PERCEPTION AND ACCEPTANCE OF GOAT CHEESE IN COMPARISION WITH SHEEP AND COW CHEESE – AN EMPIRICAL STUDY

CSAPO Zsolt[1], PENTEK Adam[2], CSAPONE RISKO Tunde[3]
[1]Department of Enterprise Development, Faculty of Economics and Business, University of Debrecen, Debrecen, Hungary
[2]Department of Agricultural Informatics, Faculty of Economics and Business, University of Debrecen, Debrecen, Hungary
[3]Department of World Economy and International Business, Faculty of Economics and Business, University of Debrecen, Debrecen, Hungary
csapo.zsolt@econ.unideb.hu
pentek.adam@econ.unideb.hu
risko.tunde@econ.unideb.hu

Abstract: *Goat milk production is a dynamic and continuously expanding branch, which determines the life of millions of people, as well as constitutes an important part of the national economies of many countries (SILANIKOVE et al., 2010). Goat milk and the cheese made from it, was venerated in ancient Egypt, with some Pharaohs supposedly placing these foods among the other treasures in their burial tombs (SMITH, 2006). Across the globe, goats can be kept almost everywhere, even poor surroundings. Goats can play an important role in the human nutrition of the continuously increasing human population. Goats are able to provide high quality products under diverse climate conditions and in extreme environments. Globally, more people drink milk from goats than from any other animal (SILANIKOVE, 1994). Goat milk plays a decisive role in feeding starving and malnourished people in developing countries. At the same time in developed countries and also in Hungary these products are "luxury" consumer goods. Due to its favourable effects on human health, goat milk has found a niche for itself in the trend towards healthy nutrition, as well in developed countries. The main objective of our empirical research was to analyse the respondents' perception and acceptance towards goat milk cheese in Debrecen, Hungary through blinded testing of cow, sheep and goat cheese. The empirical research has been carried out in the autumn, 2018 and beginning of 2019 with a sample of 202. Based on the results it can be stated, that respondents had almost the same opinion on the tested cheeses made from cow, sheep and goat milk, which is in contrary with the findings of some previous studies that goat milk products have a "special smell or flavour. Based on the correlation test it can be stated, that there is no significant correlation between the age of respondents and the affordable cheese price, (how much respondents would pay for it) and between the income and the cheese price. The affordable price proved to be the highest for the goat cheese which may reflect its perceived high quality.*

Keywords: *cheese; goat; sheep; cow; consumption; marketing.*

JEL Classification: *M31.*

1. Literature Review

1.1. Goat keeping and goat milk production in Hungary

Until the end of the 1990s, goat breeding in Hungary was relatively unimportant. However, new demand for so-called alternative products meeting the requirements of healthy nutritional programmes began to appear in the country, as well. Initially, this new demand was met with imported products, since the national goat population and goat dairy products could not compete with imported products (MARTICSEK et al., 1999). Due to many efforts, today, local goat milk and manufactured goat milk products can meet any and all market requirements (SZIGETI, 2004).

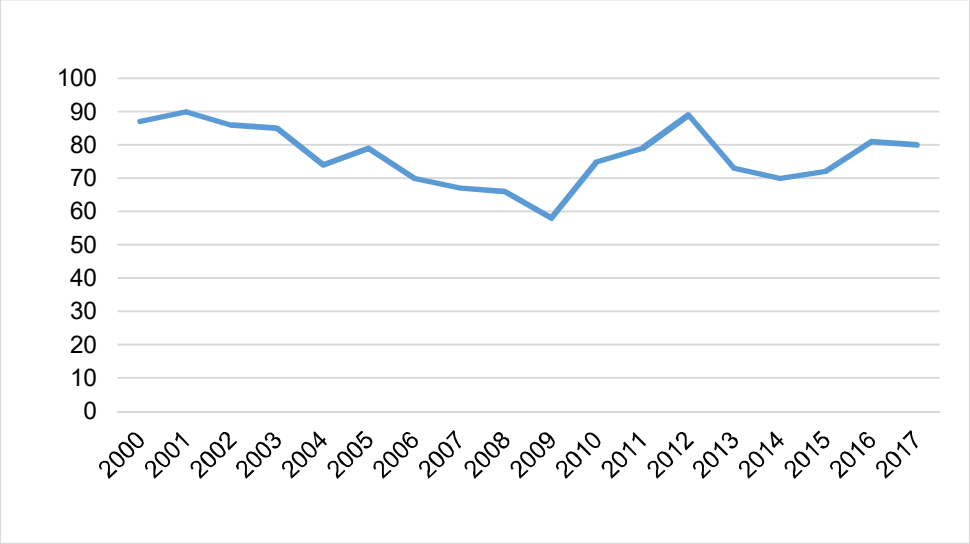

Figure 1. Goat population in Hungary between 2000 - 2017 (thousand heads)
Source: KSH, 2018a

