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Full Length Research Paper

Consumer Preference for Goat Milk in Turkey

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A survey was conducted to investigate knowledge and preference of dairy goat products and milk consumption among consumers in East Mediterranean region of Turkey. Face to face interview method was used to survey of varying socio-economic levels to examine their approach and consumption of goat milk and its products. Of the 336 responders, daily milk consumption in low, middle and high socio economic levels were 21.7%, 28.0 % and 38.1 %, respectively. The highest goat milk consumers were with 23 % in high socio economic status. Most preferred milk was cow milk with 78.3%, 90.7 and 73.8% in low, middle and high socio economic level groups, respectively. The main reason for low goat milk consumption was low commercial availability of the product. Results of the survey showed that most important differences are seen between low and high socio-economic status groups' consumers in all questionnaire parameters. Most of the responders were unaware of the importance of the goat milk. Goat milk and its product's importance should introduced strongly to the consumers. More attention on promotions and advertisements regarding to goat products should be supported.

Keywords: Goat milk, socio-economic level, consumer knowledge, dairy goat products.

INTRODUCTION

Goat products have historically been used for multitude of purposes; forming an integral component of the livestock industry, plays a vital role in the socio economic structure of the rural community. Turkey has the highest goat population in Europe with 5.2 million head however, the population has been decreased consistently due to poor performance of native breeds, lack of state support policies and migration by 50% from 13.3 million down to 5.2 million between the years of 1985 and 2013. Although goat population decreased dramatically, dairy goat product

consumption has gained more importance than before. Imported dairy breeds with higher performances from overseas has provided efficient and more production of both goat milk and dairy products.

In continents such as Europe, Oceania and America, dairy production from goats has become a more commercialized operation, for example, goat cheese production is a significant industry in countries such as France and Italy, where it is regarded as a gourmet food and receives the highest prices among cheese varieties in the market (Silanikove et al., 2010).

There are different aspects to goat products like income, market conditions, consumer knowledge and preferences in Turkey. Consumer behavior and preferences are

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influenced by demographic and socio economic factors. Literature review indicates that consumer behavior and knowledge regarding to dairy goat products differ according to gender, age, income and educational level. Apart from the present situation, consumer preferences, knowledge and factors affecting consumption of goat milk and its products in urban region was investigated according to three different socio-economic status groups in Adana, Turkey. Information gathered from this study may provide a better understanding of consumer behavior and therefore could be useful to develop more accurately strategies for goat milk and dairy goat product production.

MATERIAL AND METHODS

Data for this study were obtained from a survey conducted in three different neighborhoods in Adana, in order to determine consumption behavior and knowledge level of goat milk and its products. To ensure a uniform representation of households in the urban areas of Adana, the city was divided into three sections or strata as neighborhoods of low, middle and high socio-economic levels. To determine these areas, previous research conducted on household settlement in urban Adana was utilized (Gul et al., 2003; Mutlu and Berk, 2004; Mutlu, 2007). Also by utilizing the results of the General Census (Turkish Statistical Institute, 2010), the number of residents living in these neighborhoods was determined and the number of the surveys to be conducted was allocated in proportion to the population of the three neighborhoods.

To determine the sample size for each socio-economic status group, the following formula was used (Yıldız et al., 2006; Nakip, 2005):

$$n = \frac{Z^2 * p * (1-p)}{c^2} = 336$$

Where,

n=sample size;

Z= Z value (1.96 used for 95 %confidence level);

p=percentage picking a choice, (0.3 used for sample size needed; was determined with literature study and the test survey conducted).

c=confidence interval, (0.05=±5 used).

By adding a reserve share of 4%, to the total number of 323 surveys calculated with the above formula, a final figure of 336 was decided upon. The population ratio of the neighborhoods was divided up as; 134 surveys in neighborhoods having low socio-economic status, 124 in neighborhoods having middle socio-economic status and 78 in neighborhoods having high socio-economic status. In this study respondents having low, middle and high socio-economic status have been numbered as group1, group 2 and group 3, respectively.

