhan M, Sarkar T & Nag M (2025). Harnessing the nutritional profile and health benefits of millets: a solution to global food security problems. *Critical Reviews in Food Science and Nutrition*, 65(28), 5580–5601.

Pallavi K & Hari Charan Kalita (2024). “Millets: The Sustainable Super-Food with Anti-Ageing Properties”. *European Journal of Nutrition & Food Safety* 16 (10):102–9.

Sanjay Kumar T, Nageswari R, Somasundaram S et al. (2024). Significance of millets for food and nutritional security—an overview. *Discov Food* 4, 73