Figure 1 shows the goat population in Hungary between 2000 - 2017. The number of individuals and companies keeping goats as a livelihood generated income or business reasons is probably a few hundred in Hungary. The number of farmers keeping some goats as a hobby or providing the family with goat milk is probably a few thousand (KUKOVICS, 2007a). There are around 3-5,000 goat keepers in Hungary (the exact number is not known) and less than 80% keeps less than 10 goats. The breeds mainly belongs to Hungarian breeds, but 10% stem from imported breeds, such as Saanen, Alpine, Boer or Anglo-Nubian (KUKOVICS, 2008a). Many poor people keep goats in Hungary, in mainly underprivileged regions (KUKOVICS, 2007b). The production level (and number of animals), as well as keeping conditions are lagging behind the data for France, Spain, Italy, Greece and the Netherlands (KUKOVICS, 2008b). Production level of the sector is weak and has been struggling with several problems for many years. The number of goat breeders and goats

continuously fluctuates and the data are patchy. With the growing importance of healthy nutrition and lifestyle, growing demand is expected for goat milk and goat milk products that could contribute to the development of the goat sector (KOCSISNÉ GRÁF, 2011).
The main product of the goat sector is milk. The estimated goat milk production is around 3-5 million litre per year, but only 0.6 million litres are manufactured by milk factories. The main income of milk producing farmers comes from milk and manufactured goat milk products. It is common in the sector that goat breeders sell the produced goat milk and self-made dairy goat products directly (HUNGARIAN CHAMBER OF AGRICULTURE, 2017). Figure 2 shows the goat milk production in Hungary between 2000 - 2016.

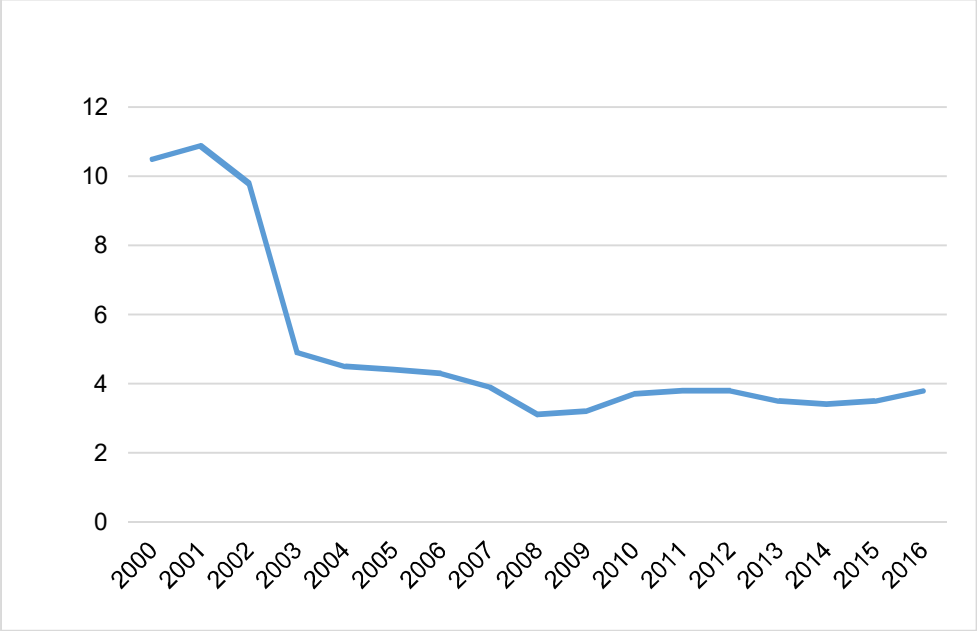

Figure 2. Goat milk production in Hungary between 2000-2016 (million litres)
Source: KSH, 2018b