Personal interviews were conducted via a questionnaire in supermarkets, which were located in three different locations and selected randomly. Data collection took place

with a face-to-face interview technique with randomly selected persons at the respective grocery store chains. Participants were asked whether they were consumers of dairy products and those that gave a positive response were then asked to differentiate between their preferences for cows, goats, sheep or buffalo milk. All of the respondents interviewed lived in their respective areas in which they were interviewed.

Data obtained from the research were analyzed by SPSS 15. The chi square test and Kruskal Wallis analysis were used to test the dependence variables between the three different districts and the level of significance which was $p=0.05$.

RESULTS

Consumer characteristics

Sociodemographic data of the respondents are represented in Table 1. The majority of the respondents were female (57.5%). Average marriage rate were highest in grup 1 (97.8%) and lowest in grup 3 (59.5%).

Consumption of Cow and Goat Milk

Respondents' consumption of cow milk was shown to be infrequent for all three neighborhoods; 62.0 % in low socio-economic neighborhoods, 56.8 % in middle and 57.9 % of respondents in the high socio-economic bracket. 38.1 % of those that consumed cow milk regularly lived in the neighborhoods with high socio-economic status (Table 2). According to the chi square and kruskal-wallis test analysis conducted, milk consumption differed with regard to the neighborhoods (chi square: 14.908; $p<0.002$; kruskal-wallis test: 12.562; $p<0.002$). Children were the highest milk consumer in the family in all neighborhoods, and were followed by their mothers, then other family members and finally their fathers in terms of milk consumption (Table 3).

Milk is mostly consumed by drinking (Table 4). According to the chi square analysis, consumption of milk varied according to neighborhood (21.948; $p<0.005$); also a significant correlation found between the way milk is consumed and those who consume it (91.693; $p<0.001$). There were differences on the types of milk preferred with regards to different neighborhoods (chi square: 35.058; $p<0.001$; kruskal-wallis test: 12.169; $p<0.002$). The results obtained from the interviews showed that choice of the families from all three neighborhoods were mostly cow milk (73.8-90.7%). The least goat milk consumption was in the neighborhoods having middle socio-economic status (2.5%). According to the chi square and kruskal-wallis test analysis, goat milk consumption differed with regard to the neighborhoods (*chi square:*

Table 1. Characteristics of study subjects

Demographic characteristics	Group1	Group 2	Group 3	Results of chi square analysis
Age	39.04	38.32	32.63	---
Household size	5.23	4.20	4.42	61.813; p<0.001
Children per family	3.10	2.13	2.17	53.714; p<0.001
Education, (years)	8.28	9.75	13.41	141.032; p<0.001
Married (%)	97.8	86.4	59.5	56.304; p<0.001

Table 2. Cow milk consumption (%)

Consumption	Group1	Group2	Group3
Daily	21.7	28.0	38.1
Infrequently	62.0	56.8	57.9
No Consumption	16.3	15.3	4.0
Total	100.0	100.0	100.0

Table 3. Milk consumption proportion of families (%)

Family members	Group1	Group 2	Group 3
Children	85.9	74.7	81.9
Mother	6.5	5.9	5.6
Father	1.1	4.2	2.4
Whole family	4.3	9.3	6.3
Other	2.2	5.9	4.0
Total	100.0	100.0	100.0

Table 4. Ways of milk consumption (%)

Way of Consumption	Group1	Group 2	Group 3
Drinking	82.6	73.7	92.1
In yogurt	8.7	18.6	4.0
In cheese	-	1.7	-
In puddings, cakes, etc...	2.2	0.8	1.6
More than one of the above	6.5	5.1	2.4
Total	100.0	100.0	100.0

Table 5. Milk Choice of the responders (%)

Type of milk	Group1	Group 2	Group 3
Sheep	2.1	3.4	3.2
Cow	78.3	90.7	73.8
Goat	19.6	2.5	23.0
Buffalo	-	3.4	-
Total	100.0	100.0	100.0

Table 6. Goat Milk Consumption (%)

