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Goat Meat Production and Evaluation of Its Sustainability in Turkey

Türkiye'de Keçi Eti Üretimi ve Sürdürülebilirliğinin Değerlendirilmesi

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ABSTRACT

Goat meat is a great source of protein that is easily found. Although known to raise cholesterol levels and blood pressure, but goat meat also have health benefits when consumed in appropriate portions. According to data of the Turkish Statistical Institute, there are still 10.63 million goats in Turkey. Hair goats constitute approximately 98 % of goat population. 37.525 tons of red meat produced from 2.07 million slaughtering goat meat in 2017. This represents only 3.3 % of the total Turkish red meat production, which is at 1.13 million tons. The main purpose of this study is to analyses recent developments in goat meat production in Turkey and evaluation of its sustainability. Further, current consumer trends for goat meat have been discussed and alternative marketing channels and strategies for goat meat have been evaluated in this study. Statistical data have been obtained from FAOSTAT and Turkish Statistical Institute. Data obtained have been shown in the tables issued by the use of percentage and index calculations. Socio-demographic variables like education or the presence of children and geographic variables are important in determining demand for goat meat. If problems of goat breeders are solve by short- and long-term precautions in Turkey, goat farming will make important contributions at regional and national level. Firstly, goat farming in Turkey should be supported directly and indirectly in accordance with EU standards.

Keywords:

Red meat, goat meat production, goat meat consumption, goat meat marketing.

ÖZ

Keçi eti kolay bulunan önemli bir protein kaynağıdır. Kan basıncını ve kolesterolü arttırdığı sanılsa da uygun miktarda tüketildiğinde sağlık için önemli yararları da vardır. Türkiye İstatistik Kurumunun verilerine göre Türkiye'de halen 10.63 milyon baş keçi bulunmaktadır. Keçi mevcudunun yaklaşık %98'ini Kıl keçiler oluşturmaktadır. 2017 yılında kesilen 2.07 milyon baş keçiden 37.525 ton kırmızı et elde edilmiştir. Aynı yıl Türkiye toplam kırmızı et üretim miktarının (1.13 milyon ton), %3.3'ünü keçi eti oluşturmuştur. Bu çalışmanın ana amacı, Türkiye'de keçi eti üretimindeki gelişmeleri analiz etmek ve sürdürülebilirliğini değerlendirmektir. Çalışmada ayrıca, mevcut keçi eti tüketim trendleri tartışılmış, keçi eti için alternatif pazarlama kanalları ve stratejiler değerlendirilmiştir. İstatistiksel veriler Türkiye İstatistik Kurumu ve FAOSTAT'tan elde edilmiştir. Elde edilen veriler yüzde ve indeks hesaplamaları yapılarak çizelgeler halinde sunulmuştur. Keçi eti talebinin belirlenmesinde eğitim veya çocukların varlığı gibi sosyo-demografik ile coğrafik değişkenler önemli olmaktadır. Keçi yetiştiriciliği yapan üreticilerin sorunları kısa ve uzun vadeli önlemlerle çözülürse, keçi yetiştiriciliği bölgesel ve ulusal düzeyde önemli katkılar yapabilecektir. Türkiye'deki keçi yetiştiriciliği öncelikle AB standartları uyarınca doğrudan ve dolaylı olarak desteklenmelidir.

Anahtar Sözcükler:

Kırmızı et, keçi eti üretimi, keçi eti tüketimi, keçi eti pazarlama.

Introduction

Red meat consumption can be analyzed in two groups in terms of both nutrition and environmental factors. This situation is closely related to the world population as well as human health (Clonan et al., 2016). Red meat consumption factors are somewhat complex. In other words, it can change with the interaction of many factors such as cultural, nutrition habit, price, gender, socio-economic structure, and religion. The relationship of some cancer diseases, especially cardiovascular and type 2 diabetes, with nutrition and especially red meat consumption, is still a matter of debate. In this respect, there are some negative approaches to the subject. On the other hand, carcinogenic substances in lean red meats are another important feature. Besides being an important protein source, it is attracting attention by microelements such as iron, zinc, and vitamin B. For example, due to iron deficiency, more than 1 million young people and women in the world today will be adversely affected by anemia if not treated (Clonan and Holdsworth, 2012). In this sense, red meat of small ruminants in a sense can be seen as an opportunity to balance the potential negative effects on environmental and human health (Webster-Gandy et al., 2012).

Meat takes an important place among animal protein sources. The main reason for this is based on the structure of amino acids (Onurlubaş et al., 2015). When the proposition is examined in terms of human, development, growth, endocrine system and many other metabolic events are realized. For this reason, the right amount of red meat should be consumed (Sanchez-Villegas et al., 2015). In other words, consumption of red meat can be said to be a measure of socio-economic development for societies at the same time (Yağmur and Güneş, 2010). Over the past decade, consumer preferences have shown significant changes in meat consumption. To start with, a preferred orientation towards red meat to white meat has become a matter of preference. There has been a growing interest in specific meat products, especially consumers in countries such as the US and Canada. Quality factors such as cholesterol, energy level, brittleness, softness, and water holding capacity play an important role as well as price. In purchasing decision of consumers, visualize and fat tissue (mosaicization) level for muscle should not be ignored. It is now a slow-growing goat meat market for goat meat consumption in the world. In other words, it has become a new alternative for people who want to eat red meat with low-fat content, especially cardiovascular diseases. Goat meat has begun to gain a bit more popular in people with cardiovascular problems with these described quality characteristics. The demand for goat meat is remarkable. However, there is not yet a very obvious or major demand for consumption compared to beef, lamb, and pork (Yaylak et al., 2010).

According to data of FAO, around 5.8 million tons of goat the meat was produced worldwide in 2017 (FAOSTAT, 2017). According to the continents, when the goat meat production was examined, the Asian continent was the first in the goat meat production with 4.2 tons, followed by the Asian continent with 1.3 million tons. The lowest goat meat production was realized in the Oceania continent with 34 thousand tons.

Yet, this amount of goat meat production does not clearly reflect the actual level of production; a high proportion is either sold to consumers directly from the farm and consequently does not follow proper marketing channels, or is consumed in the home and therefore not marketed at all. Some studies on goat meat production and marketing in Turkey have been done (Bağdatlı et al., 2012; Koluman, 2014; 2015; Koluman et al., 2016; Ogun et al., 2016; Hatipoğlu et al., 2016; Daşkıran et al., 2018). However, the studies on the technical and economic aspects of goat meat production should be carried out continuously.

The main purpose of this study is to analyses recent developments in goat meat production in Turkey and the evaluation of its sustainability. Further, current consumer trends for goat meat have been discussed and alternative marketing channels and strategies for goat meat have been evaluated in this study. Finally, some technical and economic proposals have been made regarding the topic. Statistical data have been obtained from FAOSTAT and Turkish Statistical Institute (TurkStat). Data obtained have been shown in the tables issued by the use of percentage and index calculations.

Nutrient Content of Goat Meat

The goat does not have as much carcass as other meat-type animals. They are more economical than cattle and water buffalo (Devendra, 2010; Ertuğrul et al., 2010; Goetsch et al., 2011). As stated in the studies conducted for this purpose, significant variations can be seen in meat production due to both gender and individual differences within the same species (Köseman and Şeker, 2015). The rate of growth and the chemical composition of meat is affected by both animal physiological status and microclimate and growing conditions (Tăpăloagă, 2008). Goat meat has a fat content with 50-65% lower than beef, while similar proteins content. It also has 42-59% less fat than lamb meat and respectively 25% less fat than veal. Moreover, saturated fats in goat meat are less than 850% lower than poultry (except skin), 1100 % lower than pork and 900 % lower than lamb (Liu et al., 2013**)**. Regardless of numerous studies on goat meat, regardless of breed, age or region, the goat is an important source of high - quality proteins, healthy fats (based on the ratio of unsaturated fats to saturated fat) and low cholesterol intake. Calcium and sodium in goat meat is low but contains high levels of iron, potassium and essential amino acids are included in the quality meat category (Lee et al., 2008).