SZIGETI (2004) and SZIGETI (2005) report on the results of an empirical research study carried out in Hungary. Only a small ratio of respondents reported only very rarely buying and consuming goat dairy products. The most often purchased product was cheese. The main reason for refusing goat dairy products were: they did not like the taste of goat dairy products, they did not even know these products, these products are not easy to find and buy. The main reasons for buying these products are: healthiness, taste and quality. The respondents were concerned that goat dairy products were expensive. Another empirical research study (SZIGETI el al., 2014) revealed that the opinion of Hungarian respondents had not changed much since the time of the previous studies.

1.2. Nutritional value of goat, sheep and cow milk

The use of goat milk as an excellent food source is undeniable. It has beneficial effects for health maintenance, physiological functions, in the nutrition of children and elderly people (BILLION, 2003; ALBENZO et al., 2006; DOMONKOS and GEINER, 2009; YANGILAR, 2013).

Goat milk differs from cow or human milk in having better digestibility, alkalinity, buffering capacity and certain therapeutic values in human nutrition and medicine (HAENLEIN and CACCESE, 1984; PARK and CHUKWU, 1989; PARK, 1994).

Goat milk is important for prevention of cardiovascular disease, cancer, allergy and microorganism and used for stimulation of immunity. Goat milk is recommended for infants, old and convalescent people (HAENLEIN, 2004; ZENEBE et al., 2014).

Comparing the biological value of goat, sheep and cow milk protein, FENYVESSY (2009) stated that the protein of goat milk was the most valuable, followed by the protein of sheep and cow milk. The ratio of essential amino acids was 46.7% in cow milk, 48.0% in sheep milk and 52.5% in goat milk (AGNITHORI et al., 1993 and FENYVESSY et al, 2001 in FENYVESSY 2009).

Goat milk has predominantly smaller fat globules compared to cow milk and is easier to digest (FEVRIER et al., 1993; JANDAL, 1996; LÓPEZ et al., 2003; RAMOS et al., 2005; OLALLA et al., 2009; YANGILAR, 2013). Thus, goat milk is a valuable alternative for babies, adults and nursing mothers, also (BALDO, 1984; HOST et al., 1988).

Goat milk has been recommended as a substitute for patients allergic to cow milk (TAITZ and ARMITAGE, 1984; PARK, 1994; GUO et al., 2004; YANGILAR, 2013). 40-100% of patients allergic to cow milk proteins tolerate goat milk (ZEMAN, 1982; PARK, 1994). The uniqueness of goat milk, yoghurt and cheese in human nutrition has several aspects: goat milk can be used for the treatment of direct or indirect cow milk allergy (GREZESIAK, 1989 in ANAETO et al., 2010).

When analysing the characteristics of goat milk, JANDAL (1996) reports on its several aspects:

Physicochemical aspects: Goat and sheep milk is white in colour compared with cow milk, which is yellowish because of the presence of carotene. Goat milk has a stronger flavour than sheep milk, and is alkaline in nature, which is very useful for people with stomach acid problems.

Medical aspects: Goat milk is prescribed by many doctors for children who are sensitive to cow milk, and is an alternative for people who are allergic to cow milk.

Nutrition aspects: The fat of goat milk is more digestible than milk, and the fat molecules are smaller and have a greater surface area.

Biological aspects: Goat milk is easier to digest because of its natural homogenization, which is superior to the mechanical homogenization of cow milk.

Immunological aspects: The non-allergenic properties of goat milk are due to the fact that most of the milk proteins are unable to pass through the walls of the digestive tract in their original, undigested, allergenic states.

Goat milk and manufactured goat milk products have a three-fold significance in human nutrition, as HAENLEIN (2004) summarises:

- feeding more starving and malnourished people in the developing world than from cow milk;
- treating people afflicted with cow milk allergies and gastrointestinal disorders, which is a significant segment in many populations of developed countries;
- meeting the gastronomic needs of connoisseur consumers, which is a growing market share in many developed countries.

Although PARK (2010) and MOWLEM (2005) mention two formidable barriers in marketing goat milk products: negative public perception of "goaty" flavour, and seasonal milk production, which prevents year-around uniform marketing.