Consumption	Group1	Group 2	Group 3
Yes	48.9	33.9	52.4
No	51.1	66.1	47.6
Total	100.0	100.0	100.0

Table 7. Reasons for Consuming or not Consuming Goat Milk (%)

Reasons for Consuming	Neighborhoods			Reasons for not Consuming	Neighborhoods		
	1	2	3		1	2	3
Advised	20.0	12.5	24.2	Has strong taste	17.0	20.5	36.7
Unique for health	44.4	52.5	47.0	It is not available	40.4	41.0	23.3
Advertisements	2.2	-	1.5	It is not habituated	36.2	35.9	38.3
Curiosity	8.9	10.0	16.7	Other (allergy etc.)	6.4	2.6	1.7
Coincidence	24.4	25.0	10.6		-	-	-
Total	100.0	100.0	100.0	Total	100.0	100.0	100.0
<i>Chi Square 8.413; p< 0.394</i>				<i>Chi Square 10.701; p< 0.098</i>			

9.220; $p<0.010$; *kruskal-wallis test*: 9.193; $p<0.010$). While more than half of those who live in neighborhoods having low and high socio-economic status irregularly consume goat milk (51.1% and %47.6).

Reasons for Consuming or Not Consuming Goat Milk

Goat milk consumption per neighborhood is shown in Table 6. The reasons given by respondents for consuming or not consuming goat milk are listed in Table 7. Almost half of the respondents for goat milk consumption were due to its unique characteristics. The main reason given for not-consumption in low and middle socio-economic neighborhoods was unavailability and unfamiliarity while in the high socio-economic it was strong taste and unfamiliarity. No significant relationship between the reasons for not consuming goat milk and the neighborhoods has been found.

Consumption Status of Products Made from Goat Milk with regard to the Neighborhoods and the Products Consumed

It has been determined that approximately half of the consumers from the low socio-economic status group (48%), and more than half of those from the middle (69%) and high socio economic group(71%) who responded to the survey consume products made from goats milk (Table 8). Differences on consumption of products made from goat milk has been determined among neighborhood (*Chi Square 13.701; p<0.001; Kruskal-Wallis Test: 13.360; p<0.001*).

Also dairy products choice made by goat milk largely differ in relation with the neighborhood. A significantly high rate of cheese consumption was seen in the middle socio-economic group. While desert made by goat milk was preferred mostly in neighborhoods with high socio-economic status (17.8%), both yogurt and cheese were

Table 8. Dairy goat product consumption (%)

Consumption status	Group1	Group 2	Group 3
Yes	48.0	69.5	71.4
No	51.1	30.5	28.6
Total	100.0	100.0	100.0

Chi Square 13.701; p< 0.001

Table 9. Consumption of products made by goat milk (%)

Products	Group1	Group 2	Group 3
Yogurt	17.8	3.7	17.8
Cheese	40.0	62.2	25.6
Both yogurt and cheese	33.3	12.2	20.0
Desert (made with milk)	6.7	11.0	17.8
Both yogurt and pudding	-	1.2	7.8
Both cheese and pudding	-	7.3	4.4
Other	2,2	2.4	6.7
Total	100.0	100.0	100.0

Chi Square 44.481; p 0.000

Table 10. Propensity to consume goat milk (%)

Propensity to Consume	Neighborhoods		
	Group1	Group 2	Group 3
Will consume	14.1	39.0	23.8
Will not consume	41.3	34.7	30.2
Uncertain	44.6	26.3	46.0
Total	100.0	100.0	100.0

Chi Square 21.778; p<0.000

preferred in neighborhoods of low socio-economic group (33.3%, Table 9).

Propensity to Consume Goats Milk and Goat Milk Products

Regardless of whether the respondents presently consume goat milk or not, they were also asked whether they would consume goat milk and/or its products in the future. Consumers who would continue to consume goat milk and its products were mostly in the neighborhoods having middle socio-economic status. While most of the

consumers who did not intend to consume were among the low socio-economic status group and most of those who were uncertain in the high socio-economic status group. Significant differences were determined in consumption propensities in terms of the neighborhoods (Table 10).

