



Camel Milk Production System in Türkiye

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ABSTRACT

Camels are known as “ship of the desert” and “beast of burden” and resistant to harsh climatic conditions. Their function has changed in the modern world and they have become a food source like other farm animal species. In the last 60 years, the number of camels, their meat and milk production in the world have increased 3.0, 4.95 and 5.0 times, respectively. In Türkiye, both Bactrian and dromedary camels are reared since F1 hybrid ♂ *Tülü* (Bactrian ♂ x dromedary ♀) perform better in camel wrestling, which is a unique culture of Anatolia. There are also a few farms aiming to produce camel milk and rearing young camels intensively in Türkiye. However, many practices such as calf rearing, insemination of cows, milking stimulation, milk preservation, milk quality control, milk collection and marketing and milk processing into the products are not as modern as in dairy cattle production. Although dairy camel farms in Türkiye have a higher milk production potential, since high milk prices lead to low demand for camel milk and there is only one camel milk processing facility to turn camel milk into products, farms produce far below their capacity. Processing camel milk into the products such as cheese, whey, yoghurt, pasteurized milk, kefir and ayran is still in its infancy. In conclusion, although the basis of camel rearing in Türkiye today is based on wrestling camel breeding, understanding of the benefits of camel milk on human health and the increase in demand for camel milk products suggest that this situation will change in favour of dairy camel breeding in the near future.

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Introduction

Increase in world population, global food demand for better nutrition, desertification due to global climate change and the pressures on natural resources force scientists to use existing resources more effectively. Furthermore, in the search for production with a low negative impact on the environment, it forces scientists to evaluate food production under laboratory conditions, which are costly for the time being, or insect-based foods that are relatively cheaper (Meat Atlas, 2014) as alternative food production sources.

The number of high-yielding livestock animal breeds, reared in the intensive production system, is limited and the ability of these breeds to adapt to different environmental conditions is low. Native breeds, can adapt more easily to changing climatic conditions, but are not preferred because they are not economical in intensive production systems, or crossbreeding with high-yielding breeds is preferred, which accelerates the decrease in the number and extinction of these native breeds. However, it is noteworthy that the rearing areas of various livestock species and breeds that are well adapted to arid and semi-arid areas, where the intensive production system cannot become

widespread, have expanded worldwide in parallel with the increasing desertification.

Although camelids are known as animals that are resistant to difficult climatic conditions, the evolution of pastoral societies and the decrease in their traditional transportation function have led to the change in the role of the camel in the modern world (Zhao et al., 2000). It has been successfully grown in arid and semi-arid areas, especially the hot desert areas of North Africa, and cold deserts of Asia and has made it the most important animal food source for the people living there. According to Faraz et al. (2021), camel shifted its function of being the “ship of the desert” and the “beast of the burden” to the function of being a food provider today.

It is stated that there are three genera and seven species of the large camelids (Faye, 2022), and reported that the name Bactrian comes from a region between Afghanistan, Iran and Kazakhstan and was domesticated around Uzbekistan and Western Kazakhstan 5000-6000 years ago (Burger et al., 2019). On the other hand, it is reported that the dromedary camel was domesticated 3000-4000 years ago in the south-east of the Arabian Peninsula (Fitak et al., 2020).

Burger et al. (2019) reported that there are three recognized species of Old-World camels worldwide, two of which are domestic (one humped *Camelus dromedarius* and two humped *Camelus bactrianus*) and one wild (*Camelus ferus*). It has been stated that one-humped dromedary camels are well adapted to hot deserts in Africa, Asia and Australia, and two-humped Bactrian camels are well adapted to cold deserts in the plains of central Asia (Ihuthia, 2010; Zarrin et al., 2020). It is reported that the distribution areas of dromedaries and Bactrian camels overlap in Türkiye, Iran, India and Afghanistan, and hybridization between dromedaries and Bactrian camels is associated with the transportation of commercial goods along the long-distance of Spice and Silk routes (Burger et al., 2019).

Camels are bred in African and Asian countries for milk, meat, leather and wool, in addition to being raised for tourism purposes in many countries, while they are also used as racing camels in some countries in the Middle East (Saudi Arabia, United Arab Emirates, Qatar and Oman) and for wrestling purposes in Türkiye. Türkiye is the only place in the world where camel wrestling is regularly organized in a festive atmosphere, camel wrestling is also done in Afghanistan and Pakistan, but it is not as common and regular as in Türkiye (Çalışkan, 2016).

In Türkiye, Bactrian x Dromedary F1 (*Tülü*) male hybrid camels are preferred as wrestling camels and the camel wrestling organized in about 100 different provinces and districts on the coastline in western Türkiye from November to April. Although wrestling camel breeding is dominant in Türkiye, in some touristic areas they are raised for tourism purposes as well. For the moment, there are also a few camel farms producing camel milk regularly throughout the year in Türkiye and there are some camel farms having the potential of producing camel milk as well.

