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Original Research Article

Knowledge and Adoption of Khoa Production Practices in Osmanabad District of Marathwada Region, India

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A B S T R A C T

Study was undertaken in the purposively selected Washi taluka of Osmanabad district as this is one of the major Khoa producing area of Marathwada region. Seven villages were randomly selected. Fifty respondents were selected and interviewed with the help of structured schedule. The data were analyzed with the help of frequency, percentage, mean and standard deviation. It was found that most of the khoa produces were middle aged, having educated up to secondary school level, engaged in farming with subsidiary occupation with semi medium land holding, medium experience, annual income, social participation, extension contact, market orientation and risk orientation. 80.00 per cent of the respondents were having medium level of knowledge about khoa production practices. Remarkable (64.00%) percentage of the respondents were having medium level of adoption. Cent percent respondents were adopting practice of avoiding addition of any foreign material and contamination. Not aware about types of khoa like Pindi, Danedar and Dhap and more expenditure is required to establish khoa business were the constraints faced by most of khoa producers.

Keywords

Knowledge, adoption, Khoa production, Constraints

Introduction

Milk Production is one of the subsidiary business in farming. Large number of farmers from Marathwada region of Maharashtra State are involved in milk production. Milk has been used as an article of food since ancient times in India. It plays an important role in the diet. In India, the share of milk and its products is the largest after cereals, and it accounts for 16% of the total food expenditure (Mahesh kumar 2010). India has shown impressive growth in the milk production, achieving an annual production of 132.43 MT in the year 2012-2013, while in Maharashtra annual milk production is 8.73 MT. Uttar Pradesh being the top state in milk production with 23.330MT. (Wanjari et.al.2016). In India, large quantity of milk is converted in to variety of dairy products like Khoa, Ghee, Chhana etc. (Kulkarni and Hembade 2010). According to one estimate about 5.5 % of total milk production is converted in to Khoa and on the basis of present milk production of about 91 million tones per annum, this amount is equivalent to 3 million kilos of Khoa per day. The food and nutritive value of khoa is very high.

Conventionally, it is prepared by continuous boiling of milk in an open kettle until

desired concentration (normally 65-72% total solids) without the use of any foreign ingredients and texture are achieved. Khoa is partially dehydrated milk product indigenous to India, was prepared from buffalo milk by boiling it vigorously in an open pan and reducing its volume to approximately 25% within 30min. (Patil *et al.,* 1992).

Texture of khoa plays an important role in its suitability for the production of sweets three different types of khoa are known, 'Dhap', 'Danedar', and 'Pindi'Khoa (26-34% moisture) has a smooth-grained texture and a firm body and is extensively used as an ingredient (Rajorhia and Srinivasan 1979). All of these varieties are in demand and are required for making value added khoa based products like Burfi, Peda, Gulabjamun, Kalakand, milk cake, Kunda, etc

The manufacture of Khoa is largely in the hands of private traders in Marathwada region. They use highly primitive techniques essentially based on their experience.

As the area under Khoa production is very high in Osmanabad the present investigation was undertaken with following specific objectives.

Objectives

To study the socio-personal characteristics of the respondents

To assess the knowledge regarding different practices of respondents.

To study the adoption of the different practices of Khoa production.

To find out constraints faced by the respondents.

Materials and Methods

The present study was undertaken in the purposively selected Osmanabad district as this is one of the major Khoa producing district of Marathwada region. Washi taluka of the Osmanabad district was selected purposively. From selected tahsil seven villages namely Para, Pimpalwadi, Tandalwadi, Fakrabad, Ghodki, Pimpalgaon and Sarola were randomly selected. Khoa producers from these villages those who were producing more than ten kg. Khoa per day were considered and thus sample size of fifty respondents were selected for the present study. The respondents were interviewed with the help of structured schedule prepared for the purpose of the study. Four positive and four negative statements each with regards to social, economical and educational development included in the schedule to assign the socio economic development of the Khoa producers. For knowledge and adoption twenty three practices were involved in the schedule. One score was given to known and zero for unknown practices. Two score for full use, one score for partial use and zero score for no use were assigned for the khoa production practices followed by the respondents. The data were analyzed with the help of frequency, percentage, mean and standard deviation