1.3. Nutritional value of manufactured goat dairy products: cheese

Cheese is a fermented dairy product, which has hundreds of varieties. It is probably the most popular and well known value added dairy product (PAL, 2014 in PAL et al., 2017). The proportion of goat milk processed into cheese and yoghurt is higher in comparison to cow milk (MORAND-FEHR et al., 2007; RIBEIRO – RIBEIRO, 2010). The high fat-content of goat's milk makes it very suitable for cheese-making, and some delicious cheeses can be made (PEACOCK, 1996).

Chesses hold the greatest economic value among all manufactured goat milk products. Agricultural Handbook No. 54 of the USDA describes over 400 varieties of goat cheese and lists over 800 names of cheeses, many of which are made from goat milk or combinations of goat with cow, ewe, or buffalo milk (PARK, 1990 and SANDERS, 1969 in PARK, 2010).

There are goat cheeses made from raw and pasteurized milk. In many countries, the manufacture of goat cheese from raw milk is prohibited due to food safety issues (e.g. brucellosis). The type of milk used significantly influences the finished cheese (LOEWENSTEIN et al., 1980).

Hundreds of types of cheese are made around the world. Northern and Southern European countries have developed many types of goat's milk cheese, and the recipes for some have spread outside Europe. Few countries in the tropics traditionally make cheese, and even fewer make cheese from goat's milk. This reflects local traditions and the small quantities of milk produced by most goats in the tropics, rather than any lack of potential. India and Central and South America are the main areas in which goat's cheeses are produced. About 7.5 litres of milk are needed to produce one kilo of fresh cheese, but over 10 litres are needed to make a kilo of hard cheese. The harder cheeses often become popular with urban residents as they become richer and are able to afford them. It is good for poorer farmers to take advantage of the increase in wealth of urban dwellers and sell them valuable products, provided that the farmers get a fair price for their products. (PEACOCK, 1996).

Soft and semi hard varieties of cheeses are made from goat milk. In European countries, these cheeses are marketed as premium cheese. Greece and France are the most important goat milk cheese producing countries in Europe. In India, goat milk has been used for making hard cheese. Goat cheese is easier on the human digestive system and lower in calories, cholesterol and fat than its bovine

counterpart. Goat milk cheese is rich in calcium, protein, vitamin A, vitamin K, phosphorus, niacin and thiamin (ANON, 2012 in BHATTARAI, 2012).
In some cheeses a relatively strong „goat like" flavour is preferred but for other products the absence of characterising flavour is favourable (YANGILAR, 2013). The specific „goat flavour" may be undesirable in milk for direct consumption but for cheese production its presence can be much sought-after (MORGAN – GABORIT, 2001).

2. The Applied Research method

For analysing the perception and acceptance cheese made from goat, sheep and cow milk, blinded test was used, as a primary research method. Respondents were asked to test the 3 different cheese.
The three cheeses have been purchased directly from local producers, so they are handmade quality products. Respondents did not know what kind of cheeses they tested. Cheeses were numbered (No.1: cheese made from cow milk, No.2: cheese made from sheep milk and No.3: cheese made from goat milk).

Table 1. Characteristics of the sample n=202

Gender	**%**
Male	34
Female	66
Age groups	
15-24 years	33
25-35 years	15
36-45 years	24
46-54 years	14
55-64 years	6
65- years	8
Place of residence	
Capital city	1
City of county	36.6
Town	50.5
Village	8.9
Educational level	
Elementary school	13
Secondary school	59
University degree	28
Perceived income level	
Significantly under the average	3
Under the average	17.8
Average	68.3
Above the average	5
Significantly above the average	5.9