Also the reasons given by those who would not consider consuming goat milk in the future showed significant difference between the neighborhoods (Table 11). The cost was the most important reason given for those of the low socio-economic status group (34.2%). The reason for lower goat milk consumption in middle socio economic group was due to unaccustomed (53.7%) while in the high socio-economic group the most important reason was

Table 11. Reasons of those who do not intend to consume goat milk (%)

Reasons	Group1	Group 2	Group 3
Expensive	34.2	-	-
Unavailable	-	2.4	2.6
Not Habituated	23.7	53.7	52.6
Strong smell and taste	26.3	36.6	44.7
Other	15.8	7.3	-
Total	100.0	100.0	100.0

Chi Square 47.406; p < 0.000

Table 12. Goat milk knowledge source of consumers (%)

Sources	Group1	Group 2	Group 3
TV	54.9	32.8	16.7
Magazines, Newspapers, Books	7.8	9.8	25.0
The Internet	5.9	13.1	17.9
Personal Investigation	13.7	37.7	32.1
Other	17.6	6.6	8.3
Total	100.0	100.0	100.0

Chi Square 35.861; p < 0.000

determined to be the strong smell and taste of goat milk and dairy products.

Consumers' Level of Knowledge on Goat Milk and their Source of Knowledge

55.4%, 51.7% and 66.7% of the respondents respectively living in neighborhoods having low, middle and high socio-economic status have some knowledge about goat milk. The most common knowledge the consumers have on goats milk was that it "has high fat content and is nourishing". These ratios as per the neighborhoods are 66.7%, 85.2% and 72.6%, respectively. Other knowledge known by the respondents are the fact that goat milk is easy to digest (19.6%, 31.1%, and 14.3%, respectively) and that it is similar to that of breast milk (13.7%, 14.8%, and 13.1%, respectively). The knowledge of the consumers differs by the neighborhoods (*Chi Square 12.202; p < 0.016*).

The consumers were also asked whether they knew that goats milk was used in infant formulae, significant proportions were not aware of that fact (89.0%, 84.7%, 81.7% for low, medium and high socio-economic groups, respectively), and no relationship was also found between the education levels of the respondents and their

knowledge about goats milk being used in infant formulae (*Chi square: p < 0.593*). Also when asked whether they thought that goats were harmful to forests, a yes response was 48.9%, 70.3% and 56.3% for low, medium and high socio economic groups, respectively. But no relationship between their education level and their knowledge harmfulness to forests. (*Chi square: p < 0.244*).

There was no correlation between education level of responders and their knowledge level about goat's milk (*Chi square: p < 0.622*). However how they attained their knowledge about goat milk did differ by the neighborhoods. While for the 1st Group, television constituted the major source of knowledge (54.9%), the 2nd Group's main sources were by personal investigation (37.7%) and television (32.8%), and for the 3rd group, their knowledge was mainly obtained from magazines, newspapers, books (25.0%) and the consumers' personal investigations (32.1%, Table 12).

The relationship between the consumers' sources of knowledge and their level of education was only found for the respondents in the 3rd Group. The 3rd Group also had the highest level of education. According to the Chi Square analysis, there is a significant relationship between the consumers' level of education and their knowledge' source on goat milk ($p < 0.001$) and the fact that they thought it was the closest milk to breast milk ($p < 0.000$).

DISCUSSION

The reasons why goat milk is the second most preferred type of milk for the consumers of the 1st and the 3rd Groups differ for the consumers of second group. The consumers in Group 1 primarily resided in a rural setting and therefore could be expected to access goats milk more readily than their urban counterparts. However one could expect that among the 3rd group living in a higher socio-economic neighborhood with greater expendable income to have the means of purchasing goats milk, which is generally more expensive than cow's milk in grocery stores and/or super markets. As such consumers in group 1 gave cost as the most important reason for this for having the least propensity to consume it in the future majority of consumers in the 3rd Group gave strong smell and taste as the reason for their uncertainty to consume goat's milk in the future.

