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Determination of consumers' intention to purchase goat milk: the case of the Mediterranean Region

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Abstract:

Goat milk has increasing importance in daily food consumption of individuals. This study aims to determine the factors that have influence on goat milk consumption. The research was conducted based on a face to face consumer survey which was applied in the two cities of the south-east part of Turkey, Adana and Mersin. The sample size of the survey was determined as 518 consumers depend on convenience sampling in case of unlimited population size. In this regard, a multivariate probit model was designed to test the intentions for goat milk consumption and purchase. The result of the study shows that place of purchase, bottle type, odour, brand, cheese consumption and homeland are the related factors with goat milk consumption and purchase activities. These results could be useful for understanding consumer attitude towards goat milk and to identify commercial targets and production strategies in future.

Anahtar Sözcükler:
Goat milk
Consumption
Probit model
Purchase behaviour
Turkey

Tüketicilerin keçi sütüne yönelik satın alma niyetlerinin belirlenmesi: Akdeniz Bölgesi örneği

Özet:

Keçi sütünün günlük gıda tüketimindeki önemi her geçen gün artmaktadır. Bu çalışma keçi sütü tüketimine etki eden faktörleri belirlemeyi amaçlamaktadır. Araştırmanın materyalini Adana ve Mersin illerinde uygulanan yüz yüze tüketici anketleri oluşturmuştur. Anketin örneklem büyüklüğü, sınırsız popülasyon koşulları altında 518 tüketici olarak (kolayda örnekleme yöntemi kullanılarak) belirlenmiştir. Bu bağlamda, keçi sütü tüketimi ve satın alma niyetlerini test etmek için çok değişkenli bir probit modeli tasarlanmıştır. Çalışmanın sonuçları, satın alma yeri, şişe tipi, koku, marka, peynir tüketimi ve memleket faktörlerinin keçi sütü tüketimi ve satın alma faaliyetleri ile ilişkili olduğunu göstermektedir. Bu sonuçlar, tüketicinin keçi sütündeki tutumunu anlamak ve gelecekteki ticari hedefleri ve üretim stratejilerini belirlemek için yararlı olabilecektir.

Keywords:
Keçi sütü
Tüketim
Probit model
Satın alma davranışı
Türkiye

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1. Introduction

Since profits from satisfied consumers are at the focus of modern marketing, marketers are much more sensitive to consumer behaviour discipline (Rugimbana, 2007). Thus, understanding and identifying consumer behaviour is being fundamental and the most important task of the marketers. In today's saturated and competitive markets, consumers are much more influenced by factors such as income, price, stability, lifestyle and values in product selection and preferences (Santoso et al., 2012).

Despite its conservative nature, changes in consumer preferences have been observed in the food and

agriculture sector. Higher incomes shift food expenditures from grains and other starchy foods to meat, fresh vegetables, fruit, fish, processed and ready-to-eat foods and milk and dairy products (Narrod et al., 2011).

In the global food market, demand for animal products is expected to increase for the coming periods due to the urbanization, population and income growth. The average growth rate for milk production was 2.1% during the last decade and projected to increase by 22% in 2027 compared to the 2015-2017 based period (OECD/FAO, 2018). Milk and milk products are at the category of frequently purchased food products which makes factors effecting the consumption more important

(Kurajdová et al., 2015).

Milk and its products are expecting to find more places in the developing markets due to the nutritional and medical values that they comprise (Jerop et al., 2013). Moreover, as incomes and population increase, and diets become more globalised, more dairy products are expected to be consumed in developing countries (OECD/FAO, 2018). On the other hand, due to their employment and income creation capacity, dairy agribusiness system gives important contributions to economic and social life of the developing countries (Narrod et al., 2011).

In recent years, there is an increasing trend on consumption and awareness of goat milk and its products based on the advantages of nutritional value and high digestibility compared to the other milk types (Popescu, 2019). Rapid population growth, climate change, urbanization and land fragmentation are the factors that will support goat milk and its products consumption increase (Jerop et al., 2014; Utami, 2014). Depending on the increases in consumption, an important increase taken place on global goat population with 33.79% during the period 2000-2013. Goat milk production also increased by 39.2% in the same period (Skapetas and Bampidis, 2016).