Source: own research, 2018, 2019

Characteristics (outside- and inside look, smell, taste, fatness and colour) of the 3 cheeses were tested by the respondents using Likert scale 1-10 (1 meaning the worst and 10 meaning the best). The affordable price of 100 gr of the 3 different cheese were also asked, as well as the preferred way of consumption.
The survey was conducted in the autumn 2018 and the beginning of 2019 with the involvement of 202 respondents. Location of data collection was a postsecondary school and companies in Debrecen, Hungary. Paper based data collection was carried out during the blinded test. Data were processed in SPSS. Regarding statistical methods, mean, median, standard deviation coefficient (H) and coefficient of variation (H2) were calculated. The coefficient of variation is the ratio of standard deviation to the mean expressed as percentage. Coefficient of variation can be defined as the coefficient of standard deviation with respect to mean which is generally expressed in terms of percentage. Coefficient of variation is used to compare the variability of two or more series. Standard deviation coefficient (H) is the square root of the coefficient of variation.
The introduction of the sample is shown in Table 1. It shows that the proportion of female to male in the sample is almost two times higher. Regarding the age distribution of the sample, the proportion of age group 15-24 is the highest. The place of residence is mainly city of county and town (36.6% and 50.5% respectively). The highest level of school respondents have completed is secondary school (59%). The perceived income level of respondents was average for most respondents (68.3%).

3. Results

Respondents had to evaluate the three different cheeses using Likert scale 1-10 (1 is the worst and 10 is the best). Five different characteristics were evaluated by the respondents like outlook, smell, fatness, taste and colour. The cheeses to be tested were marked with numbers and were offered on separate plates. Cheese No 1.: cheese made from cow milk, Cheese No 2.: cheese made from sheep milk and Cheese No. 3.: cheese made from goat milk. When tasting the cheeses respondents were asked to fill in a questionnaire.
Evaluation of cheese No 1 (cheese made from cow milk) can be seen in Table 2.

Table 2. Evaluation of cheese No. 1 n=202

Value	Characteristics				
	Outlook	**Smell**	**Fatness**	**Taste**	**Colour**
Mean	8,39	7,99	8,28	8,04	8,55
Median	9,00	8,00	8,00	8,00	9,00
Standard deviation	1,703	1,938	1,578	2,030	1,911

Source: own research, 2018, 2019

Regarding cheese No. 2 (made from sheep milk) the same evaluation system was applied, results are shown in Table 3.

Table 3. Evaluation of cheese No. 2 n=202

Value	Characteristics				
	Outlook	**Smell**	**Fatness**	**Taste**	**Colour**
Mean	8,32	8,27	7,00	7,68	8,21
Median	9,00	8,00	7,00	8,00	8,00
Standard deviation	1,837	1,679	2,021	2,218	1,802

Source: own research, 2018, 2019

Results for cheese No. 3 (made from goat milk) can be seen in Table 4.

Table 4. Evaluation of cheese No. 3 n=202

Value	Characteristics				
	Outlook	**Smell**	**Fatness**	**Taste**	**Colour**
Mean	8,12	8,03	7,89	7,46	8,24
Median	8,00	8,00	8,00	8,00	9,00
Standard deviation	1,838	1,923	1,943	2,422	1,910

Source: own research, 2018, 2019

Results of the empirical research show in all cases, that the mean is relatively high, around 8 in case of each characteristics with only slight differences. The median is the value separating the higher half from the lower half of a data sample. In case of our research, the median is around the mean. Regarding standard deviation, a low standard deviation indicates that the data points tend to be close to the mean of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values. The standard deviation shows in all three cases that our data are not homogenous. The results show that the perceived characteristics of the tested cheese were rather similar for respondents, however the data were heterogeneous. This results is in contrary with the findings of some previous studies (PARK, 2010 and MOWLEM, 2005), that goat milk products have a “special smell or flavour”.

We asked our respondents how much they would pay for 100 gr cheese? The mean was 200 HUF for cheese No. 1, 240 HUF for cheese No. 2 and 250 HUF for cheese No. 3. It shows, that respondents would pay the highest amount for goat cheese. We can suppose that this high price is connected to the perceived best quality.

We asked our respondents how they would eat the tested cheese. They had to consider the following options: alone, grilled and use as a kitchen row material. They had to rate these option on a scale 1-3, where 3: the most and 1: the least. Answers can be seen in Table 5, 6 and 7.

For the cow cheese we can state that the preferred way of consumption is alone (mean=2,40), followed by as a kitchen row material (mean=2,35), while the grilled version (mean=2,09) is the least preferred way of consumption. For the sheep cheese we got the same order, but the means for the first two versions (mean=2,16 and 2,14 respectively) were much lower. In case of the goat cheese the most preferred way of consumption is as a kitchen row material (mean=2,30) followed by

alone (mean=2,24) and the grilled version is the least preferred way of consumption (mean=2,07).

