

An Investigation into Consumer Preferences Regarding Millet and Millet-Based Value-Added Products

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ABSTRACT: To delve into consumer preferences regarding millets and millet-based products, a survey was undertaken in Hyderabad, involving 200 participants. The study explores consumer preferences and consumption patterns of millets, revealing that 50 percent of respondents prioritize health benefits as the main reason for consuming millets. Health advantages include the control of blood pressure, diabetes reduction, improved digestion, skin health, and vision. Gluten-free nature ranks as the second major reason, followed by rich fiber and nutrient content, and weight control. Most respondents consume millets during breakfast and dinner (78%), citing the availability of diverse millet breakfast items. High price and limited knowledge regarding millet culinary preparation were the major factors hindering the millet consumption. To promote millet consumption, the study suggests increasing awareness, addressing pricing concerns, emphasizing health benefits, and diversifying millet-based products. Additionally, incorporating millets into public distribution systems and ensuring availability in local markets can enhance awareness and accessibility.

Keywords: Millets, Nutrition, Consumer Preference, Consumption, Health Benefits.

INTRODUCTION

Micronutrient deficiency stands as a significant global health concern, with approximately 2 billion individuals facing insufficient levels of essential vitamins and minerals (Azman *et al.*, 2019). Renowned for their superior nutritional content, surpassing other grains and pulses in specific nutrients (Mohanraj *et al.*, 2023), millets are recognized as nutrient storehouses due to their high fiber content compared to other grains (De Groote *et al.*, 2018).

Being one of the earliest cereal grains used for household purposes, millets hold a historical significance in human food traditions (Durgad *et al.*, 2021). India leads in millet production, accounting for 42%, followed by Niger with 10% and China with 9%. Despite their historical importance, millets' significance in Indian cuisine diminished due to production challenges and government policies favoring rice and wheat. Furthermore, research has revealed a correlation between the use of refined grains, specifically refined white rice, and the development of type II diabetes and obesity (Kane-Potaka *et al.*, 2019). This shift in dietary patterns contributed to health issues, including malnutrition and non-communicable diseases like diabetes (Eski *et al.*, 2020). Millets, being gluten-free and rich in dietary fiber, aid digestion, regulate bowel movements, and promote a sense of fullness (Mohan *et al.*, 2022). Their substantial fiber content supports

weight management and reduces the risk of chronic ailments like heart disease and type II diabetes (Harshitha and Jayaram 2019).

Millets are advantageous for diabetics, persons with cancer, oxidative stress, obesity, celiac disease, and people with gastrointestinal diseases because they are gluten-free grains (Sangappa *et al.*, 2023). Millets emerge as vital suppliers of micronutrients, including vitamin B complex, calcium, iron, folic acid, and sulphur (Rizwana *et al.*, 2023). Despite their acknowledged nutritional value, a significant gap exists between millet production and consumption (Kumar *et al.*, 2022). India, ranking 12th globally in high-yield millet production, faces a disparity in integrating millets into everyday diets, impacting the overall well-being of the population (Kumar *et al.*, 2022). Addressing this issue requires an examination of customer preferences towards millets and millet-derived value-added products. Therefore, this study aims to investigate the extent of people's knowledge, preferences, and practices related to millet consumption.

METHODOLOGY

The present study was undertaken at Hyderabad, Telangana to examine and explore consumers' preferences about millets and millet value added products. The clients who come and purchased millets and their value added products from "Eat Right Products" outlet of ICAR-IIMR, Hyderabad were

chosen at random for this study. The study encompassed a sample of 200 millet consumers, comprising individuals from various sectors such as public/private sector employees, homemakers, business persons, and students. The collection of primary data was conducted through the utilization of a meticulously designed and pretested interview schedule. The study's objective was explicitly communicated to the participants to ensure their active participation and correctness in their responses. Additionally, crosschecks were conducted to minimize errors. The study was undertaken in the period 2022-23. Collected data was analyzed and processed utilizing cumulative frequencies, percentages, arithmetic mean, and other descriptive statistics. The Relative Important Index (RII) and Garret Ranking Techniques were utilized to comprehend consumer preferences about millet and millet value-added items. The Relative Importance Index (RII) and Garret ranking were computed using the following equation.

$$RII = \frac{\text{Sum of weights (W}_1 + \text{W}_2 + \text{W}_3 + \dots + \text{W}_n)}{A \times N}$$

Where, W = weights given to each factor by the respondents

A = highest weight

N = total number of respondents.