Goat meat, which has an important place in red meat production, is consumed in many countries, especially in North Africa and the Middle East. Apart from these regions, Southeast Asia is a very important animal food in the the Caribbean and other tropical countries (Rodrigez and Texieira, 2010). In Central and South American countries, Cabrito is a 3 to 3-year-old boy with a weight of less than 22 kg. In some Mediterranean countries, special importance is given to the consumption of goat meat, especially in the form of roast or grill, called Cabrito (Teixeira et al., 1998). There has been a trend towards goat breeding in the context of the EU's recent expansion-based economic policies and sustainable animal production. In countries such as Portugal and Spain, Cabrito

has a traditional structure with low-fat content and is a sought-after meat at festivals (Teixeira et al., 1998). Another important issue is the production of the Portuguese goat named Serrana and the Cabrito meat production with 4-9 kg carcass weight. However, consumer preferences may vary depending on carcass weight, animal gender, dietary habits, and health and income level. Chevon, 6-9 months of age and 20-30 kg live weight is obtained from a cut taken from the children (Simela et al., 2004a). Although it is mostly consumed in developing and ethnic countries, it becomes meat that is becoming increasingly widespread in many countries, especially the USA. The nutrient content of goat meat is given in Table 1.

Table 1. Nutrient content of goat meat (Approximately 84 g of cooked meat)
Çizelge 1. *Keçi etinin besin maddesi içeriği (yaklaşık 84 g pişmiş et)*

Nutrient content	Goat	Poultry	Beef	Pork	Lamb
Energy	122	162	179	180	175
Fat (g)	2.6	6.3	7.9	8.2	8.1
Saturated fat (g)	0.79	1.7	3.0	2.9	2.9
Protein (g)	23	25	25	25	24
Cholesterol (mg)	63.8	76.0	73.1	73.1	78.2
Iron (mg)	3.2	1.5	2.9	2.7	1.4

Source:Anonymus, 2010

As shown in Table 1, goat meat has lower values than the meat of other known species in terms of energy, total fat, saturated fat, and cholesterol. Low cholesterol content, especially with saturated fats, is health food for consumers who are concerned about human health. High potassium and low sodium levels are another important features of goat meat. It is very similar to beef and lamb which is an important source of red meat with its amino acid structure. The feeding value of goat meat is becoming more important in the name of healthy life in humans. Goat meat is not only low in cholesterol but also in saturated fatty acids compared to other meat (Simela et al., 2004a). In other words, less saturated fatty acid and total unsaturated fatty acids contain a high-level make goat meat a healthier nutrient. While the level of saturated fatty acids in the blood increases, the risk of cardiovascular or the other chronic diseases are increasing. Namely, unsaturated fats regulate blood cholesterol levels, reduce inflammation, and ensure regular heart rhythm (USDA, 2002). Low-fat foods such as goat meat also play an important role in weight control. 100 g goat meat contains 109 calories and 21 g protein. In particular, the importance of weight control in cardiovascular patients with diabetes is considered as healthy food (Kannan et al., 2014).

The Characteristics of Goat Meat

Goat meat, as well as feeding characteristics, it contains less fat as other red meat and it should be preferred as food. Goat meat, sheep or lamb meat has a dark red color and texture as well as a different taste and aroma (Casey et al., 2003). The results of the sensory analysis with goat meat suggest that goat meat is close to or not worse than lamb meat. Goat meat and goat meat products also contain less water than lamb (Tshabalala et al., 2003). Flavor and aroma are properties that contribute to goat meat. These sensory characteristics are influenced by species, age, condition, body area and ration, and cooking method. Consumers can easily identify taste and flavor and can be classified according to adoption. Goat meat flavor can be either acceptable or less acceptable than lamb meat. Branched fatty acids can contribute to the formation of a unique taste of sheep and goat meat. The strongest goat the smell is caused by four ethyloctanic acids found in lamb, goat and sheep (Webb, 2014).

One of the most important contributions made to the current knowledge about the quality of goat meat in recent years is the sensitivity of the animal at the time of the goat's death and affects the transformation of muscle to meat. The final pH in goat carcasses varies between 5.8 and 6.2. This high pH in goat carcasses indicates that the goats are exposed to stress. The level of glycolytic metabolites in muscles at the time of death supports the findings. The glycogen level is about 50 bil/mol, which is sufficient to produce the required acid so that the final pH in the carcass can be maintained at the desired level. However, Simela et al. (2004b) reported that less than brightness in the meat samples taken from the herd of goat herds were not a problem. As a result, goats are one of the animals that can contribute to meeting the daily animal protein requirements of people in countries with high population growth. Goat meat is generally considered as lean meat and today it is thought that the demand for this meat will increase in a healthy diet. Goat breeders have started to popularize semi-intrusive or intensive business models by using effective methods to increase the efficiency of feeding and housing conditions, especially in the periods when demand for red meat is becoming more important in developing countries (Daşkıran et al., 2010). Problem; it is due to the lack of proper herd management practices and animal welfare rules. In other words, the quality of goat meat decreases in goat farms where animal welfare worsens. Healthy and lean goat meat with the right presentation and marketing of the market share will be deserved (Darcan et al., 2005).

Goat meat has a distinctive odour and aroma. The quality of the goat meat is determined by taking into consideration the criteria such as marbleisation in meat, drug residue, colour, water-holding capacity, crispness, juiciness, odour density, aroma density, aroma quality and general acceptability (flavour). In the sensory evaluation of goat meat, the female bull meat was found to be more qualified, but it was reported that the difference was not statistically significant (Şeker

et al., 2011). Aromatic, fragrance, sensitivity and generally acceptable male goat meat were found to be more qualified than the female goats. The colour of the goat meat may vary depending on the species. Studies show that goat meat is less watery and less oily than sheep meat. It also has less myofibril band structure than goat meat for sheep meat. The unique odour of goat tends to increase as the animal ages (Najafi et al., 2012; Özcan et al., 2014). Goat meat secreted by the glands of the goats is effective in separating goat meat from other meats. In the studies, it is pointed out that goat meat is less watery and less oily than sheep meat and products.

Goat meat has a distinctive and distinctive odour. The sex odour of adult male goats is noticeably noticeable. However, as goats are affected animals more than stress, pH may be very low due to pre-cut conditions. Accordingly, meat quality may vary (Knight et al., 2006). In addition, qualified goat meat can be obtained by feeding the animal and maturing the carcass after cutting. When comparing the fatty acids profile of goat and lamb meat; it was reported that the amount of palmitic, palmitoleic and oleic acid in the goat meat was lower than the lamb meat stearic acid level. Fatty acid composition affects nutritive value and sensory properties of meat. According to the studies on this subject, the animal's way of feeding, feed content, age, height, sex and amount of fat, fatty acid composition and therefore affects the taste of meat (Banskalieva et al., 2000). Oiliness; besides the flavour, it is a source of energy for the body and is an important factor affecting the texture, juice, and odour of the meat. Goat meat contains fat-soluble vitamins (ADEK) and essential fatty acids. These factors are necessary for growth and many more body activities. Fatty acids play an important role in the protection of human health (Biswas et al., 2007). Edibleness, which is an important parameter in goat meat, is about softness, aroma, and flavor.