Table 5. How would you eat cheese No. 1? (made from cow milk) n=202

Value	How to eat it		
	Alone	Grilled	Use as kitchen row material (to pizza, soup, etc.)
Mean	2,40	2,09	2,35
Median	3,00	2,00	3,09
Standard deviation	0,910	0,871	0,837

Source: own research, 2018, 2019

Table 6. How would you eat cheese No. 2? (made from sheep milk) n=202

Value	How to eat it		
	Alone	Grilled	Use as kitchen row material (to pizza, soup, etc.)
Mean	2,16	2,08	2,14
Median	2,00	2,00	2,00
Standard deviation	0,961	0,929	0,885

Source: own research, 2018, 2019

Table 7. How would you eat cheese No. 3? (made from goat milk) n=202

Value	How to eat it		
	Alone	Grilled	Use as kitchen row material (to pizza, soup, etc.)
Mean	2,24	2,07	2,30
Median	3,00	2,00	2,00
Standard deviation	0,958	0,884	0,827

Source: own research, 2018, 2019

It can be stated, that in all cases the mean and median are quite close to each other. The standard deviation is low, thus the data are homogenous. It can be stated, that respondents would like to eat in the same way all the three cheeses.
The coefficient of variation (H2) calculated by the division of the external variance and the total variance, shows how the salary category determines the amount to be paid for cheese. This value is 0,493%. The standard deviation coefficient (H) defines the strengthness of the relationship between the above mentioned two criteria. It is 0,07%. This means that the amount to be paid for the cheese does not depend on the income level of respondents.
The coefficient of variation (H2) calculated by the division of the external variance and the total variance, shows how the age category determines the amount to be paid for cheese. This value is 3,289%. The standard deviation coefficient (H) defines the strengthness of the relationship between the above mentioned two

criteria. It is 0,18%. This means that the amount to be paid for the cheese does not depend on the age of respondents.

5. Conclusion

Goat milk products are not among the everyday consumed dairy products in Hungary due to several reasons. Among these reasons we have to point out that these products are not easy to purchase, since they can be purchased mainly directly from the farmers or at large supermarkets. The price of these products is relatively high and last but not least they said to have (or at least believed to have) a special “goaty” flavour and smell. Our empirical research with a sample of 202 in Debrecen region, Hungary explored the perception of goat cheese regarding its outlook, smell, fatness, taste and colour is almost the same as in case of the tested cow and sheep cheese. The price our respondents would be willing to pay was the highest for the goat cheese. Regarding the preferred way of consumption, it is rather similar for all the three tested cheese (cow, sheep, and goat). They would consume it alone as a cheese plate, grilled or even as an ingredient to other meals, such as pizza, soup, etc. Based on these results we can state that the perception of goat cheese was not worse than of the tested cow and sheep cheese. Even its smell was not perceived as a negative feature. However further investigation is needed to study the perception of smell of goat cheese. As it is known from empirical studies, the “goaty” flavour of goat milk products is mainly undesirable, but in case of goat cheese it is highly favoured and sought. Our respondents were willing to pay the highest price for the goat cheese (250 HUF/100 grams). We can suppose that this price is connected to the highest perceived quality, however this price is still much lower than the current market price of goat cheese in Hungary. The goat milk as an excellent food source is undeniable. When marketing Hungarian goat cheese, its taste, ways of consumption (recipes) and local handmade nature should be emphasised.

References

1. Albenzo, M., Caroprese, M., Marino, R., Muscio, A., Santillo, A., Sevi, A. (2006): Characteristics of Garganica goat milk and Cacioricotta cheese. Small Ruminant Research (64): 35-44
2. Anaeto, M., Adeyeye, J. A., Chioma, G. O., Olarinmoye, A. O., Tayo, G. O. (2010): Goat products: Meeting the challenges of human health and nutrition. Agriculture and Biology Journal of North America. 1(6): 1231-1236
3. Baldo, B. A. (1984): Milk allergies. Australian Journal of Dairy Technology 39:120-128
4. Bhattarai, R. R. (2012): Importance of goat milk. Journal of Food Science and Technology Nepal. (7) 107-111
5. Billion, P. (2003): Milking management. In: Roginski, H., Fuquay, J. W., Fox, P. F. (Eds.), Encyclopaedia of Dairy Sciences. Academic Press, Cornwall, 1243-1253