We can state that the level of education was not directly related to their level of knowledge about goat's milk. As with respondents in Group 1 who has the highest level of knowledge about goat milk yet the lowest education level probably due to their rural connections.

One of our primary aims with this study was to ascertain the consumers' level of knowledge with regards to nourishment, healthiness and ease of digestion of goat's milk. As related to this topic a significant part of all consumers from all three groups also had no knowledge of the fact that goat milk was used in infant formula. Another important matter of discussion of this study is related with the 2nd Group of consumers. The consumers involved in this group represent the segment of the society that experiences a transition between the low and high socio-economic statuses. In all matters dealt with in this study, most significant differences have been found between the 1st and the 3rd Groups, and the 2nd Group has given results that are proximate either to the 1st Group's or 3rd Group's results; or being completely different from both of the Groups, the 2nd Group had the highest values. With such features, the consumers of the 2nd Group reflect the characteristics of a society in transition. With educational tasks to be carried out, the awareness on goat milk of the consumers of this group can be raised and they may be facilitated to show features proximate to the features of the 3rd Group.

The results of the study demonstrate, consumers included in different socio-economic status groups showed differences in terms of socio-demographic indicators. In particular the consumers in the 1st Group who were distinctly different from the 2nd and 3rd Groups on all indicators and this difference were negative. In all the neighborhoods, majority of the consumers consumed cow's milk on an irregular basis. In all neighborhoods cow's milk was consumed mainly by children and by drinking. No relationship was found between those consuming milk and the manner in which they consuming it. Goat's milk was the

second most preferred type of milk for the 1st and the 3rd Group. No significant relationship was seen between the reasons for consuming or not consuming goat's milk and the neighborhoods the consumers live in. However the biggest consumers of products made of goat's milk; were Group 1 and 2 (40.0% and 62.2%, respectively) and significant difference from Group 3. The lowest intention to consume goat's milk was found with the consumers of the 1st Group, and the highest intention with Group 2. The most uncertain for future consumption were among the 3rd Group.

There were notable differences between the content of the knowledge the consumers had on goat's milk according to the neighborhoods they lived in, however these differences were not dependent on their education level. On the other hand, their sources of knowledge on goat's milk differed according to their neighborhood and in the 3rd Group their level of education was an effecting factor. Considering the answers given to the subjects of the study, the consumers living in the 2nd Group of neighborhoods have values between those who live in 1st and 3rd Group of neighborhoods and they show transition characteristics between these two groups.

Ozawa et al. (2008) by the use of a questionnaire method researched the consumer acceptability of goat milk products and the effectiveness of promotion and marketing techniques. The key points made in the study were that; Goats milk in Japan was virtually a "forgotten" commodity as only 10% of Japanese households recognized that goats milk and related products were commercially available, and only 30% of middle-aged consumers could recollect ever drinking goats milk although more than 70% of respondents who had never consumed goats milk expressed a desire to do so. One could conclude from this that with appropriate promotion there could be high demand from middle class customers. Goat milk should not be promoted merely as a drink that is similar to cow's milk, but as a functional drink or a health food product to expand the Japanese goat milk market. In another research, Haenlein (2004) concluded that demand for goat milk is based on 3 aspects. First is the importance given to goat milk products in the rural household; second is growing connoisseur interest in goat milk products especially cheeses and yoghurt in developed countries and third is affliction of people in developed nations to cow's milk related allergies and other gastro-intestinal ailments. Last two aspects are quite different from the first one because the goat milk is requested or even needed by all levels.

CONCLUSION

Our research group concluded that information related to benefits of goat's milk and goat's milk products was gravely needed in the marketplace. Based on our findings, irrespective of the consumers' level of education, the print

media as well as television were the best means of relaying this information. We concluded that informing consumers in the 1st and 2nd Groups with a visual media campaign directed at the benefits of goat's milk products to human health would have a more positive response than any other means. As for the consumers in the high socio-economic bracket we felt that an improvement in the quality of the products to improve the strong taste would increase their consumption rate.

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