Benefits of Goat Meat

Goat meat is one of the important problems of our age and used as an important source of prevention of cardiovascular diseases and shaping the daily diets of patients (Casey and Webb, 2010). Goat meat has a lower calorie rate than the chicken meat known for its low caloric properties. Because of its continuous movement in terms of feeding mode, it is a distinct feature of intramuscular and subcutaneous adipose tissue. Goat meat contains higher amounts of B1, B2 and B3 vitamins than other meats. This protects the nervous system, prevents skin and skin diseases. Goat meat also has an accelerating effect on our energy metabolism. Necessary amounts of vitamins for the nervous system, goat meat is found in ideal conditions (Kadim et al., 2010). They provide carbohydrate and fat burning but also cause the formation of healthy hair, skin, and nails. The rate of healthy fatty acid detected in goat meat ranges between 61-80 %. Because of this feature, consumers prefer it because it is suitable for Mediterranean diet.

Goat meat has a protein ratio similar to sheep and beef but its fat content is lower than 50 65%. In addition, 1 g goat and chicken meat calories are reported as 120 and 122, respectively. Goat meat and organs are rich in macro and micro many minerals. In the study conducted in M. longissimus dorsi muscle, some amino acid contents are as follows: Goat meat, beef, veal, meat, iron, potassium, B group is rich in vitamins. The naturalness of the meat will be understood considering the natural foods of goats that are grown in rural areas and mountainous areas. In fact, it can be seen that the way of the production that we can call organic meat is shaped by itself in this sector.

Goat meat is an important source of protein, especially in developing countries. Goat farming is seen by governments as an important tool in rural development. Goat breeding is carried out in forests, mountainous and rural areas away from traditional agriculture. In recent years, new and large goat farms have been established by employing large capital owners as goat breeding. Goat farming in the world is made to obtain meat, milk, and hair. In many countries, including our country, these aims are all tried to be carried out in the same herd. However, flocks are formed according to the product to be obtained in America. Goat meat will have a serious share in the market not only with the number of goats and good goat health but also with professional management and qualified marketing in this field. Each of these stakeholders has important roles in the achievement of quality products to consumers. In addition to the marketing of goat meat, the market can be offered to the consumers in the form of products

Table 2. Mineral substances in some muscles and organs of goat meat

Çizelge 2. *Keçi karkasının bazı kas ve organlarındaki mineral maddeler*

Mineral	Meat	Liver	Kidney	Heart	Spleen	Brain
Ca	11.00	10.06	13.58	7.70	11.47	46.99
P	155.5	263.9	168.1	111.71	214.03	245.64
Mg	19.7	15.08	10.19	9.63	15.28	12.82
K	350	188.55	122.26	100.15	194.9	277.68
Na	64.48	58.18	148.68	38.52	59.38	136.92
Cu	0.30	8.28	0.52	0.53	0.41	0.40
Zn	3.51	2.99	2.61	1.41	2.19	1.40
Fe	4.37	7.82	9.78	4.40	34.79	3.07
Mn	0.087	0.66	0.19	0.098	0.159	0.122

Source: Kurşun and Yalçın, 2014.

prepared in line with the wishes of the suppliers that supply the products to the market and special markets (tourism, gourmet market etc.). It is thought that the people who need to be fed with low-fat diet, those who take care of their nutrition, the healthy-conscious consumers and the gourmet restaurants offering goat meat should be considered in the marketing of goat meat. In recent years, factors such as alpha-carotene, beta-carotene, lutein, lycopene, and zeaxanthin have been added to goat meat. This type of goat meat, as well as nutritional properties of health for the use of health, meat and meat industry is one of the innovative approaches. Some meat obtained from goats smells. The reason for this is that there is no fat tissue between the meat and the skin. Thus, the malodorous secretion produced in the hair easily passes to the meat. This is generally seen in the meat obtained from the animal (castrated male) or from the male animal. Goat meat causes diarrhea in summer. This is because the meat is stored incorrectly. Meat and broth constitute a good medium for the growth of microorganisms. These microorganisms cause an active intestinal syndrome in humans. Therefore, the meat must be taken care of before cooking or before cooking (Darcan et al., 2005).

Goat Population in Turkey

Changes according to the year of the goat's presence in Turkey is given in Table 3. The number of goats, which were more than 5.6 million in 2007, showed significant decreases in 2011 and 2012. Especially with the incentives and supports that started in 2010, this number increased and reached 10.6 million in 2017. Based on goat presence in 2008 (assuming index 100), this value reached 149.86 in 2017. When the share of goats in total small ruminant is examined, it is 18.92 % in 2007 and this value increased by 24 % in 2017 (TurkStat, 2018).

Goat Meat Production in Turkey

In Turkey, the number of slaughtered sheep and goat is given in Table 4. The consensus reached on the chart is that in the total sheep and goat meat production, the number of sheep cut over the last 15 years declined significantly in 2009, but the relative increase and decrease in the following years has been a matter of course. In other words, the index of small ruminant that was slaughtered in 2009 was 72.42 while it was 113.32 in 2017. When the share of goats in the cut small ruminant is examined, it ranges from 12 to 30 %, and from 2013 onwards, there are relative increases. Changes according to the year of the sheep and goat meat production in Turkey are given in Table 5. Goat meat production in 2017 increased to 37.525 tons in particular. This is directly related to the increase in the number of goats in the mentioned years. The lowest quantity was with 86.308 tons in 2009. The highest quantity was with 158.747 tons in 2010. When the share of goat's meat in total small-leaved meat production is examined, this value ranges from 12 to 27 %. The lowest rate was observed at 12.45 % in 2008 and the highest value reached 27.32 % in 2016 (TurkStat, 2018).

Table 3. Changes according to the year of the goat number in Turkey (1000 head)
Çizelge 3. *Türkiye'deki keçi sayısının yıllar içindeki değişimi (1000 baş)*

Years	Sheep	Goat	Total small ruminant number	Index (2008=100)	The rate of goat for total small ruminant (%)
2008	23.975	5.594	29.569	100.00	18.92
2009	21.750	5.128	26.878	90.90	19.08
2010	23.090	6.293	29.383	99.37	21.43
2011	25.032	7.278	32.310	109.27	22.53
2012	27.425	8.357	35.782	121.01	23.36
2013	29.284	9.225	38.509	130.23	23.96
2014	31.140	10.345	41.485	140.30	24.94
2015	31.508	10.416	41.924	141.78	24.85
2016	30.984	10.345	41.329	139.77	25.03
2017	33.678	10.635	44.313	149.86	24.00

Source: TurkStat, 2018.

Table 4. Change over the years have slaughtered the number of small ruminants in Turkey (1000 head)
Çizelge 4. *Türkiye'de kesilen küçükbaş hayvan sayısının yıllar içindeki değişimi (1000 baş)*

Years	Sheep	Goat	Total slaughtered small ruminant number	Index (2008=100)	Rate of slaughtered goat in total small ruminant (%)
2008	5.589	767	6.356	100.00	12.07
2009	3.997	606	4.603	72.42	13.16
2010	6.874	1.219	8.093	127.33	15.07
2011	5.479	1.254	6.733	105.93	18.62
2012	4.541	927	5.468	86.03	16.95
2013	4.958	1.341	6.299	99.10	21.29
2014	5.197	1.570	6.767	106.47	23.20
2015	5.008	1.999	7.007	110.24	28.53
2016	4.084	1.756	5.840	91.88	30.07
2017	5.134	2.069	7.203	113.32	28.72

Source: TurkStat, 2018.