In Turkey, due to the restricted economic sources of the individuals' dairy consumption is quite low compared with the European countries. Annual per capita consumption of milk is 166 kg, 26 kg of which is fluid milk and 140 kg is dairy products and consumption of dairy products (as equivalent milk) is 85 kg cheese, 31 kg yoghurt, 21 kg butter, 1.36 kg ice cream and 1.54 kg milk powder in EU countries. A total of 22.121.000 tons of milk is produced in Turkey, whereof the total production 90,6% is cow milk, 6,5% is sheep milk, 2,5% is goat milk and 0,3% is buffalo milk (TUIK, 2018). In European countries, just fluid milk consumption is above 100 liters annual per capital (Yayar, 2012). In terms of goat milk consumption, goat breeding spreads throughout Turkey, especially it is popular in the east and west mountainous regions of the Mediterranean region. Çukurova region, which is in the south-east part of Turkey covers two big cities, Adana and Mersin and these cities have one of the most concentrated goat population in Turkey with 1.2 million goats. Therefore, goat breeding has an important role in the socio-economic and cultural structure of this region from past to now (TUIK, 2018). Although goat breeding is historically significant for Çukurova region and Turkey, reasons like migration, yield loss and supporting of alternative products decreased interest on dairy goat farming and goat population dramatically downfall at the beginning of the 2000s but this reduction turned to an upward trend in recent years (Daşkıran and Koluman, 2014).

The purpose of the study is to examine the factors affecting goat milk consumption and purchase intentions considering the attitudes on milk consumption. In this context, it is aimed to reveal the

behaviour of the individuals towards consuming goat milk considering their milk consumption behaviours. Finally, the relation between the possible effective attitudes on milk consumption and goat milk consumption was established.

2. Materials and Methods

2.1. Material

To determine goat milk consumption and purchase intentions by analyzing general milk consumers' behaviour, a face to face consumer survey was designed by the authors.

The sample size of the survey was calculated using the formula given below (İslamoğlu, 2008).

$$n = \frac{p \cdot (1 - p)}{\left(\frac{e}{z}\right)^2}$$

In this formula, n is the sample volume, p is the frequency of the observed event, e is the error ratio, and z is the confidence interval. Based on the highest value of p (1-p), the error margin e = 5% and the confidence interval 95% the sample size was assumed to as 384 people. In our study, 518 consumers sampled through convenience sampling who are responsible for their household or family purchases.

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The survey was applied around the shopping malls and food retailers to randomly selected 518 individuals among which 268 was from Adana and 250 from Mersin cities in July and August 2016 and samples size for each city was determined considering their populations. The survey questions were designed based on the quintile Likert scale where 1 represents insignificance and 5 represents extreme importance (Güney and Sangün, 2017).

The questionnaire was organized in sections to gather data related to socio-demographic characteristics of the sample, consumption frequencies and consumers' preferences and attitudes towards milk and goat purchase and consumption. The socio-demographic characteristics of the sample were given in Table 1.

2.2. Method

In order to associate goat milk consumption frequency with general milk consumption attributes a probit model was established. In the probit model goat, milk consumption frequency was accepted as the

dependent variable and attributes for general milk consumption were accepted as independent variable. The probit model is aimed at finding out how likely it is that a consumer buys goat milk, taking into account some characteristics that he has and some behaviours he has declared. The probit model allows carrying out this type of studies since the condition of existence of a

variable for which dichotomous evidence is observed is fulfilled. In this paper, the probit model posits as an observable variable whether the person is willing or not to buy goat milk. With this information, the model subsequently reproduces a latent variable, defined as the propensity – for an individual to buy goat milk.