The garret ranking score was noted by Percent position = $100(R_{ij} - 0.5) / N_j$

Where,

R_{ij} = Rank given for the i^{th} items by the j^{th} individual

and

N_j = Number of items ranked by the j^{th} individual.

RESULTS AND DISCUSSION

The collected data was categorized into various broad areas like demographic characteristics of consumers, awareness level towards millets products, factors influencing the consumer preference towards millets and millet products, and constraints faced by consumer in consuming the millet value added products.

A. Socio economic characteristics of Consumers

Socio-economic profile is an essential prerequisite for any research study centered on consumers. Demographic characteristics of the respondents (Table 1) included in the study encompass family structure, occupational status, gender, age, and monthly income. The consumer gender distribution stood at 68% male and 32% female. A significant proportion of the consumers (40%) belonged to the older age bracket, which spanned from 46 to 50 years. It is evident that the majority of the participants were members of conjugal households, each earning between Rs. 15,000 and Rs. 30,000 per month on average. The participants comprised individuals with various educational backgrounds and occupied a range of professional positions, including as public and private sector employees (32%), entrepreneurs (29%), individuals managing household affairs (23%), and students (16%).

Table 1: Socio economic characteristics of consumers.

Sr. No	Particulars	Frequency	Percentage
1.	Gender		
	a) Male	136	68
	b) Female	64	32
2.	Age		
	a) < 30 years	54	27
	b) 31-45 years	66	33
	c) 46-50 years	80	40
3.	Family type		
	a) Nuclear	184	92
	b) Joint	16	08
4.	Monthly Income		
	a) Rs. 15,000-30,000	106	53
	b) Rs. 30,000-50,000	70	35
	c) Rs. 50,000 above	24	12
5.	Education type		
	a) PUC	58	29
	b) Degree / PG/Ph.D.	142	71
6.	Occupation		
	a) Public/Private sector employees	64	32
	b) Business	58	29
	c) Home maker	46	23
	d) Student	32	16

B. Awareness level of millets among selected consumers

It was found that, all the respondents interviewed had awareness about millets & millet-based value-added products (Table 2). The majority of participants, comprising 54%, demonstrated a medium level of awareness, indicating a reasonably informed understanding of millets. Following closely, 24% exhibited a low level of awareness, suggesting a notable

portion of the respondents had limited knowledge about millets. About 18%, showcased a high level of awareness, indicating a more comprehensive understanding of millets. Additionally, 4% of the respondents demonstrated complete awareness, signifying an in-depth and thorough knowledge of millets.

When participants were enquired about their primary sources of information regarding millets and their value added products, the predominant influence emerged from the road shows, walkathons, and awareness programs on millets organized by ICAR-IIMR, Hyderabad, with an overwhelming 89.00 percent of participants expressing reliance on these initiatives. In the hierarchy of information sources, social media secured the second position, with 37.5 percent of

respondents acknowledging its influence, followed closely by television, cited by 26.50 percent of the surveyed individuals. Currently, media interventions primarily focus on capturing attention, arousing interest, and generating a desire among farming families to seek more information and engage in additional inquiries. These interventions aim to enhance knowledge, attitudes, and utilization of millets (Lalitha *et al.*, 2022).

Table 2: Awareness level and source of information on millets among respondents.

Sr.No.	Particulars	Frequency	Percentage
Awareness			
1.	Low level of awareness	48	24
2.	Medium level of awareness	108	54
3.	High level of awareness	36	18
4.	Complete awareness	8	4
Source of Information			
1.	ICAR-IIMR, Hyderabad	178	89.00
2.	TV	53	26.50
3.	News paper	20	10.00
4.	Social Media	75	37.50
5.	Family and friends	40	20.00

C. Consumer preferences in consumptions of millets

The participants surveyed reported the reasons for consuming millets, which are presented in Table 3. The data is classified into five primary components. The primary reason commonly mentioned for consuming millet is its "health benefits," as reported by a substantial majority of 100 participants, accounting for 50 percent of the overall sample. This signifies a prevalent acknowledgment of the beneficial influence of millets on health. In a study conducted by Reddy and Patel (2023), it was found that attitude factors, specifically health advantages such as nutritional value, diabetes control, and reduction of inflammation in the gut, had the greatest impact on millet consumption. The second most often cited reason is "Gluten-free" by about 19 percent of the respondents. This discovery indicates an increasing recognition and inclination for gluten-free substitutes among consumers. An additional significant aspect is the nutritional content, with 28 responses (14 %) of the participants, selecting "Abundant in fiber and nutrients." Furthermore, 13 percent of the respondents recognized the effectiveness of the product in aiding weight loss and control. Only 4 percent of the respondents were consuming millets for other reasons like childhood habit, product preference, ease of availability, having knowledge on millet, and guidance from doctors and dietitians (Pandey and Bolia 2023).