Table 5. Changes according to the year of the small ruminant meat production in Turkey (tonnes)
Çizelge 5. *Türkiye'deki küçükbaş hayvanlardan* üretilen *etin yıllara göre değişimi (ton)*

Years	Sheep	Goat	Total small ruminant meat production	Index (2008=100)	Rate of goat meat in total small ruminant meat production (%)
2008	96.738	13.753	110.491	100.00	12.45
2009	74.633	11.675	86.308	78.11	13.52
2010	135.687	23.060	158.747	143.67	14.53
2011	107.076	23.318	130.394	118.01	17.88
2012	97.334	17.430	114.764	103.87	15.19
2013	102.943	23.554	126.497	114.49	18.62
2014	98.978	26.770	125.748	113.81	21.29
2015	100.021	33.990	134.011	121.29	25.36
2016	82.485	31.011	113.496	102.72	27.32
2017	100.058	37.525	137.583	124.52	27.27

Source: TurkStat, 2018.

Goat Meat Consumption in Turkey

Changing the demographic structure and consumer demands have a significant impact on the type of meat that people eat. There is a tendency for more general or known products and tastes. A demand for low-fat red meat consumption by consumers is on the rise, but the future of goat breeding seems promising. Chevon, which has fat-free goat meat, can be an important source for the preparation of lean red meat products in general (Karthikeyan et al., 2000). Although it is reported that there is no problem in the marketing of high-priced goat carcass piece as a waist, the economic value of the goat carcass must be increased as a whole. Chevon, which has oil-free goat meat, can be an important source for the preparation of lean red meat products in general (Karthikeyan et al., 2000). Although it is reported that there is no problem in the marketing of goat carcass piece sold at such high prices as waist, the economic value of the goat carcass should be increased as a whole. The most important reason for this; the goat is regarded as a farm animal and has low fat-free red meat. However, the fact that goat meat and goat meat products do not have some dry and widespread consumption habits compared to other red meat limits consumer preferences (Vote et al., 2000). In some studies, it has been determined that the marinating of goat meat with different spices, the flavor and aroma has improved or the negativity decreased (Hivey et al., 2002; Dhanda et al., 2002).

The global goat meat market had total revenues of 25.657 million USD in 2015, representing a compound annual growth rate (CAGR) of +15.0 % from 2007 to 2015. In physical terms, the market showed an increase of + 2.4 % over the period under review. Finally, the goat meat market reached 5.7 million tonnes in 2015. In 2015, according to market research conducted by Index Box, the leading consuming market was China (2.3 million tons). It was followed by India (512.800 tons), Pakistan (303.600 tons), Nigeria (299.800 tons) and Sudan (155.900 tons), Iran (139.200 tons), Mali (84.600 tons) and Turkey (84.200 tons). These countries were also the leading producers of goat meat (Avramenko, 2017).

In China, the largest consumer country, per capita, goat meat consumption was estimated at 1.6 kg/person, twice the global average (0.8 kg/person). The highest level of goat

meat consumption was registered in Sudan (3.9 kg/person). India (0.4 kg/person) had the lowest levels of goat meat consumption. In Pakistan, per capita, goat meat consumption remained stable at 1.6 kg/year. In Turkey, per capita goat meat consumption was estimated at 1.1 kg/person. However, per capita, goat meat consumption in Turkey was also estimated in other studies. For example, it was estimated at 0.2 kg (Akbay et al., 2008) and 6.1 kg (Saçlı and Özer, 2017). In another study, goat meat consumption rate of households in Turkey was determined as 3.3 % (Uzunöz and Karakaş, 2014). In a study, income elasticity and demanding price elasticity for goat meat in Turkey were determined as 0.53 and -1.69, respectively (Akbay et al., 2008). According to the results of this study, if income of household increases 10 %, goat meat consumption of household will increase by 5.3 %. However, if goat meat price increase 10 %, goat meat demand of household will decrease 16.9 %. In a study, reasons for not consuming goat meat were determined as the smell of meat (56.25 %), no habit (16.67 %), hard of meat (5.20 %), health disruption (4.16 %) and other reasons (17.72 %), respectively (Atay et al., 2004). Goat meat consumption rate of households in different regions of Turkey were determined by survey. Results of these surveys were given in Table 6. Goat meat consumption rate varies between 1.8 % and 27.6 % according to regions. Table show it is higher in the East region of Turkey.

Table 6. Goat meat consumption rate of households in different regions of Turkey

Çizelge 6. *Türkiye'nin farklı illerindeki hane halkının keçi eti tüketimi (%)*

İller	Goat meat consumption rate of households (%)	References
Kocaeli-Merkez	4.2	Akçay and Vatansever, 2013
İzmir-Ödemiş	8.6	Yaylak et al., 2010
Elazığ-Merkez	15.3	Şeker et al., 2011
Aydın-Çine	5.7	Atay et al., 2004
Konya-Selçuklu	2.8	Tüzemen, 2012
Aydın-Merkez	1.8	Ulaş, 2011
Bingöl-Merkez	27.6	Karakaya and Kızıloğlu, 2017

Consumer price for goat meat vary according to meat characteristics in Turkey. Average meat price for goat kids in special markets (Ermenek, Alibaba etc.) as follow;

Hip meat: 7.67 $/kg, Stalk: 6.85 $/kg, Arm meat: 7.40 $/kg, Fillet meat: 6.85 $/kg, Ribs: 6.57 $/kg and Chop: 8.19 $/kg.

Marketing Channels for Goat Meat

Goat meat with intensive marketing channels in Turkey, producing local markets is a common form of national markets for the company's extensive production can be assessed at two levels. Strengthening the marketing channels of breeders, particularly in rural areas, is of socio-economic importance in the goat husbandry sector (Koluman et al., 2016). Products produced at this level may also be included as local or ecological products in national markets. It is especially important that the carcasses obtained after slaughter, as well as, live animals be improved in cold chain conditions between the farm and the national market and sanctions for the removal of the so-called traders from this sector. The breeder sells a live goat for 3-5 $/kg, sometimes even not. Livestock purchased by intermediaries at very low prices are marketing small animal carcasses to 4-6 $/kg after culling (Anonymous, 2015). People living in rural areas in Turkey has an important place among red meat goat meat is because they have low-income levels. The main reason for this is the fact that socio-cultural factors play an important role in the region. Goat meat in our country, beef, and lamb meat have no significant market share. In other words, goat meat is generally considered castrated male animal. Capricorns vary according to the region but are marketed as milk (non-weaned) or 4-5 months of age (average 12-15 kg carcass). Goat meat marketing in our country, Ogun et al. (2016) is similar to the Knipscheer et al. (1987) model shows.