Table 1. Socio-demographic characteristics of the sample (% of respondents)

	Frequency	Percent		Frequency	Percent
Gender			Education		
Male	279	53.9	Literate	14	2.7
Female	239	46.1	Elementary school	295	56.9
Total	518	100	High school	160	30.9
Age			University	46	8.9
25<	82	15.8	Graduate	3	0.6
25-34	102	19.7	Total	518	100,0
35-44	126	24.3	Income (TL)		
45-54	141	27.2	none	8	1.5
54>	67	12.9	1001<	66	12.7
Total	518	100	1001-2000	281	54.2
Homeland			2001-3000	107	20.7
Mediterranean	485	93.6	3001-4000	41	7.9
Black Sea	4	0.8	4000>	15	2.9
Aegean	2	0.4	Total	518	100
East Anatolia	4	0.8	Occupation		
South-east Anatolia	15	2.9	Worker	32	6.2
Central Anatolia	8	1.5	Officer	23	4.4
Total	518	100	Tradesman-Craftsman	52	10.0
Household Numbers			Self-employment	152	29.3
1	12	2.3	Private sector	30	5.8
2-3	98	18.9	Student	45	8.7
4-5	224	43.2	Housewife	155	29.9
5>	184	35.5	Unemployed	10	1.9
Total	518	100	Retired	19	3.7
			Total	518	100

TL: Turkish Lira

A dichotomous dependent variable and independent qualitative or quantitative variables are identified. This creates a data set perfectly similar to a contingency table where the data are grouped showing the answers for each combination of independent variables and the frequency and total of cases for the dependent. With this set of data, it is possible to perform the probit model and thus calculate the probability of response for each level or combination of variables.

Given the following model;

$$P(y = 1/x) = G(\beta_0 + \beta_1 x_1 + \dots + \beta_k x_k) = G(\beta_0 + \beta X)$$

where G is a function that takes values between zero and one for all real numbers z.

In the probit model, G represents the standard cumulative normal distribution function given by:

$$F(Z_i) = \int_{-\infty}^{Z_i/\sigma} \frac{1}{\sqrt{2\pi}} \exp\left[-\frac{t^2}{2}\right] dt$$

Since the probit model is a limited dependent variable model, the estimation of the parameters is done through the maximum likelihood method. This method suggests that the values of the parameters that maximize the logarithm of the likelihood function are chosen as estimates (Maddala, 1983). The logarithmic likelihood function for observation i is given by:

$$\lambda_i(\beta) = y_i \log(G(x_i\beta)) + (1 - y_i) \log(1 - G(x_i\beta))$$

The logarithm for a likelihood function for a sample-sized n is then defined as:

$$\mathcal{L} = \sum_{i=1}^n \lambda_i(\beta)$$

The maximum likelihood estimator of β , denoted by $\hat{\beta}$ maximizes this logarithm of likelihood (Wooldridge, 2003). The properties of the maximum likelihood estimators of the model are consistent, asymptotically normal, and asymptotically efficient.

In order to know the effects of changes in explanatory variables on the probabilities that any observation belongs to one of the two groups ($y=0$, $y=1$), it is used the partial derivative denoted as:

$$\frac{\partial p(x)}{\partial x_j} = g(\beta_0 + x\beta) \beta_j$$

$$g(z) \equiv \frac{\partial G}{\partial z}(z)$$

where

The term $g(z)$ corresponds to a probability density function. Since in the probit model $G(\cdot)$ is a strictly positive cumulative distribution function, $g(z) > 0$ for all z , the sign of the partial effect is the same as that of β_j . To test the significance of each of the estimated coefficients, the hypothesis test $H_0: \beta_j = 0$ is performed

with a test $\hat{\beta}_j / (se) \hat{\beta}$. The probit regression model was performed using STATA[®] 14 software.

Furthermore, to describe the basic features of the data, descriptive statistic was also used to provide simple summaries about attributes. In this context means and frequencies of the measures were calculated using SPSS[®] 21 software (SPSS Inc., Chicago IL, USA).

3. Results and Discussions

When the surveyed individuals were examined from Table 1, it was determined that 53.9% of the participants are male and 64.4% are over 35 years old. It is found that 87.8% of them has a primary school and high school degree and 74.9% of them are composed of individuals with income between 1000-3000 TL. The majority of the individuals participating in the survey are from the homeland of the Mediterranean region (93.6%).

