P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating: 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 6; June 2024; Page No. 455-458

Received: 08-04-2024
Accepted: 11-05-2024

Indexed Journal
Peer Reviewed Journal

Knowledge assessment of dairy farmers regarding khoa, dahi, and lassi: A comparative study in agro-climatic zones of Haryana

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DOI: https://doi.org/10.33545/26180723.2024.v7.i6f.751

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Abstract

This study examines the knowledge levels of dairy farmers in Hisar and Kurukshetra districts of Haryana regarding khoa, dahi, and lassi, traditional value-added dairy products widely consumed in India. A sample of 120 farmers was surveyed across these agroclimatically distinct regions using structured questionnaires and statistical analysis, including the Z-test. Findings indicate that a significant majority of farmers exhibit a moderate level of knowledge about khoa, dahi, and lassi, with no significant differences observed between the two districts. Comparative analysis with studies from Uttar Pradesh, Maharashtra, Punjab, Andhra Pradesh, and Rajasthan reveals consistent trends in farmers' understanding of these products. The study underscores the need for targeted educational interventions to enhance farmers' knowledge of production techniques, quality control, and market orientation, thereby improving product quality, market competitiveness, and economic sustainability in the dairy sector.

Keywords: Dairy farmers, khoa, dahi, lassi, knowledge levels, value-added dairy products, Hisar, Kurukshetra, Haryana, India, agricultural education

Introduction

Value-added dairy products play a crucial role in the dairy industry, offering economic benefits to farmers and nutritional advantages to consumers. In India, traditional dairy products such as khoa, dahi, and lassi are particularly significant due to their widespread consumption and cultural importance. Value addition in the dairy sector not only enhances the economic returns for farmers but also improves the nutritional quality and shelf life of dairy products. In India, value-added dairy products account for about 30% of the total dairy market, with significant contributions from khoa, dahi, and lassi (BAHS, 2023) [1]. Globally, value addition in dairy has been a key driver of growth, with the market for value-added dairy products expected to reach USD 500 billion by 2025 (FAO, 2023) [3].

Khoa is a milk product obtained by boiling milk until it reduces to solids through evaporation. It is widely used in Indian sweets and desserts, such as barfi and gulab jamun. According to Kumar *et al*. (2012) [6], khoa production is a labor-intensive process requiring specific knowledge and skills to ensure quality and consistency. Despite its economic potential, many dairy farmers lack adequate knowledge of khoa preparation and preservation techniques. According to the Food and Agriculture Organization (FAO, 2023) [3], India produced approximately 18 million tons of khoa in 2022, highlighting its significance in the dairy sector. The value addition in the dairy sector has been growing steadily, contributing significantly to the rural economy.

Dahi, or curd, is a fermented milk product produced by bacterial fermentation of milk. It is a staple in many Indian diets, known for its probiotic benefits and versatility in culinary uses. Research by Patil and Revanewar (2013) [7] highlights the importance of dahi in promoting gut health and its potential in enhancing farmers' income through value addition. However, the level of awareness and knowledge about the scientific aspects of dahi production among dairy farmers remains variable. As per Basic Animal Husbandry Statistics (BAHS, 2023) [1], the production of dahi in India reached 24 million tons in 2022, indicating its prominent role in the country's dairy consumption. Globally, fermented dairy products, including yogurt and curd, represent a significant portion of the dairy market, valued at approximately USD 90 billion in 2022 (FAO, 2023) [3].

Lassi is a traditional yogurt-based drink, popular in Northern India. It is made by blending yogurt with water,

sugar, and sometimes spices or fruit. Lassi is not only refreshing but also nutritious, providing probiotics and essential nutrients. A study by Singh and Singh (2015) [10] emphasizes the growing market demand for lassi and the opportunities it presents for small-scale dairy farmers. Nevertheless, there is a need to educate farmers on hygienic practices and innovative recipes to meet market standards. In 2022, lassi production in India was estimated at 8 million tons (FAO, 2023) [3], reflecting its significant market presence. The global market for yogurt drinks, including lassi, was valued at USD 40 billion in 2022, showing substantial growth and demand (FAO, 2023) [3].

Understanding the knowledge levels of dairy farmers regarding these value-added products is essential for designing effective training programs and interventions. Previous studies have shown that knowledge dissemination and capacity-building initiatives can significantly improve the quality and marketability of dairy products (Sharma *et al*., 2011) [9]. This study aims to assess the knowledge levels of dairy farmers in Haryana regarding khoa, dahi, and lassi, providing insights that can guide future educational efforts.