When the marketing channel of goat meat is examined in our country, breeders need to buy and sell animals among themselves and meet the need for meat in domestic consumption. Goat meat consumption in rural areas is evaluated in local or urban markets. Markets in these regions are provided from slaughterhouses. In addition to the regional consumption of slaughterhouses in the region, it is also evaluated in slaughterhouses in rural areas and markets oriented to the city. Goat meat is evaluated only in regional markets in Turkey conditions. In some areas, traditional types of special meals such as "kid spinning or Capricorn" give some important clues about the consumption of the kid's meat. Kid meat is a kind of meat with its own cooking methods and different methods have to be used to cook other red meat. Cooking techniques and recipes of goat meat have been the subject of scientific research. The initiation of scientific studies for Turkish cuisine will also provide some important data on goat meat consumption (Dalmas et al., 2011, Stanisz et al., 2009). The development in organizing has played an important role in the development of small ruminant husbandry activities. All these developments can be regarded as important breakthroughs in the development of marketing channels in the livestock sector. General Directory of Meat and Milk Board, which added sheep and goat meat in addition to the sale of beef meat in the contracts, renewed for the year 2015 in Turkey, acted to support the small ruminant breeding and to consume more meat. In 2017, prices 5.48 $/kg for the first quality bottles and 4.93 $/kg for the second quality bottles were given. In Turkey, average live animal and meat prices for breeders are given in Table 7. Live goats also traded on the market in Turkey. In 2017, average live goat prices in Edirne Commodity Exchange for goat and goat kids were 2.74 $/kg and 4.11 $/kg, respectively.

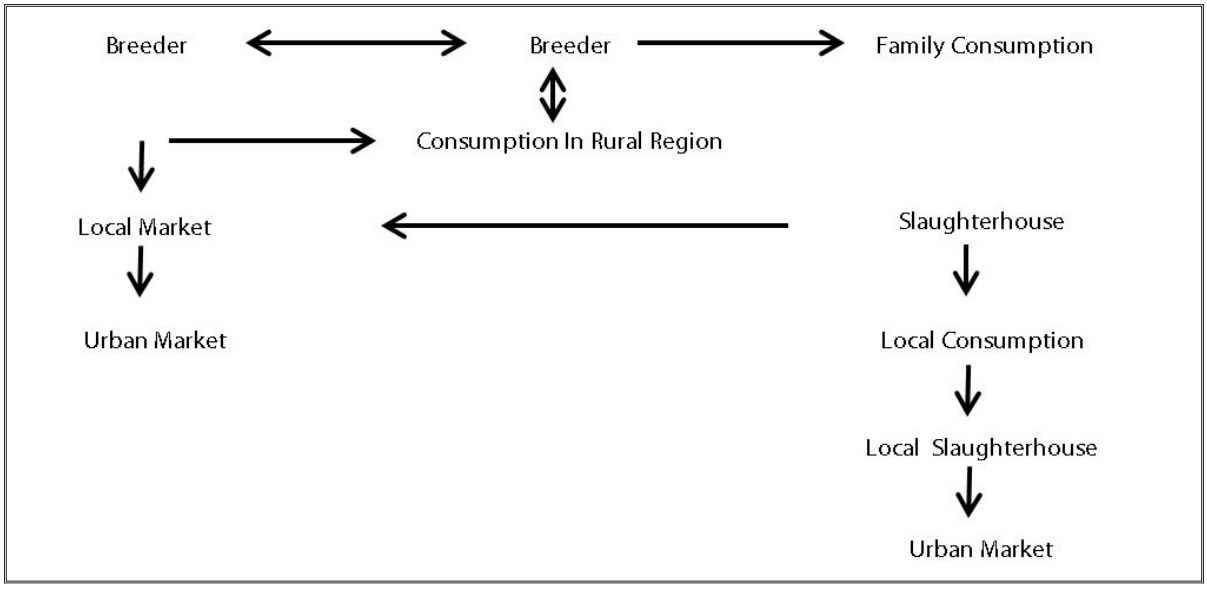

Figure 1. Goat meat marketing channels in Turkey

Şekil 1. *Türkiye'de keçi eti pazarlama kanalları*

Source: Knipscheer et al., 1987; Ogun et al., 2016

Table 7. Development of live animal and meat prices in Turkey

Çizelge 7. *Türkiye'de canlı hayvan ve et fiyatlarındaki değişim*

Years	Live small ruminant prices ($/head)						Meat prices ($/kg)		
	Sheep (Domestic)	Sheep (Merino)	Lamb (Domestic)	Lamb (Merino)	Hair goat	Hair goat kid	Beef meat	Sheep meat	Goat meat
2008	169.77	204.65	112.40	137.98	139.53	86.82	9.08	8.63	7.81
2009	177.42	196.13	120.64	135.48	150.32	92.26	8.65	8.56	8.11
2010	299.33	303.33	207.33	222.67	256.67	163.33	12.27	12.62	12.21
2011	323.95	343.11	222.16	237.13	281.44	182.04	11.10	12.19	11.30
2012	288.83	321.79	199.44	230.17	262.57	168.16	9.78	10.97	10.49
2013	272.07	337.99	188.83	232.97	258.66	163.13	8.84	10.13	9.50
2014	197.26	252.05	153.88	181.73	194.52	127.85	7.81	8.35	7.76
2015	170.22	219.85	136.40	154.78	165.44	112.50	7.77	7.62	6.93
2016	178.48	227.48	142.38	159.27	166.56	114.57	8.29	8.03	7.36
2017	178.90	217.81	143.29	161.10	156.44	113.70	7.52	7.62	6.87

Source: TurkStat, 2018.

On the other hand, animal livelihood (01), meat and degraded offshoots (02), crude postments, (41) chapters were evaluated as small ruminant breeding foreign trade data cannot be distinguished in many chapters in foreign trade in animal products in TurkStat data system (Anonymous, 2013, 2017). According to the 2014 data of TurkStat 26.7 million livestock exports have been made of which approximately 2 million $ are small ruminants. When Turkey's exports do not show a very stable structure in the trade of livestock, which constitutes about 8% of the total livestock trade, the exports differ according to the supply of red meat and the domestic market conditions (Anonymous, 2017). Looking at the last two years of exports, we are doing to Azerbaijan, Turkmenistan, Qatar and Lebanon. The whole of 898 heads of live sheep exports carried out in 2013 is the breeding cattle. In 2014, a total of 8.483 sheep and goats were exported, including 376 goats and 8.107 sheep. According to the provisional data of 2014, 95 % of sheep exports were made to Qatar and Lebanon. Goat exports are carried out in Azerbaijan and Turkmenistan. According to the 2014 data of TurkStat, about 140 million $ the worth of live animal importation has been realized, When the TurkStat data for 2014 is examined approximately 3.8 million $ of sheep and goat importation have been done. In 2009, 2010, and 2011, when imports of live sheep were the highest, the highest purchases were made from Bulgaria and Australia. Almost 90 % of the actual imports are realized in these countries (Aras, 2015). According to data of TurkStat, the live goat import value of Turkey were 868,765 $ in 2013, 416,078 $ in 2014, respectively. Turkey import goats mostly from Australia. Recently, Turkey has exported live goats to Azerbaijan. Live goat export value of Turkey was 142,739 $ in 2013, 45,628 $ in 2014, respectively (Engindeniz and Uçar, 2016).

Government Supports for Goat Meat

Turkish Ministry of Agriculture and Forestry took various precautions for solving the problems and for developing dairy goat farming in recent years. Government supports have been applied in 2018 pursuant to the decree no. 2018/11460 taken by the Council of Ministers. These supports were; 5 $ per animal for bred goats, 0.2 $ per animal for the vaccine, 19 $ per sheep breeding for protection (Table 8). However, the farmers who farming goats must be a member of the Sheep-Goat Breeders Association for receiving these supports.

Further, interests are subsidized for the small ruminant production in the credits given to Agriculture Sector by the Republic of Turkey, Turkish Agricultural Bank, and Agricultural Credit Cooperatives and Interest, free credit application has started to be implemented (Notification 2018/21). Low-interest low for goat farmers is limited with ≥25 head.