Table 3: Reasons for consumption of millets.

Sr. No.	Reason for Consumption	Frequency	Percentage
1.	Rich in fibre and nutrients	28	14
2.	Health benefits	100	50
3.	Helps in weight loss (control)	26	13
4.	Gluten free	38	19
5.	Other reasons	8	4

D. Mealtime preferences for consumption of millets

The mealtime preferences for the consumption of millets among the surveyed individuals are presented in Table 4. The most prevalent choice is during breakfast, with a substantial majority of 62.5 percent signifying a strong inclination among respondents to incorporate the item into their morning meals. Reason for higher consumption of millets during breakfast time was due to availability of various forms of millet breakfast items like millet rusk, millet kitchidi mix, millet idly, millet dosa, millet roti and other food items. This indicates a notable inclination towards including millets in the breakfast. Following this, dinner was the second most common time for consumption, with 34 percent of respondents opting for the item during their evening meals. The respondents (diabetic patients) said that their doctor had recommended eating millets during evening meals. Notably, a considerable portion of the respondents also reported consuming the item during both breakfast and dinner (27%). During lunch, the consumption of millets is relatively lower, as only 4 respondents (2%) stated that this is their preferred mealtime for millets. In addition, 4 percent stated that they consumed millets three times daily, demonstrating a consistent incorporation of millets in all their meals.

Table 4: Mealtime preferences for consumption of millets.

Sr. No.	Consumption	Frequency	Percentage
1.	During breakfast	127	63.5
2.	During lunch	4	2
3.	During dinner	58	29
4.	During breakfast and lunch	8	4
5.	During breakfast and dinner	54	27
6.	During lunch and dinner	6	3
7.	3 times per day	8	4

E. Constraints in consumption of millets

The major constraints faced by the consumers in consumption of millets are presented in Table-5. Garret

ranking technique was used for ranking the constraints based on garret score. Higher prices of millets were the major constraint expressed by the respondents. Limited cultivation, low yield and processing difficulty are the major reasons for higher price of millets. Limited knowledge regarding millet culinary preparation was the second major constraint with a Garret score of 72. Educational activities, awareness efforts, and the integration of millets into mainstream culinary media could all help to bridge these gaps. Prashanthi *et al.* (2022) propose that future study should focus on educating the public about millet nutrition using several media platforms, enhancing understanding about the importance of millets, and implementing interventions to alter people's attitudes towards consuming millets. Providing accessible and user-friendly recipes, cooking demonstrations, and highlighting the nutritional benefits of millets can contribute to increased knowledge and utilization in the kitchen. Preparing millet dishes consumes more time than cooking rice or breads from wheat and this was the their major constraint hindering the consumption of millets. Non palatability was the third major constraint expressed by the consumers. Millets have a distinct flavor profile that might be unfamiliar to those accustomed to more commonly consumed grains like rice or wheat. Increasing knowledge about the various culinary uses of millets and offering easily accessible recipes can be crucial in overcoming the perception that millets are unpalatable.

Table 5: Constraints in consumption of millets.

Sr. No.	Constraints	Garret Score	Rank
1.	High Price	83	I
2.	Limited knowledge regarding millet culinary preparation	72	II
3.	Require more time to prepare millet dishes	65	III
4.	Not palatable	59	IV
5.	Lack of availability	55	V
6.	Habituated to other cereals	50	VI
7.	Difficulty in digestion	45	VII

CONCLUSIONS

All respondents were aware of millets and millet-based value-added products. Most responders got information on millets from ICAR-IIMR, Hyderabad roadshows, walkathons, and awareness activities, as well as social media and TV. The findings reveal that the majority of respondents prioritize health benefits as the primary reasons for consuming millets. Additionally, gluten-free property and high fiber content influenced the consumption of millets. The factors influencing consumer preference for millets and millet products include their perceived high nutritional value, appealing taste, and overall quality. However, the study identifies high prices and limited knowledge regarding millet culinary preparation as significant constraints faced by consumers. To promote millet consumption, the prime thing to focus is to increase awareness, address price concerns, to emphasize health benefits and nutritional

content of millets. Providing accessible and user-friendly recipes, cooking demonstrations, and highlighting the nutritional benefits of millets can contribute to increased knowledge and utilization in the kitchen. Additionally, considering millets in public distribution systems will create more awareness on millets among the rural and urban areas. Diversifying and making millet-based products more available may enhance consumption, especially among different age groups and genders. Including millets in public distribution channels will also raise rural and urban awareness. Providing millets in local markets and grocery stores and using culinary innovation tactics can help study area respondents overcome their constraints.