In this study, after discussing the changes of camel population in the world and Türkiye in the last century, the characteristics of camel breeding and camel milk production system in Türkiye will be emphasized.

Camel Population, Milk and Meat Production in the World

According to 2020 FAO data worldwide, there are 38.65 million camels in 46 countries (Figure 1) and 87.16% of this population is raised in Africa, 12.82% in Asia and only 0.2% in Europe (FAOSTAT, 2022). Considering the

difficulties in collecting statistical data in camel-raising countries, it can be said that the population is higher than the reported number. While the number of camels is almost approaching 10 million in Chad (8.82 m) and 7.5 million in Somalia (7.34 m), where they are about to reach 5 million in countries such as Sudan (4.92 m) and Kenya (4.67 m) and the number has exceeded one million in countries such as Niger (1.86 m), Ethiopia (1.64 m), Mauritania (1.51 m), Mali (1.27 m) and Pakistan (1.10 m) (FAOSTAT, 2022).

When the animal species reared are evaluated together, after the chickens and ducks, the species that increased the most in the world between 1961 and 2019 can be clearly seen in Figure 2: goat (3.24 folds), camel (3.0 folds), pig (2.35 folds), buffalo (2.30 folds), other camelids (1.70 folds), cattle (1.62 folds) and sheep (1.27-fold) (FAOSTAT, 2022). It is noteworthy that the number of camels in the world has increased at a higher rate than both pigs, which provide about one-third of the world’s meat production, and cattle, which provide more than 80% of milk production.

While 0.36% (3.15 m tons) of world milk production (Figure 3), and 0.18% (607,284 tons) of world meat production are provided by camels (Figure 4), the contribution of camels to total meat and milk production in the African continent is 1.88% (373,201 tons) and 5.65% (2.89 m tons), respectively (FAOSTAT, 2022). While there was an increase of 4.95 times and 5.0 times, respectively, in camel meat and milk worldwide between 1961 and 2020, the increases in the African continent were 5.41 and 5.12 times, and in the Asian continent were 4.36 and 4.0 times, respectively, in the same period.

It is seen that in undeveloped or developing countries where breeding programs cannot be implemented easily due to the need for an important economic infrastructure and organization, in addition to increasing the number of animals to meet the demand of the increasing population, it is seen that the genetically improved breeds are crossed with pure or native breeds. However, the camel has remained far from many technological developments applied to other farm animals as a characteristic of itself and the countries and regions where it is raised. However, in recent years, it has started to be the focus of attention around the world both in meeting the animal food needs of people in the regions where it is grown and also the various characteristics of its milk and meat.

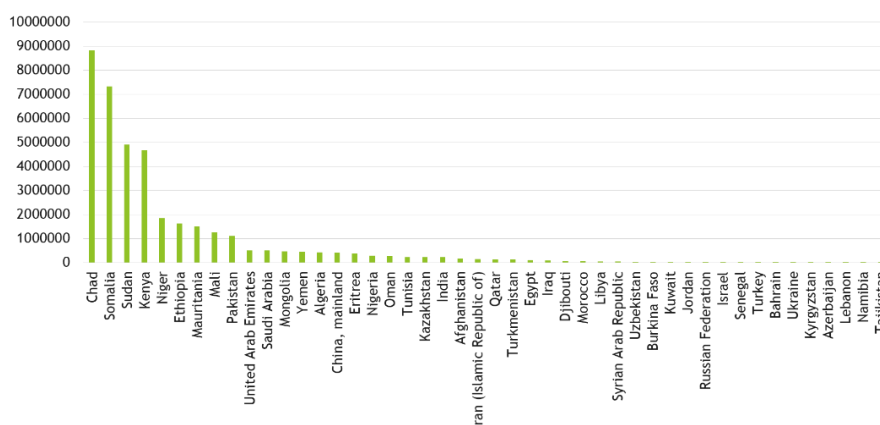


Figure1. Camel rearing countries and population sizes (FAOSTAT, 2022).