Problems Related to Goat Meat Production and Marketing in Turkey

There are many issues pending resolution of Turkey's red meat production. These problems should be planned to be solved in short, medium and long periods. Turkey shows the small ruminant number of changes over the years. The most important cause of this change in animal assets is that the animal breeders, who are oppressed under increasing production costs, have to leave the industry (Duyum, 2017). As it is known, the only way an enterprise can continue its economic activities is to sell a good over a little over the cost of the goods it produces (Demircan et al., 2011). Otherwise, the animal grower must be economically supported by direct and/or indirect means. The main reason for the low productivity is that the genetic structures of the causal animals cannot be brought to the desired level. Regeneration work on the subject should be made a state policy and long-term work programs should be regulated. In this sense, the coordination of the universities, the Ministry, the industrial organizations will be beneficial. It is seen that the costs increase with direct or indirect effects on the production. It is known that the most important cost factor is the sales price of the feed. The rise in feed prices, especially in 2007-2008 can be said to be the extreme drought in years, which is the most important factor in the rising input prices. There is also clear quality forage in Turkey.

It is considered that the need for quality roughage can be met in some measure with the improvement of meadows and pasture. Production costs can be reduced by lowering the prices of inputs used for feed production or by increasing the support for feed plants. Another reason is the marketing channel of Turkey started to fall in recent years, with the exception of poultry meat production is higher marketing costs due to length (Aktürk et al., 2009). Especially in red meat marketing, it is seen that average 5-6 vehicles are found, depending on whether the consumer is located in the urban or rural area. Today, the situation has fallen into the state support for animal husbandry is not enough. On the other hand, it is understood that export subsidies are also extremely inadequate (Karakaya and Kızıloglu, 2017). Have not yet passed the carcass grading system in Turkey is the cause of the carcass to be sold at a lower price. In addition, applications for the breakdown of meat at retail points and the increase in the value-added from the carcass on this side are insufficient. In this sense, it is understood that consumers are also very reluctant to behave. On the other hand, in recent years a negative attitude towards sheep and goat meat has been demonstrated by claiming that meat oil contains high levels of cholesterol. However, studies have shown that there is no significant difference in animal species research in terms of fat cholesterol. As a result, the number of sheep and goats has decreased considerably in recent years. However, Turkey's only animal farm is relatively superior to sheep breeding is allowed. In order to prevent the misconceptions mentioned above and give more importance to the large animal farming and to struggle the small-scale diseases which have decreased in number by half in the last decade, vaccination programs should be organized and followed up first. In particular, the modes of transmission and spreading of zoonotic diseases

Table 8. Government supports for goat breeding in Turkey (2018)

Çizelge 8. *Türkiye'de keçi yetiştiriciliğine yönelik devlet destekleri (2018)*

Supports		Unit Support Amount
Forage crops supports	Annual forage crops	19 $/decar
	Perennial forage crops	12 $/decar
	Corn silage	21 $/decar
	Forage crops growing in dry land	8 $/decar
Shepherd support (≥250 head)		1,040 $
Animal protection support		19 $/head
Breeding goats support		5 $/head
Animal waste support (after vaccine)		31 $/head
Vaccine support		0.2 $/head
Ear tag support		0.2 $/head
Support of animal improvement by the breeder		8-15 $/head

Source: Turkish Ministry of Agriculture and Forestry (http://www.tarimorman.gov.tr).

should be identified and, if necessary, these animals should be quarantined or culled for a certain period. Animal husbandry supports must be paid on time and in full.

Conclusion and Suggestions

The future of goat meat as an important nutrient source to a large part of the world population is indisputable. Goats have good meat characteristics but unfortunately have not been researched as extensively as beef, pork, and mutton, due to many factors including available research funding, technology and the poor image of a goat. Goats are small hardy ruminants, easily managed and able to utilize a wide range of plant material that has no food value to humans. Continued and increased research is required in production efficiency for reproduction, growth, nutrition and carcass quality characteristics. Through the appropriate technology, the quality of goat meat as a fresh meat consumer item can be maintained or improved. Processing is a means of extending the product, improving the shelf life and producing an upgraded, value- added product.

Goat meat, particularly in tropical regions, Southeast Asia and more is consumed due to be preferred by people with low incomes in Africa. Due to insufficient marketing the situation, organizational structure, prejudice and grassland possibilities, the economic value of goat meat is very low. On the other hand, besides of goat meat production has different advantages, goat is used low productive grassland areas, and it is very effective livestock production systems in terms of cost-benefit. During the last 10 years, goat production sector has changed in Turkey. The number of dairy goat farms has increased sharply and the possibilities of marketing to goat meat comes into the agenda, as well (Koluman et al., 2016; Koyuncu and Taşkın, 2016). Regardless of the cost of the breeders of policies for the sector for this purpose, short-term solutions instead of taking structural measures are seen as crucial for the sustainability of the livestock sector in Turkey (Şeker et al., 2011; Savran et al., 2011; Saçlı and Özer, 2017). It must come to a country that is not engaged in the import and export opportunities to discuss the existing potential and industry experience. The red meat processing industry, which is the second important part of the red meat sector, should be integrated with the livestock sector together with its own economic and technical internal problems. It is necessary to reduce the number of vehicles in the market and to establish the producer-consumer balance. A healthy structure that breeders can keep on their feet is provided. In times when animal product prices are low, price stability should be provided in the market by intervening prices when necessary. Necessary precautions should be taken to reduce feed production cost, which is an important input in animal breeding (Akgül and Yıldız, 2016). Feed quality and control should be made effective and precautions should be taken to ensure quality feed production in raw materials use of feed factories. The organization of farmers will also play an active role in the marketing of products and in the formation of prices. It is necessary to prevent illegal animal movements, to create sub-structures of animal markets, to make animal sales outside of animal markets, to vaccinate against outbreaks and to disinfection (Taşkın et al., 2017).

Nowadays, extensive goat breeding is replaced by intensive goat breeding. Growing goat milk and goat meat industry with the increase in production and making this product in the most economical and high quality makes it important for the manufacturer and the consumer (Gül et al, 2016). It is very important for the boys who are obtained in the production season in the intensive enterprises to be produced with the quality of the carcass composition and the profitability of the producer in the free market and the sustainability of the operation. In our country, the disadvantage of the goat meat consumption to beef meat and sheep meat, the benefits and production of the benefits of the red meat sector in later times with an increase in the production will take its place in the market. This will only be possible by making more profitable and sustainable production by increasing the unit yields in the intensive system according to the system. Changing demographics and consumer demands are having a significant impact on what people eat. There is a trend toward more global products and flavour. With an increase in demand for low-fatted red meat alternatives by consumers, the future of goat farming looks promising.

REFERENCES

Akbay, C., Bilgiç, A., Miran, B., 2008. Demand Estimation for Basic Food Products in Turkey, Turkish Journal of Agricultural Economics, 14(2):55-65.

Akçay, Y., Vatansever, Ö., 2013. A Research on Red Meat Consumption: A Case Study of Urban Area in Kocaeli Province, Journal of Institute of Social Sciences of Çankırı Karatekin University, 4(1):43-60.

Akgül, S, Yıldız, Ş. 2016. Red Meat Production Forecast and Policy Recommendations in Line with 2023 Targets in Turkey. European Journal of Multidisciplinary Studies. 11(2): 432-439.

Aktürk, D., Tatlıdil, F.F., Savran, F. 2009. Determination of Milk Production Cost on the Member Farms of Sheep and Goat Breeders Association in Çanakkale, Journal of Animal and Veterinary Advances, 8(3):526-529.