FUTURE SCOPE

The objective of the current investigation was to ascertain the level of awareness concerning millets, their value-added products, and consumption preferences among urban dwellers. The findings derived from this study are anticipated to serve as valuable insights for designing campaigns or nutritional education initiatives aimed at enhancing millet nutrition awareness among consumers. Furthermore, these results may prove beneficial to policymakers, institutional reform advocates, and researchers in developing novel millet nutrition programs and interventions to promote sustained millet consumption over the long term.

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Conflict of Interest. None.

REFERENCES

- Azman, N. S., Ramli, M. Z., Razman, R., Zawawi, M. H., Ismail, I. N. and Isa, M. R. (2019). Relative importance index (RII) in ranking of quality factors on industrialised building system (IBS) projects in Malaysia. In *AIP Conference Proceedings* (Vol. 2129, No. 1). AIP Publishing.
- De Groote, H., Kariuki, S. W., Traore, D., Taylor, J. R., Ferruzzi, M. G. and Hamaker, B. R. (2018). Measuring consumers' interest in instant fortified pearl millet products: a field experiment in Touba, Senegal. *Journal of the Science of Food and Agriculture*, 98(6), 2320-2331.
- Durgad, A. G., Joshi, A. T. and Hiremath, G. M. (2021). Consumer preference for foxtail and little millets in north eastern region of Karnataka. *Economic Affairs*, 66(1), 101-108.
- Eski, T., Ozbal, A. F. and Yilmaz, D. (2020). Increasing University Students' Awareness about Winter Sports. *Cypriot Journal of Educational Sciences*, 15(1), 65-72.
- Harshitha, H. and Jayaram, D. (2019). Consumers preference for value-added products of finger millet (*Eleusine coracana*). *Indian Journal of Economics and Development*, 7(9), 1-4.
- Indirani, K. (2021). Review on nutritional profiles and health benefits of little millets-India. *International Journal of Research in Engineering and Science*, 9(11), 07-11.

- Kane-Potaka, J., and Kumar, P. (2019). Smart food—Food that is good for you, the planet and the farmer. *State of India's Livelihoods Report*, 71-82.
- Kumar, T. L., Gowda, V. G., Begum, S. S., Shankara, M. H., Girish, M. R., Ganapathy, M. S., and Banu, A. (2022). Consumer Preferences for the Products of Minor Millets in Tumakuru District of Karnataka, India. *International Journal of Environment and Climate Change*, 12(11), 2214–2220.
- Lalitha, A., Neela Rani, R., Geetha Reddy, R., Kamalaja, T., and Meena, A. (2022). Knowledge of farm Families on Millets in Selected Districts of Telangana State. *Biological Forum—An International Journal*, 14(3), 1512-1517.
- Mohan, A. R., George, A., and George, G. (2022). Consumer perception and factors influencing consumption of millets. *Journal of Tropical Agriculture*, 59(2), 177-182.
- Mohanraj, T., Balaji, P., Karthikeyan, C., Vidhyavathi, A., and Kathiravan, M. (2023). Consumer preferences on millet-based value-added products in northern Tamil Nadu. *International Journal of Statistics and Applied Mathematics* 2023; SP-8(5),110-115.
- Pandey, A., and Bolia, N. B. (2023). Millet value chain revolution for sustainability: A proposal for India. *Socio-Economic Planning Sciences*, 87(Part B), 101592.
- Prashanthi, A., Reddy, R. G., Rani, R. N., Devi, T. S., and Meena, A. (2022). Awareness and Consumption of Millets among School Children in Rural and Urban Areas of Telangana State, India. *Biological Forum – An International Journal*, 14(4), 64-70.
- Reddy, R., and Patel, D. (2023). A Study on Consumers' Awareness and Preference towards Millets and Its Products in Vizianagaram District, Andhra Pradesh, India. *Asian Journal of Agricultural Extension, Economics & Sociology*, 41(6), 9-16.
- Rizwana, M., Singh, P., Ahalya, N., and Mohanasundaram, T. (2023). Assessing the awareness of nutritional benefits of millets amongst women in Bangalore. *British Food Journal*, 125(6), 2002-2018.
- Sangappa, D. Rafi and K. Srinivasa Babu (2023). A study on area-production productivity of minor millets in India. *Biological Forum—An International Journal*, 15(1), 275-280.

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