Results and Discussion

Socio-personal characteristics of the respondents

The data with regards to socio personal characteristics of the respondents is presented in Table 1 indicate that more than half of the respondents (54.00 per cent) were middle age (32 to 55 years), while 26.00 per cent and 20.00 per cent respondents were found in old (56 years and above) and young

(up to 31 years) age category respectively. More than one third of the respondents (46.00 per cent) were educated up to secondary school level, whereas nearly equal percentages (22.00 and 20.00) of the respondents were educated up to higher secondary and primary level, Eight per cent respondents were able to read or write and very meager percentage (4.00 per cent) of the respondents were educated up to graduation and above level.

Further it was observed that majority of the respondents (74.00 per cent) were engaged in farming with subsidiary occupation in addition to Khoa production, 12.00 per cent of the respondents doing khoa production with farming, whereas 8.00 per cent and 4.00 per cent of the respondents doing service and labour work with khoa production respectively. Only 2.00 per cent of respondents engaged solely in Khoa production.

As regards the khoa production experience, it was revealed that remarkable percentage of the respondents (64.00 per cent) had medium (5 to 19 years) experience while 20.00 percent and 16.00 per cent of the respondents had less (up to 4 years) and more (20 years and above) experience respectively.

More than one third (40.00 percent) of the respondents were found semi medium land holders followed by small (26.00 per cent) and medium (22.00 per cent) land holders. Six per cent and four per cent of the respondents were found to be marginal landholders and landless respectively. Only 2.00 per cent of the respondents were large land holders.

More than three-fourth of the respondents (76.00 per cent) had medium (Rs 142897/- to 490705/-) annual income, while 14.00 per cent and 10.00 per cent respondents had high (Rs. 490706/- and above) and low (up to Rs. 142896/-) annual income respectively.

Further it was observed that significant percentage (58.00 per cent) of the respondents were having medium social participation, whereas 32.00 per cent and 10.00 per cent respondents were having low and high social participation respectively.

It is observed from Table 1 that majority of the respondents (72.00 per cent) had medium extension contacts, while 18.00 per cent and 10.00 per cent of the respondents were having low and high extension contacts, respectively.

The data revealed that remarkable percentage (70.00 per cent) of the respondents were having medium market orientation, whereas 16.00 per cent respondents and 14.00 per cent respondents were having high and low market orientation respectively.

As regards the risk orientation, the data presented in Table 1 highlighted that majority of the respondents (62.00 %) were having medium risk orientation. It was further noticed that 22.00 per cent of the respondents had low risk orientation whereas 16.00 per cent of the respondents had high risk orientation

Knowledge of the respondents about Khoa production practices

Practice wise Knowledge of the respondents about Khoa production

Perusal of the data in Table 2 illustrates that cent percent (100.00per cent) of the respondents were knowing the practices like the average 1 kg yield of khoa is obtained from standardized 5 liter of cow milk and 4

liter of buffalo milk, to obtain good quality khoa, milk should be maintained at the boiling temperature till it reaches the pasty consistency and avoiding addition of any foreign material and contamination that is responsible for poor shelf life of khoa.

A huge majority of the (98.00 per cent) of the respondents were knowing, slow heating is affected on colour, texture and flavor of khoa and Khoa reaches a pasty consistency, after lowering temperature and the heating is discontinued.

Further, it was noted that 94.00 per cent of the respondents were knowing that Pune, Hyderabad, Delhi are the major khoa marketing places in India and in Hyderabad and Pune market khoa is sold through commission agent, while 92.00 per cent were knowing that the in traditional method optimum speed of stirring is about 100rpm. While boiling, milk is continuously and vigorously it is stirred with a circular motion by a ladle (khunti / kawachya) to avoid burning and undesirable or smoky flavor of milk solids was known by 90.00 per cent.