Anonymous, 2010. Benefit of Goat Meat. https://vkvequipment.com/Benefits%20of%20Goat%20Meat.pdf. Access:11.01.2019

Anonymous, 2013. General Directory of Meat and Milk Board Sector Report, https://www.esk.gov.tr/, Access: July, 2018.

Anonymous, 2015. Small Ruminant Purchase Prices, http://www.esk.gov.tr/tr/11931/Alim-Fiyatlari, Access: July, 2018.

Anonymous, 2017. Ukraine Live Animal and Meat Report, https://bulutali.com/2017/11/21/ukrayna-canli-hayvan-ve-et-raporu-kiev-ticaret-mustesari-haydar-kocak/, Access: July 2018.

Aras, İ., 2015. Konya Small Ruminant Sector Report, http://www.konyadayatirim.gov.tr/ images/dosya/Küçükbaş%20Hayvancılık%20Sektörü%20Raporu-MEVKA.pdf, Access: July 2018.

Atay, O., Gökdal, Ö., Aygün, T., Ülker, H., 2004. Consumption Habits of Meat in Çine District of Aydın Province, Fourth National Congress of Animal Science, 1-4 September 2004, Faculty of Agriculture of Süleyman Demirel University, Isparta, S.348-354.

Avramenko, S., 2017. Which Countries Consume the Most Goat Meat?, https://www.indexbox.io/blog/which-countries-consume-the-most-goat-meat/, Accessed:15 May 2018.

Bağdatlı, A., Demir, S., Kaplan, I., 2012. Goat Meat Quality and Development Efforts, 11nd Food Congress, 10 October 2012, Manisa-Turkey.

Banskalieva, V., T. Sahlu, A.L. Goetsch. 2000. Fatty acid composition of goat muscle fat depots: A review. Small Rumin. Res. 37:255–268.

Biswas, S., Das, A. K., Banerjee, R., Sharma, N. 2007. Effect of electrical stimulation on quality of tender stretched chevon sides. Meat Science, 75, 332–336.

Casey, N.H., W.A. Van Niekerk, E.C. Webb. 2003. Goats meat. In: B. Caballero, L. Trugo, and P. Finglass, editors, Encyclopedia of Food Sciences and Nutrition. Academic Press, London. p. 2937–2944.

Casey, N.H., E.C. Webb. 2010. Managing Goat Production for Meat Quality. Small Rumin. Res. 89:218–244.

Clonan A, Holdsworth M. 2012. The Challenges of Eating A Healthy and Sustainable Diet, Am J Clin Nutr 96, 459–460.

Clonan A, Katharine E., Holdsworth, R., Holdsworth, M. 2016. Socioeconomic Demographic Drivers of Red and Proceeded Meat Consumption: Implications for Health and Environmental Sustainability. Proceedings of the Nutrition Society, 75:367-373.

Dalmas,P.S., Bezerra, T.K.A., Morgano, M.A., Milani, R.F., Madruga, M.S., 2011. Development of Goat Pate Prepared With "Variety Meat", Small Ruminant Research, 98, 46-50.

Darcan, N., D. Budak M. Kantar, 2005. Technical Analysis of Small Ruminant Production at Taurus Mountainous Area. Journal of Biological Sciences, 5 (No.8): 694-696.

Daşkıran, İ., Çankaya, S., Darcan, N.K., Günes, E. 2010. A Case Study for Production System Analysıs of Turkish Angora Goat Farms. Bulgarian Journal of Agricultural Science, 16(4):512-520.

Daşkıran, I; Savas, T., Koyuncu, M., Koluman, N., Keskin, M., Esenbuğa, N., Konyalı, A., Cemal, İ., Gül, S., Elmaz, Ö., Koşum, N., Dellal, G., Bingöl, M. 2018. Goat production systems of Turkey: Nomadic to industrial, Small Rumin. Res., 163:15-20.

Demircan, V., Yılmaz, H., Gül, M., Köknaroğlu, H., 2011. Effect of Farm Size on Performance and Profitability of Hair Goat Production in Isparta, Turkey, Animal Production Science, 51(5):454-459.

Devendra, C. 2010. Concluding Synthesis and the Future for Sustainable Goat Production. Small Rumin. Res. 89:125–130.

Dhanda, J. S., R. B. Pegg, J. A. M. Janz, J. L. Aalhus and P. J. Shand. 2002. Palatability Of Bison Semimembranosus and Effects of Marination. Meat Sci. 62:19-26

Duyum, S. 2017. Turkey Livestock and Products Annual Report-2017. https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Livestock%20and%20Products%20Annual_Ankara_Turkey_8-15-2017.pdf., Access: July 2018.

Engindeniz, S. and Ucar, K. 2016. Goat Milk Production and Marketing in Turkey. Journal of Global Agriculture and Ecology, 5(4): 240-245.

Ertuğrul, M., Savaşl, T., Dellal, G., Taşkın, T., Koyuncu, M., Cengiz, F., Dağ, B., Koncagül, S., Pehlivan, E. 2010. The Development of Sheep and Goat Farming in Turkey, VII. Turkey Agricultural Engineering Technical Congress, 11-15 January 2010, Ankara.

FAOSTAT, 2017, Livestock Primary Statistics, http://www.fao.org/faostat/en/#data/QL, Access:July.

Goetsch, A.L., R.C. Merkel, T.A. Gipson. 2011. Factors affecting goat meat production and quality. Small Rumin. Res. 101:173–181.

Gül, M., Demircan, V., Yılmaz, H, Yılmaz, H., 2016. Technical Efficiency of Goat Farming in Turkey: A Case Study of Isparta, Revista Brasileira de Zootecnia, 45(6):328-335.

Hatipoğlu, K., Aggoussou, J., Koluman, N., 2016. Comparison to Meat and Fattening Performances of Meat Type Lambs and Kids, Çukurova Agriculture and Food Sciences Journal, 31: 21-26.

Hively, T. S., R. K. Miller, W. S. Ramsey, D. B. Griffin. 2002. Goat Leg and Loin Enhancement by Electrical Stimulation and Injection to Improve Sensory Characteristics. In: Proceedings of the 55th Annual Reciprocal Meat Conference, July 28-31, 2002, Michigan State University, American Meat Science Association

Kadim, I.T., O. Mahgoub, W. Al-Marzooqi, S. Khalaf, S.H. Al-Sinawi, I. AlAmri. 2010. Effects of Transportation During the Hot Season, Breed and Electrical Stimulation on Histochemical and Meat Quality Characteristics of Goat Longissimus Muscle. Anim. Sci. J. 81:352–361.

Kannan, G., Lee, J. Kouakou, B., 2014. Chevon Quality Enhancement: Trends In Pre-and Post-Slaughter Techniques. Small Rumin. Res. 121, 80-88.

Karakaya, E., Kızıloğlu, S., 2017. Analysis of Factors Affecting Red Meat Demand of Households Living in Bingol City Center, Anadolu Journal of Agricultural Sciences, 32 (2017):169-180.

Karthikeyan, J., S. Kumar, Anjaneyulu, A.S.R., Rao. K.H. 2000. Application of hurdle technology for the development of Caprine keema and its stability at ambient temperature. Meat Sci. 54:9-15

Knight, E., House, L., Nelson, M. C. Degner, R. 2006. An Evaluation of Consumer Preferences Regarding Goat Meat in The South, Journal Of Food Distribution Research, 37, 88-96.

Knipscheer H.C., Sabrani M., Soedjana T.D. and De Boer A.J., 1987. The small ruminant market system in Indonesia. A review. In: Agricultural Systems, vol. 25, p. 87-103.

Koluman N., 2014. Goat Meat in Turkey and the World, International Participation Small Ruminant Congress, 16-18 October 2014, Konya-Turkey, pp.25-32.