In the study to determine the independent variables for probit analyse the participants were asked for the perception of the factor affecting their milk

consumption and purchase decisions. The results were given in Table 2 and Table 3.

Factors that are effective in milk consumption are determined as taste, health, habit, nutrition value and lifestyle. In their studies, Hsu and Lin, 2006; Alwis et al., 2009; Ozawa, 2009; Kurajdová et al., 2015; Kurajdova and Petrovicova, 2015 and Pinto, 2016 also stated that these factors are important in milk consumption. From the analyze it is found that all the factors are important in milk consumption but health, nutritional value and taste are the primary effective ones. Besides, habit and lifestyle are secondary effective factors and have less importance in consumption.

Table 3 shows that primary factors for milk purchase behaviour are the place of purchase, fat rate, colour, odour and the expiry date. In their studies Krešić et al., 2010 stated that the fat rate is important on milk purchase decision. Milk distribution and processing structure is different from other food products. In addition, milk is a perishable food product and consumers are more careful on expiry date and place of purchase. Recent years, products with different fat ratios are existed due to product diversity in the market (semi-oily, full fat and light products). Thus, consumers are checking the fat rate while their purchase. Colour and odour are other important factors because these factors give an idea about the freshness of the milk.

Shelf-life, brand, package and processing methods are the secondary effective factors for milk purchase behaviour. The price is the least effective factor in the purchase of milk. This means consumers are willing to pay the market price for the milk in Turkey. Brand factor is also found important in the study of Alwis et al., 2009.

The probit analysis results for factors affecting goat milk consumption are given in Table 4.

In the scope of the research, a multivariate probit model was performed to test relations between general milk consumption attributes and intention for goat milk consumption. The obtained effective factors for consumption and purchase of milk (Table 3 and Table 4) were used in the model. From the probit model results, it can be concluded that, for the case of place of purchase, a correlation was found between street sale and goat milk consumption ($p < 0.05$). The reversed direction of the relation (-0.146), explains that as the individuals' purchases from street vendors are increasing, the probability of consumption of goat milk is decreasing. However, there is also a relation between goat milk consumption and supermarket and delicatessen use ($p < 0.01$) is existing but this time the direction of the relationship is positive (0.270 and 0.306) which identifies that consumer who uses supermarkets and deli for buying milk has the probability of consuming goat milk. The factor place of purchase was also used in the consumer behaviour model study of Utami, 2014.

Table 2. Frequency and percentage distribution values for milk consumption behaviour

		Ineffective	Very least effective	Less effective	Effective	Very efficient	Total
Taste	F	-	1	10	207	300	518
	%	-	0.2	1.9	40.0	57.9	100
Health	f	1	1	12	115	389	518
	%	0.2	0.2	2.3	22.2	75.1	100
Habit	f	16	19	84	143	256	518
	%	3.1	3.7	16.2	27.6	49.4	100
Nutrition value	f	-	4	14	129	371	518
	%	-	0.8	2.7	24.9	71.6	100
Life-style	f	42	43	105	159	169	518
	%	8.1	8.3	20.3	30.7	32.6	100

Table 3. Frequency and percentage distribution values for milk purchase behavior

		Ineffective	Very least effective	Less effective	Effective	Very efficient	Total
Price	f	66	95	82	166	109	518
	%	12.7	18.3	15.8	32.0	21.0	100
Odour	f	4	10	43	231	230	518
	%	0.8	1.9	8.3	44.6	44.4	100
Colour	f	5	6	39	258	210	518
	%	1.0	1.2	7.5	49.8	40.5	100
Shelf life	f	81	10	34	158	235	518
	%	15.6	1.9	6.6	30.5	45.4	100
Brand	f	101	12	56	189	160340	518
	%	19.5	2.3	10.8	36.5	30,9	100
Fat rate	f	2	5	42	235	234469	518
	%	0,4	1	8.1	45.4	45.2	100
Package	f	91	12	42	177	196373	518
	%	17.6	2.3	8.1	34.2	37.8	100
Expiry date	f	86	7	8	87	330417	518
	%	16.6	1.4	1.5	16.8	63.7	100
Process type	f	90	15	29	114	270384	518
	%	17.4	2.9	5.6	22	52.1	100
Place of purchase	f	18	11	25	103	361464	518
	%	3.5	2.1	4.8	19.9	69.7	100