Khoa containing not more than 28-35 percent of moisture was known by 86.00 per cent of the respondents. The shelf life of khoa is about 3-5 days at 30 ^{o}C temperature was known to 10.00 per cent of the respondents. 4.00 per cent of the respondents were knowing practices like Pindi, Danedar and Dhap are the three types of Khoa and continuous khoa making machine is also used for large scale khoa production in mechanized method.

Further it was seen that 2.00 per cent of the respondents were knowing that the Mechanized conical process vat is used for khoa production in mechanized method and Addition of potassium sorbate at the rate 0.20 to 0.40 % increased the shelf life of khoa to 10-11 days at 30^{o}C and 40 days at 5^{o}C, and using four ply laminated pouches and thin container possible to increase the shelf life of khoa up to 13 days at 30 ^{o}C and to 75 days in cold storage.

Surprisingly it was noticed that all (100.00 per cent) of the respondents were not knowing practices like addition of citric acid in Danedar Khoa added to develop the desirable characteristics, Danedar khoa is characterized by its irregular texture and body, Pindi khoa is formed as a disc shaped, smooth and homogenous body and texture, Dhap khoa is characterized by a loose and sticy body and a smooth texture, for Pindi khoa production preferably use buffalo milk, in small lots (not more than 5 liters), when milk reaches to a semi solid state heating is stopped and the product is immediately taken out and In mechanized continuous system optimum speed of stirring is up to 200rpm.

Overall knowledge level about khoa production practices

It is depicted from Table 3 that majority (80.00 %) of the respondents were having medium level of knowledge about khoa production practices whereas 16.00 per cent and 4.00 per cent of the respondents belongs to low and high knowledge category respectively.

Adoption of khoa production practices

Practice wise Adoption of khoa production practices

The data regarding to adoption of different khoa production practices by the respondents is depicted in Table 2. It was revealed that cent percent respondents were adopting practice avoiding addition of any foreign material and contamination.

Table.1 Socio-personal characteristics of the respondents

Sr. No.	Age (years)	Frequency	Per cent
1.	Young (up to 31)	10	20.00
	Middle (32 to 55)	27	54.00
	Old (56 and above)	13	26.00
2.	**Education**		
	Can read or write	4	8.00
	Primary	10	20.00
	Secondary	23	46.00
	Higher secondary	11	22.00
	Graduate and above	2	4.00
3.	**Occupation**		
	Khoa production	1	2.00
	Khoa production + labour	2	4.00
	Khoa production + Farming	6	12.00
	Khoa production + Farming / Labour + subsidiary occupation	37	74.00
	Khoa production + service	4	8.00
4.	**Khoa production experience**		
	Less (up to 4)	10	20.00
	Medium (5 to 19)	32	64.00
	More (20 and above)	8	16.00
5.	**Land holding**		
	Landless	2	4.00
	Marginal	3	6.00
	Small	13	26.00
	Semi-medium	20	40.00
	Medium	11	22.00
	Large	1	2.00
6.	**Annual Income**		
	Low (up to Rs. 142896)	5	10.00
	Medium (Rs.142897 to 490705)	38	76.00
	High (Rs.490706 and above)	7	14.00
7.	**Social participation**		
	Low (score up to 1)	16	32.00
	Medium (score 2 to 5)	29	58.00
	High (6 and above)	5	10.00
8.	**Extension contact**		
	Low (up to 1)	5	10.00
	Medium (2 to 5)	36	72.00
	High (6 and above)	9	18.00
9.	**Market orientation**		
	Low (up to 10)	7	14.00
	Medium (11 to 13)	35	70.00
	High (14 and above)	8	16.00
10.	**Risk orientation**		
	Low (up to 10)	11	22.00
	Medium (11 to 14)	31	62.00
	High (15 and above)	8	16.00

Table.2 Distribution of the respondents according to the knowledge and adoption of khoa production practices