Koluman, N., 2015. Marketing Channels for Goat Meat in Turkey, FAO-CIHEAM Seminar on Sheep and Goats, 16-18 June 2015, Montpellier-France, pp.25-35.

Koluman, N., Görgülü, M., Göncü, S., Daşkıran, I. 2016. Sustainable Goat Farming: Goat Meat, https://www.researchgate.net/publication/297564115_Surdurulebilir_Keci_Yetistiriciligi_ Keci_ Eti, Accessed: July, 2018.

Köseman, A., Şeker, İ. 2015. Current Status of Cattle, Sheep and Goat Breeding in Turkey. Van Vet J, 2015, 26 (2) 111-117.

Koyuncu, M., Taskin, T. 2016. Organic Sheep and Goat Production, Animal Production, 57(1):56-62.

Kurşun, Ö., Yalçın, H., 2014. Characteristics and Benefits of Goat Meat, Journal of Ayrıntı, 2(19): 7-13.

Lee HJ, Kouakou B, Kannan G., 2008. Chemical composition and quality characteristics of chevon from goats fed three different postweaning diets. Small Rumin. Res.75, 177-184

Liu, X., Nelson, M., Styles, E. 2013. Validating the demand for goat meat in the US meat market. Agricultural Sciences 4 (2013) 549-557.

Najafi, M.H., Zeinoaldini,S., Ganjkhanlou, M. 2012. Performance, carcass traits, muscle fatty acid composition and meat sensory properties of male Mahabadi goat kids fed palm oil, soybean oil or fish oil. Meat Science, v.92, p.848-854.

Ogun, S., Koluman, N., Daşkıran, I., 2016, Marketing Channels for Goat Meat in Turkey, Options Méditerranéennes, 115:475-479.

Onurlubaş, E., Doğan, H.G., Demirkıran, S., 2015. Dietary Habits of College Student, Journal of Faculty of Agriculture of Gaziosmanpasa University, 32(3):61-69.

Özcan, M., Yalcintas, H., Tölü, C., Ekiz, B., Yilmaz, A. Savaş, T. 2014. Carcass and meat quality of Gokceada Goat kids reared under extensive and semi-intensive production systems. Meat Science, 96: 496–502.

Rodrigues, S, Teixeira, A. 2010. Consumers' preferences for meat of Cabrito Transmontano. Effects of sex and carcass weight. Spanish Journal of Agricultural Research. 8(4): 936-945).

Saçlı, Y., Özer, O.O., 2017. Analysis of Factors Affecting Red Meat and Chicken Meat Consumption in Turkey Using an Ideal Demand System Model, Pakistan Journal of Agricultural Sciences, 54(4):933-942.

Sánchez-Villegas, A., Martínez-González, M.A., Estruch, R. Salas-Salvadó, J., Corella, D., Covas, M. I., Arós F., Romaguera, D., Gómez-Gracia, E., Lapetra, J., Pinto, X., Alfredo Martínez, J., Lamuela-Raventós, R.M., Ros, E., Gea, A., Wärnberg, J., Serra-Majem, L., 2015. Mediterranean dietary pattern and depression: the PREDIMED randomized trial. BMC Medicine, 11:208 No text inside

Savran, F., Aktük, D., Dellal, İ., Tatlıdil, F., Dellal, G., Pehlivan, E., 2011. The Factors Effected on Consumption of Goat Milk and Its Products in Some Selected Cities in Turkey, Journal of the Faculty of Veterinary Medicine, 17(2):251-256.

Simela, L., E.C. Webb, L. Frylinck. 2004a. Effect of sex, age and pre-slaughter conditioning on pH, temperature, tenderness and colour of indigenous South African goats. S. Afr. J. Anim. Sci. 24(1):208–211.

Simela, L., E.C. Webb, L. Frylinck. 2004b. Post-mortem metabolic status, pH and temperature of chevon from indigenous South African goats slaughtered under commercial conditions. S. Afr. J. Anim. Sci. 24(1):204–207.

Stanisz, M., Slosarz, P., Gut, A., 2009.Slaughter Value and Meat Quality of Goat Kids With Various Share of Boer Blood. Anim. Sci., Pap. Rep., 27,189-197.

Şeker, İ., Özen, A., Güler, H., Şeker, P., Özden, I., 2011. Red Meat Consumption Behavior in Elazığ and Consumers' Opinion in Animal Welfare, Journal of Faculty of Veterinary of Kafkas University, 17(4):543-550.

Tăpăloagă, D. 2008. Sisteme de productie animaliera, Editura Vox, Bucuresti, ISBN 978-973-158-010-4

Taşkın, T.; Koşum, N.; Engindeniz, S.; Savran, A.F.; Aktürk, D.; Kesenkaş, H.; Uzmay, A.; Gökmen, M. 2017. A Study on Herd Management Practices of Goat Farms in Izmir, Canakkale and Balikesir Provinces, Journal of Faculty of Agriculture of Ege University, 54 (3):341-349.

Teixeira A., 2003. Goat situation and research projects in Portugal. IGA newsletter. http://www.iga-goatworld.org/2003-12_IGA_Newsletter.pdf. [Accessed Nov. 20].

Tshabalala, P.A., P.E. Strydom, E.C. Webb, and H.L. De Kock. 2003. Meat quality of designated South African indigenous goat and sheep breeds. Meat Sci. 65(1):563–570.

TurkStat, 2018. Animal Production Statistics in Turkey, http://tuik.gov.tr/PreTabloArama.do?metod=search&araType=hb_xi, Access:July 2018.

Tüzemen, E., 2012. Factors Influencing of Red Meat Consumption Habits in Selçuk Distirict, Konya Province, Master's Thesis, Institute of Science and Technology of Selçuk University, Konya.

Ulaş, B., 2011. Factors Influencing and Decisions of Red and Poultry Meat Consumers in Urban Area of Aydın Province, Master's Thesis, Institute of Science and Technology of Gaziosmanpaşa University, Tokat.

USDA/Economic Research Service 2002. Changing Consumer Demands Create Opportunities for US Food System. Food Review, 25, 19-22.

Uzunöz, M., Karakaş, G., 2014. Socio-Economic Determinants of Red Meat Consumption in Turkey: A Case Study, Journal of Institute of Social Sciences of Çankırı Karatekin University, 5(1): 37-52.

Vote, D. J., W. J. Platter, J. D. Tatum, G. R. Schmidt, K. E. Belk, G. C. Smith and N. C. Speer. 2000. Injection of beef strip

loins with solutions containing sodium tripolyphosphate, sodium lactate, and sodium chloride to enhance palatability. J. Anim. Sci. 78:952-957.

Webb, E.C. 2014. Goat meat production, composition, and quality. https://pdfs.semanticscholar.org/eb1c/7f32f6987001a8e1116dfdc85629580b9351.pdf.

Webster-Gandy J, Madden A.,_Holdsworth M 2012. Oxford Handbook of Nutrition and Dietetics, 2nd ed. Oxford Handbook Series. Oxford: OUP.

Yağmur, C., Güneş, E., 2010. Scrutiny of Food Production and Consumption of Turkey in terms of Balanced Diet, 7nd Agricultural Engineering Technical Congress, 11-15 January 2010, Ankara-Turkey.

Yaylak, E., Önenç, A., Taşkin, T., Konca, Y. 2010. A Study on Determination of Red Meat Production in Ödemiş Municipal Slaughterhouse, Journal of Faculty of Agriculture of Ege University, 40(3): 81-88.