Table 4. The probit model estimates

	B	S.E.	Sig	95% C.I. for EXP (B)	
				Lower	Upper
[Goat milk consumption = Yes]	-2.707	.643	.000***	-3.967	-1.447
Street sale use	-.146	.064	.022*	-.272	-.021
Supermarket use (milk)	.270	.097	.005**	.081	.460
Glass bottle use	.275	.099	.006**	.080	.469
Odour	-.343	.111	.002**	-.559	-.126
Big brand	-.223	.062	.000***	-.344	-.102
Cheese consumption	-1.036	.075	.000***	-1.183	-.890
Supermarket use (milk products)	.261	.079	.001**	.107	.416
Delicatessen	.306	.087	.000***	.135	.477
Homeland	.366	.109	.001**	.152	.580

*: p<0.05; **: P<0.01; ***: P<0.001

Similar positive relation is also existing in the use of glass packaging for milk purchase. Purchase of milk in a glass bottle was found to be significant ($p < 0.01$) and consumers tend to consume goat milk who prefer to buy the milk in a glass bottle (0.275).

There was a significant relationship between the consumption of cheese and consumption of goat milk ($p < 0.001$). But this reverse relationship (-1.036), indicates that as consumption of cheese increases, goat milk consumption tends to decrease. In other words, consumption of goat milk is decreasing in individuals who increase cheese consumption. Ozowa et al., 2009 and Utami, 2014 also indicate a positive relationship between cheese and goat milk consumption.

Among all the sensory properties odour factor has identified as important ($p < 0.01$). The relation between the milk odour factor and goat milk consumption is negative which expresses that milk odour component reduces consumption on goat milk consumption (-0.343). In their studies Park, 2005; Ozowa et al., 2009; Jerop et al., 2014 and Savran et al., 2016 also found that unpleasant smell is effecting goat milk consumption and led the low consumptions levels.

Besides, the relationship between consumption of goat milk and branding is significant ($p < 0.001$) and the relationship is negative (-0.223). The higher market price of branded products causes branding to have a negative impact on goat milk consumption.

There is also a significant relationship between the homeland of the individuals and consumption of goat milk ($p < 0.01$) which shows that the interest in consumption to goat milk is increasing from the coastal zones to inner zones (0,366). This situation is suggesting that people from mountainous inland regions are more likely to consume goat milk than coastal people. The numbering in the answer to the question concerned was made from the coastal zones to the inner zones.

4. Conclusions

The current study states that some of the factors that are effective in milk consumption are also having an impact on goat milk consumption, and knowing that will be useful for the goat milk agribusiness system. The results can be concluded that some of the factors that are effective in milk consumption are also having an impact on goat milk consumption, and knowing that will be useful for the goat milk agribusiness system.

Probit model shows that delicatessen and supermarkets as place of purchase for milk has a positive relation with goat milk purchase. In addition, milk in glass bottle also has a positive relation with purchasing goat milk. This situated that consumers mostly prefer to buy goat milk from delicatessens and supermarkets with glass bottle. With the help of the probit model the factors with negative relation to goat milk purchase were detected. In this context cheese

consumption has a great negative relation with goat milk consumption. This situation identifies that the consumers who consume more cheese do not tend to consume goat milk. Other factors that have negative relation with goat milk consumption are street vendor, brand and odour. The odour makes the consumers uncomfortable for goat milk and has a negative impact on consumption. The consumers are also not intending to buy goat milk in big brands and they rather prefer the local brands. This consumer pattern is very big opportunity to geographical indication products produced from goats.

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