6. Domonkos, A., Greiner, E. (2009): A kiskérődzők teje a felnőttek táplálkozásában és a gyógy élelmezésben. In: A tej szerepe a humán táplálkozásban (Szerk.: Kukovics, S), Melánia Kiadó, Budapest, 465-481
7. Fenyvessy, J. (2009): A kiskérődzők tejének értékes tulajdonságai a fogyasztás és a feldolgozás szempontjából. In: A tej szerepe a humán táplálkozásban (Szerk.: Kukovics, S), Melánia Kiadó, Budapest, 417-424
8. Fevrier, C., Mourot, J., Jaguelin, Y., Mounier, A., leberton, Y. (1993): Comparative digestive utilization of UHT goat and cow's milk: nutritional effects of galation-use of a swine model. Lait 73:581-592
9. Guo, M., Park, Y. W., Dixon, P. H., Gilmore, J. A., Kindstedt, P. S. (2004): Relationship between the yield of cheese (Chevre) and chemical composition of goat milk. Small Ruminant Research (52) 103-107.
10. Haenlein, G. F. W., Caccese, R. (1984): Goat milk versus cow milk. In: Haenlein, G.F.W., Ace, D. (Eds.), Extension Goat Handbook. Fact Sheet E-1. United States Department of Agriculture, Washington, DC, 1984.
11. Haenlein, G. F. W. (2004): Goat milk in human nutrition. Small Ruminants Research. 51: 154-163
12. Host, A., Husby, S., Osterballe, O. (1988): A prospective study of cow's milk allergy in exclusively breast-fed infants. Acta Paediatrica Scandinavica 77:663-670
13. Hungarian Chamber of Agriculture (2017): A kiskérődző ágazat stratégiai fejlesztése 2015. In: A kiskérődző szektor jelene és jövője – A Juh Terméktanács 25 éve tükrében. (Szerk: Kukovics, S) 159-172
14. Jandal, J. M. (1996): Comparative aspects of goat and sheep milk. Small Ruminant Research 22: 177-185
15. Kocsiné Gráf, M. (2011): A szánentáli kecskék életkorának és kondíciójának hatása a tejtermelésre és a szaporaságra. PhD Thesis. Debreceni Egyetem Agrár- és Gazdálkodástudományok Centruma, Állattenyésztési Tudományok Doktori Iskola
16. Kukovics, S. (2007a): A kecsketartásban alkalmazott gyephasználat. Magyar Mezőgazdaság, Magyar Juhászat + Kecsketenyésztés 16(3) 4-7
17. Kukovics, S. (2007b): Az anyakecske tartás támogatása. Őstermelő: Gazdálkodók Lapja 11(4):92
18. Kukovics, S. (2008a): A Magyar juh- és kecskeágazat helyzete és kilátásai. Magyar Mezőgazdaság. Magyar Juhászat + Kecsketenyésztés 17(3):2-8
19. Kukovics, S. (2008b): Létszám és termelésváltozások az Európai (EU), valamint a magyar juh és kecskeszektorban. In: "A juhtenyésztés jelene és jövője az EU-ban"; (szerk.: Kukovics, S. – Jávor, A.); ISBN 978-963-8030-58-0. Kiadó: Magyar Juhtejgazdasági Egyesület - Debreceni Egyetem Agrár- és Műszaki Tudományok Centruma Herceghalom – Debrecen, 2008. 9-29
20. Loewenstein, M., Speck, S.J., Barnhart, H.M. (1980): Research on goat milk products: a review. Journal of Dairy Science (63) 1631–1648
21. López-Aliaga, I., Alférez, M. J. M., Barrionuevo, M. J., Nestares, T., Sanz-Sampelayo, M. R., Campos, M. S. (2003): Study of nutritive utilization of protein and magnesium in rats with resection of the distal small intestine. Beneficial effect of goat milk. Journal of Dairy Science (86) 2958-2966.