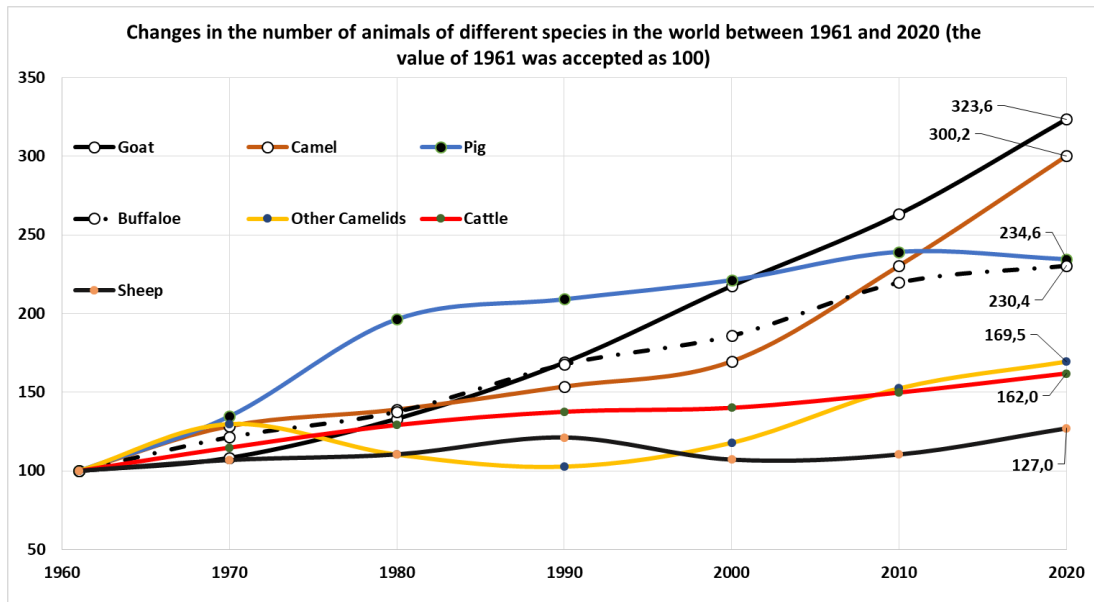


Figure 2. Changes of population sizes in different animal species in the world from 1961 to 2019 (the value of 1961 accepted as 100).

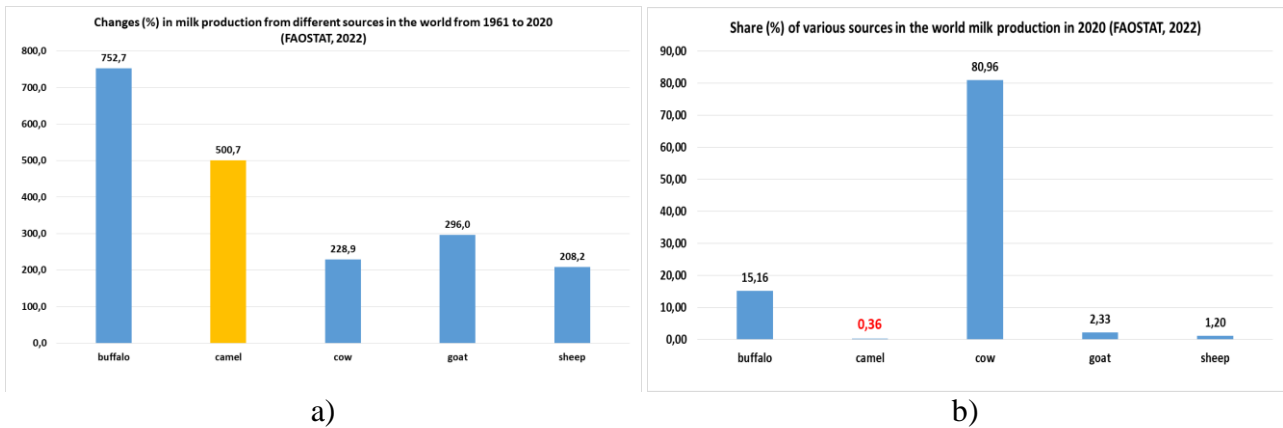


Figure 3. Changes in the milk production from different species (a) and share of various sources (b) in the world total milk production in 2020 (FAOSTAT, 2022).