Methodology

This study was conducted in the Hisar and Kurukshetra districts of Haryana, chosen for their distinct agroclimatic zones. Hisar represents a semi-arid region, while Kurukshetra falls under the sub-humid climatic zone. These variations in climate conditions provided a comprehensive understanding of the knowledge levels of dairy farmers in different environmental contexts. A total sample size of 120 dairy farmers was selected for this study, with 60 respondents from each district. The respondents were chosen using random sampling techniques to ensure the representation of diverse dairy farming practices within each district. Data were collected through a structured interview schedule designed to assess the knowledge levels of dairy farmers regarding the preparation, benefits, and market potential of value-added dairy products such as khoa, dahi, and lassi. The knowledge levels of the respondents were categorized into three levels: low, medium, and high. The data collected were then analyzed using SPSS software, employing statistical techniques to determine the distribution of knowledge levels among the respondents. To compare the knowledge levels between the two districts, the Z-test was used. This statistical test is appropriate for comparing the means of two independent groups and determining if there is a significant difference between them. The Z-test results provided insights into whether the agroclimatic differences between Hisar and Kurukshetra had any impact on the knowledge levels of dairy farmers regarding value-added dairy products.

The formula for calculating Z score is given below:

$$\text{Z score} = \frac{X - \bar{x}}{\sigma}$$

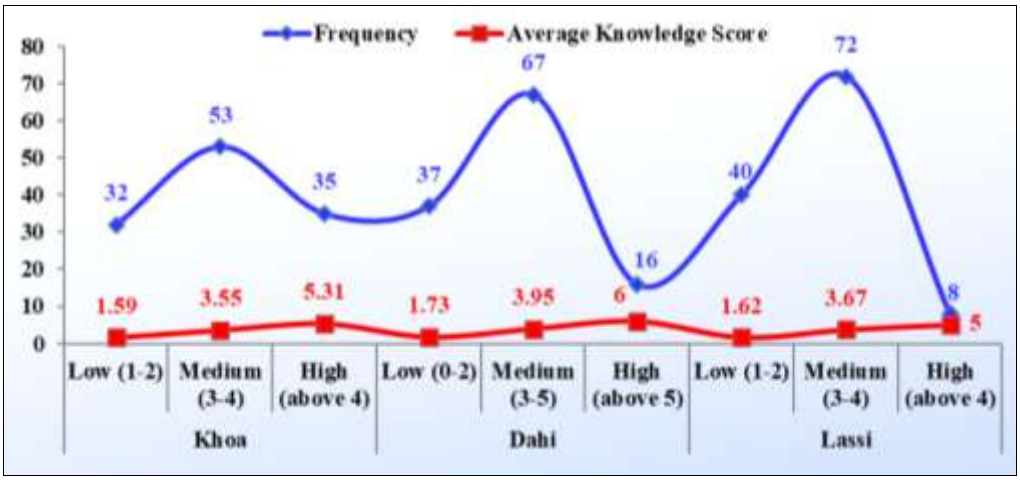
Where,

X= Standardized random variable

$\overline{X}$ = Mean of the data

σ= Population standard deviation

Results and Discussion



Knowledge of Dairy Farmers Regarding Khoa

Khoa is a milk product obtained by boiling milk until it reduces to solids through evaporation. The data depicted in Table-1 indicates that the majority (41.67%) of respondents from Hisar had a medium level of knowledge regarding khoa, followed by 33.33% with high knowledge and 25% with low knowledge. In Kurukshetra, 46.67% of respondents had medium knowledge, 28.33% had low knowledge, and 25% had high knowledge. Overall, most respondents had a medium level of knowledge about khoa.

Table 1: Distribution of respondents based on knowledge about KHOA

Product	Category	Kurukshetra (n= 60)	Hisar (n= 60)	Overall (N= 120)	Z-value
Khoa	Low (1-2)	17 (28.33)	15 (25)	32 (26.67)	0.86^{NS}
	Medium (3-4)	28 (46.67)	25 (41.67)	53 (44.17)	
	High (above 4)	15 (25)	20 (33.33)	35 (29.17)	
	Mean ± S.E.	3.43 ± 0.19	3.67 ± 0.19	3.55 ± 0.13	

The Z-test results indicated no significant difference in the knowledge levels between the respondents from Hisar and Kurukshetra. This aligns with findings from Jaiswal and Singh (2016) [5], who reported that dairy farmers in different regions of Uttar Pradesh also exhibited medium knowledge levels about khoa, with no significant regional differences. Similarly, Reddy *et al*. (2014) [8] in Andhra Pradesh found that while many farmers were familiar with khoa, only a small percentage understood the nuances of quality control and market demands. This indicates a consistent pattern across various states in India, where knowledge about khoa remains moderate but can be significantly improved through educational initiatives.