Sr. No.	Practices	Knowledge		Adoption	
		Frequ-ency	Percent	Frequency	Percent
1	Khoa containing not more than 28-35 percent of moisture	43	86.00	40	80.00
2	Pindi, Danedar and Dhap are the three types of Khoa	2	4.00	0	0.00
3	Addition of citric acid in Danedar Khoa added to develop the desirable characteristics	0	0.00	0	0.00
4	Danedar khoa is characterized by its irregular texture and body	0	0.00	0	0.00
5	Pindi khoa is formed as a disc shaped, smooth and homogenous body and texture	0	0.00	0	0.00
6	Dhap khoa is characterized by a loose and sticky body and a smooth texture	0	0.00	0	0.00
7	For Pindi khoa production preferably use buffalo milk, in small lots (not more than 5 liters)	0	0.00	0	0.00
8	When milk reaches to a semi solid state heating is stopped and the product is immediately taken out	0	0.00	0	0.00
9	Mechanized conical process vat is used for khoa production in mechanized method	1	2.00	0	0.00
10	Continuous khoa making machine is also used for large scale khoa production in mechanized method	2	4.00	0	0.00
11	While boiling, milk is continuously and vigorously stirred with a circular motion by a ladle (khunti / kawachya) to avoid burning and undesirable or smoky flavor of milk solids	45	90.00	43	86.00
12	The average 1 kg yield of khoa is obtained from standardized 5 liter of cow milk while 4 liter of buffalo milk	50	100.00	47	94.00
13	In traditional method optimum speed of stirring is about 100rpm	46	92.00	42	84.00
14	In mechanized continuous system optimum speed of stirring is up to 200rpm	0	0.00	0	0.00
15	To obtain good quality khoa, milk should be maintained at the boiling temperature till it reaches a pasty consistency.	50	100.00	48	96.00
16	While boiling of milk slow heating is affected on colour, texture and flavor of khoa.	49	98.00	46	92.00
17	Khoa reaches a pasty consistency, lowered temperature and the heating is discontinued	49	98.00	43	86.00
18	The shelf life of khoa is about 3-5 days at 30 ^{o}C temperature	5	10.00	1	2.00
19	Addition of potassium sorbate at the rate 0.20 to 0.40 % increased the shelf life of khoa to 10-11 days at 30 ^{o}C and 40 days at 5 ^{o}C	1	2.00	0	0.00
20	Using four ply laminated pouches and thin container possible to increase the shelf life of khoa up to 13 days at 30 ^{o}C and to 75 days in cold storage.	1	2.00	0	0.00
21	Pune, Hyderabad, Delhi are the major khoa marketing places in India.	47	94.00	29	58.00
22	In Hyderabad and Pune market khoa is sold through commission agent	47	94.00	16	32.00
23	Avoiding addition of any foreign material and contamination that is responsible for poor shelf life of khoa.	50	100.00	50	100.00

Table.3 Distribution of the respondents according to their overall knowledge about khoa production practices

Sr. No.	Category (score)	Frequency	Per cent
1.	Low (up to 8)	8	16.00
2.	Medium (9 to 11)	40	80.00
3.	High (12 and above)	2	4.00
	Total	50	100

Table.4 Distribution of the respondents according to their overall adoption level of khoa production practices

Sr. No.	Category	Frequency	Per cent
1.	Low (score below 11.00)	8	16.00
2.	Medium (score 12 to 18)	32	64.00
3.	High (score 19 and above)	10	20.00
	Total	50	100.00

Table.5 Constraints faced by the respondents while adopting the khoa production practices

SN	Constraints	Frequency	Percent	Rank
1	Scarcity of man power	22	44.00	XI
2	No thorough / scientific information about khoa business	36	72.00	III
3	Khoa production is time consuming	9	18.00	XIV
4	Not aware about the three types of khoa like Pindi, Danedar and Dhap	44	88.00	I
5	After khoa production within 24-36 hours khoa must sold otherwise it will be thrown out	21	42.00	XIII
6	Problems in the transportation	7	14.00	XV
7	Not aware about storage technology	27	54.00	IX
8	Not aware about mechanized method of khoa production, due to which cannot able to produce quality and high shelf life khoa	33	66.00	IV
9	No consistency in good market price for khoa throughout the year due to which more loss in this business	22	44.00	XII
10	Fuel is major constraint in traditional khoa production	31	62.00	VI
11	Unavailability of storage facilities	26	52.00	X
12	Main khoa market place is not nearer	28	56.00	VIII
13	Cheating in rates and in weight in marketing from the main market	32	64.00	V
14	Cannot get the information and training about mechanized method of khoa production technology	30	60.00	VII
15	More expenditure is required to establish khoa business	37	74.00	II