22. Marticsek, J., Előd, R., Székelyhidi, T.,Pataki, R., Belényesi, M. (1999): A kecskeágazat szerepe a nemzeti vidékfejlesztési és környezetgazdálkodási programokban. VI. Debreceni Állattenyésztési Napok. Debrecen. 100-109
23. Morand-Fehr, P., Fedele, V., Decandia, M., Le Frileux, Y: (2007) Influence of farming and feeding systems on composition and quality of goat and sheep milk. Small Ruminant Research 68:20-34
24. Morgan, F., Gaborit, P. (2001): The typical flavour of goat milk products: technological aspects. International Journal of Dairy Technology 54(1) 38-40
25. Mowlem, A. (2005): Marketing goat dairy produce in the UK. Small Ruminant Research (60) 207-213
26. Olalla, M., Ruiz-López, M. D., Navarro, M., Artacho, R., Cabrera, C., Gimėnez, R., Rodriquez, C., Mingorance, R. (2009): Nitrogen fractions of Andalusian goat milk compared to similar types of commercial milk. Food Chemistry (113) 835-838
27. Pal, M., Dudhrejiya, T. P., Pinto, S. (2017): Goat milk products and their significance. Beverage & Food World. 44(7) 21-25
28. Park, Y. W. (1994): Hypo-allergenic and therapeutic significance of goat milk. Small Ruminant Research 14: 151-161
29. Park, Y. W. (2010): Goat milk products: Quality, composition, processing, and marketing. In: Encyclopaedia of Animal Science, Publisher: CRC Press, Editors: Pond, W. G. and N. Bell, N.
30. Park, Y. W., Chukwu, H. I. (1989): Trace mineral concentrations in goat milk from French-Alpine and Anglo-Nubian breeds during the first 5 months of lactation. Journal of Food Composition and Analysis 2: 161-169
31. Peacock, C. (1996): Improving Goat Production in the Tropics. Oxfam/FARM-Africa, 307-315
32. Ramos Morales, E., De la Torre Adarve, G., Carmona López, F. D., Gil Extremera, F., Sanz Sampelayo, M. R., Boza, J. (2005): Nutritional value of goat and cow milk protein. Options Méditerranéennes (67) 167-170
33. Ribeiro, A. C., Ribeiro, S. D. A. (2010): Specialty products made from goat milk. Small Ruminant Research (89) 225-233
34. Silanikove, N. (1994): The struggle to maintain hydration and osmoregulation in animals experiencing severe dehydration and rapid rehydration: the story of ruminants. Exp. Physiol. 79, 281–300.
35. Silanikove, N., Leitner, G., Merin, U., Prosser, C. G. (2010): Recent advances in exploiting goat's milk: Quality, safety and production aspects. Small Ruminant Research (89) 110-124
36. Smith, V. (2006): Food fit for the soul of a Pharaoh. The Mortuary temple's bakeries and breweries. Expedition 48 (2): 27–30
37. Szigeti, O. (2004): Kecsketejből készült élelmiszerek táplálkozási előnyei és fogyasztói szokásai. Élelmiszer, Táplálkozás és Marketing. 1 (1-2) 1-17
38. Szigeti, O., Szente, V., Szakály, Z. (2005): Fogyasztói megítélés a kecsketej termékek piacán. Élelmiszer, Táplálkozás és Marketing. 2 (1-2) 29-37
39. Szigeti, O., Szente, V., Szűcs, A., Szendrő, K. (2014): Kecsketej termékek fogyasztói megítélése. Élelmiszer, Táplálkozás és Marketing. 10 (2) 29-34

40. Taitz, L. S., Armitage, B. L. (1984): Goat's milk for infants and children. Br. Med. J., (288) 428-429
41. Yangilar, F. (2013): As a potentially functional food: Goat's milk and products. Journal of Food and Nutrition Research 1(4): 68-81
42. Zeman, F. J. (1982): Clinical nutrition and dietetics. Callamore Press, D. C. Health & Co. Lexington, Massachusetts. USA
43. Zenebe, T., Ahmed, N., Kabeta, T., Kebede, G. (2014): Review on Medicinal and Nutritional Values of Goat Milk. Academic Journal of Nutrition 3 (3): 30-39
44. KSH (2018a): http://www.ksh.hu/docs/hun/agrar/html/tabl1_5_1_2.html
45. KSH (2018b): http://www.ksh.hu/docs/hun/agrar/html/tabl1_5_3_4.htm