Knowledge of Dairy Farmers Regarding Dahi

Dahi, or curd, is a fermented milk product produced by bacterial fermentation of milk. Table-2 shows that 56.67% of respondents from Hisar had a medium level of knowledge about dahi, with 26.67% having low knowledge and 16.67% having high knowledge. In Kurukshetra, 55% of respondents had medium knowledge, 35% had low knowledge, and 10% had high knowledge. Overall, the majority (55.83%) of respondents had medium knowledge about dahi, followed by low (30.83%) and high (13.33%) levels of knowledge.

Table 2: Distribution of respondents based on knowledge about DAHI

Product	Category	Kurukshetra (n= 60)	Hisar (n= 60)	Overall (N= 120)	Z-value
Dahi	Low (0-2)	21 (35)	16 (26.67)	37 (30.83)	0.65^{NS}
	Medium (3-5)	33 (55)	34 (56.67)	67 (55.83)	
	High (above 5)	6 (10)	10 (16.67)	16 (13.33)	
	Mean ± S.E.	3.45 ± 0.19	3.63 ±0.21	3.54 ± 0.14	

The Z-test value (0.65) revealed no significant difference in knowledge levels between respondents from Hisar and Kurukshetra. These findings are consistent with the study by Patil and Revanewar (2013) [7], which found that a significant proportion of dairy farmers in Maharashtra also had medium knowledge levels about dahi production. Further, a study by Gupta and Arora (2015) [4] in Punjab showed similar medium levels of knowledge about dahi among farmers, with a need for better understanding of hygienic production practices and the nutritional benefits of dahi. This consistency across various regions underlines the importance of improving awareness and training related to dahi production.

Knowledge of Dairy Farmers Regarding Lassi

Lassi is a traditional yogurt-based drink popular in Northern India. According to Table-3, 56.67% of respondents from Hisar had a medium level of knowledge about lassi, 38.33% had low knowledge, and 5% had high knowledge. In Kurukshetra, 63.33% of respondents had medium knowledge, 28.33% had low knowledge, and 8.33% had high knowledge. Overall, 60% of respondents had medium knowledge, 33.33% had low knowledge, and 6.67% had high knowledge about lassi.

Table 3: Distribution of respondents based on knowledge about LASSI

Product	Category	Kurukshetra (n= 60)	Hisar (n= 60)	Overall (N= 120)	Z-value
Lassi	Low (1-2)	17 (28.33)	23 (38.33)	40 (33.33)	-1.32^{NS}
	Medium (3-4)	38 (63.33)	34 (56.67)	72 (60)	
	High (above 4)	5 (8.33)	3 (5)	8 (6.67)	
	Mean ± S.E.	3.22 ± 0.14	2.93 ± 0.16	3.07 ± 0.11	

The Z-test value (-1.32) indicated no significant difference in knowledge levels between Hisar and Kurukshetra. This finding is in line with Singh and Singh (2015) [10], who found that dairy farmers in Punjab also had medium knowledge levels about lassi production, with a notable portion lacking detailed knowledge about hygienic practices and innovative recipes. Additionally, Choudhary *et al*. (2017) [2] in Rajasthan observed similar trends, where farmers had moderate knowledge but required more training in quality control and market-oriented production of lassi. This consistency highlights the need for comprehensive training programs across different states to enhance the quality and economic benefits of lassi production.

Conclusion

In conclusion, while dairy farmers in Hisar and Kurukshetra demonstrate a moderate level of knowledge regarding khoa, dahi, and lassi, there exists significant scope for improvement through structured educational initiatives. Enhancing farmers' understanding of production techniques, hygienic practices, and market dynamics is crucial for maximizing the economic potential of value-added dairy products. Future research should explore the effectiveness of specific training programs and policy interventions aimed at enhancing dairy farmers' knowledge and practices, thereby contributing to sustainable agricultural development in the region.

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