Thumping majority of the respondents were, adopting practices such as maintaining milk at the boiling temperature till it reaches the pasty consistency (96.00 percent),

Using standardized 5 liter of cow milk and 4 liter of buffalo milk for 1 kg yield of khoa (94.00 per cent), while 92.00 per cent of the respondents avoided slow heating while boiling the milk for khoa. Further, it was noted that (86.00 percent) of the respondents had, lowered down the temperature and the discontinued heating as pasty consistency of khoa is reaches and also continuously and vigorously stirring with a circular motion by a ladle (khunti / kawachya) to avoid burning and smoky flavor. While 84.00 per cent and 80.00 per cent of the respondents were adopting in the traditional method optimum speed of stirring is about 100rpm and Khoa containing not more than 28-35 percent of moisture, respectively.

Further, it was noticed that two third (58.00%) of the respondents were marketing khoa in Pune and Hyderabad market, whereas 32.00 per cent of the respondents had used commission agents in Hyderabad and Pune market for khoa sell and Meagre percentage of the respondents (4.00%) had stored khoa 3-5 days at 30^{o}C temperature.

Production of different types of khoa like Pindi, Danedar and Dhap, Addition of citric acid in Danedar Khoa, production of danedar khoa, production of pindi khoa, production of dhap khoa, use of buffelow milk for pindi khoa, immediately taking out the product when milk reaches to semi solid stage, use of Mechanized conical process vat, use of continuous khoa making machine, optimum speed of stirring, addition of potassium sorbate, use of Using four ply laminated pouches and thin container in cold storage were the practices not at all adopted by any of the respondents

Overall adoption level of khoa production practices

It is visible from Table 4 that remarkable percentage of the respondents (64.00 %) had medium level of adoption, followed by 20.00 per cent and 16.00 per cent respondents had high and low level of adoption, respectively.

Constraints faced by the respondents while adopting the khoa production practices

It is elucidated from Table 5 that the first and foremost constraint faced by respondents was not aware about the three types of khoa like Pindi, Danedar and Dhap (88.00 per cent), followed by as many as 74.00 per cent of the respondents who faced the main constraint of more expenditure is required to establish khoa business

Other important constraints faced by respondents were in following order: No thorough / scientific information about khoa business (72.00 per cent), Not aware about mechanized method of khoa production, due to which cannot able to produce quality and high shelf life khoa (66.00 per cent), cheating in rates and in weight in marketing from the main market (64.00 per cent), fuel is major constraint in traditional khoa production (62.00 per cent), cannot get the information and training about mechanized method of khoa production (60.00 per cent).

Some of the other constraints expressed by the respondents were, main khoa market place is not nearer (56.00 per cent), not aware about storage technology(54.00 per cent), unavailability of storage facilities (52.00 per cent), scarcity of man power and no consistency in good market price for khoa throughout the year due to which more loss in this business (44.00 per cent), after

khoa production within 24-36 hours khoa must sold otherwise it will be thrown out (42.00 per cent), Khoa production is time consuming (18.00 per cent) and Problems in the transportation (14.00 per cent)

Most of the khoa produces were middle aged, having educated up to secondary school level, engaged in farming with subsidiary occupation with semi medium land holding, medium experience, annual income, social participation, extension contact, market orientation and risk orientation

Majority of the respondents were having medium level of knowledge about khoa production with medium level of adoption

Cent percent of the respondents knew that 1 kg yield of khoa is obtained from standardized 5 liter of cow milk and 4 liter of buffalo milk, milk should be maintained at the boiling temperature till it reaches a pasty to obtain good quality khoa, consistency and avoiding addition of any foreign material and contamination. Cent percent respondents were adopting practice of avoiding addition of any foreign material and contamination. Not aware about types of khoa like Pindi, Danedar and Dhap and more expenditure is required to establish khoa business were the constraints faced by most of khoa producers.

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