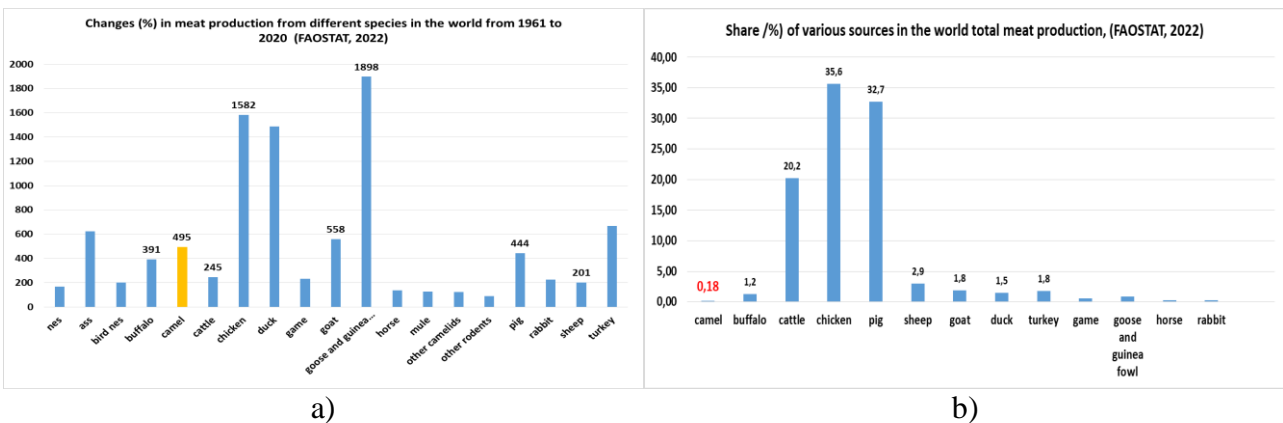


Figure 4. Changes in the meat production from different species (a) and share of various sources (b) in the world between 1961 and 2020 (FAOSTAT, 2022).

Camel Population in Türkiye

Although the history of the camel dates back to ancient times, it was brought to Anatolia by nomads in 300 years BC (Yılmaz and Ertuğrul, 2015). While there were 74,437 camels in Türkiye in 1928, the number increased to 119,378 heads in 1937, and then a sharp decrease was seen

in the number until 2003. In recent years, there has been an increase in the number of camels in Türkiye (Figure 5), largely due to the increasing popularity of camel wrestling. The number of camels in Türkiye reached 1,708 heads in 2019 (FAOSTAT, 2022), but since a system for the

registration of camels is not yet in place, and the uncontrolled entry of animals, especially from countries bordering Türkiye, such as Iran, Iraq and Syria, the number of camels in the country is not included in the statistics of official institutions. It should be emphasized that the number is much higher than stated.

Although Türkiye is not seen as a camel country, when we look at its historical background, the history of camel farming goes back to very old times. In ancient times, all the food, tents, weapons and war machines and all kinds of supplies of the army were carried by camels. In addition, during the migration period of the nomad Turks (Yörük), all their migration goods were carried by camels in Southern and Western Anatolia, or they hired camels to carry their loads. While camels were used to transport olives from olive groves to oil mills, agricultural products such as cotton, grain and tobacco in the Mediterranean and Aegean regions, coal, wood, grain and salt in some other regions were carried by camels. For the aforementioned reasons, camels were mostly bred in the Mediterranean coast, Aegean and Southeast regions in Türkiye (Yarkın, 1965).

According to Yarkın (1965), different hybridizations between single and double humped camels (Tülü (Bactrian ♂ x Dromedary ♀ F1), Tavsi (Tülü ♀ x Bactrian ♂), Teke (Tülü ♂ x Dromedary ♀), Kerteles (Teke ♀ x Bactrian ♂), Yeğen (Tülü ♀ x Bactrian ♂), Kükürdi (Tülü ♂ x Tülü ♀)) were made in the past in Türkiye.

During the mating season, male camels fight with each other, and for this reason, camel wrestling is done in winter. Although the origin of camel wrestling, which is a popular activity in Western Anatolia, is not known exactly, camel wrestling was started to be practiced in Hıdırbeyli village, close to İncirliova district of Aydın province, Türkiye, due to the competition between nomadic tribesmen and caravanists about two centuries ago (Çalışkan, 2009; Aydın, 2011; Çulha, 2012), and are known to be made between November and April in many cities, towns and even villages in the west of Türkiye on Sundays and in some places on Saturdays as well, becoming increasingly widespread in the surrounding provinces and districts.

While the use of camels in transportation is similar in all geographies, camel wrestling has emerged as a cultural feature of Anatolian geography. Camel wrestling is held in more than 100 centers in a season (https://m.facebook.com/story.php?story_fbid=pfbid02RC9zAFQj8BswRfamk7L9qfu9mGNDwLFkDaedxheVvFqtKUH9joqEmUyLpMabnwmHI&id=109016328462641&sfn=scwspmo), and organizations can be held in several places on the same day. The camel wrestling program, membership fees, matching rules, attendant rules and transportation rules are determined by the Turkish Camel Culture and Camel Wrestling Federation, which was established in 2012. The widespread practice of traditional camel wrestling made it possible to evaluate camel meat, milk and wool as a potential product, along with camel breeding in the region.

It is seen that some camel owners who use their camels in tourism in western Türkiye have dromedary and Bactrian male camels to raise wrestling camels. It is also seen that they aim to make money by selling male *Tülü* camels (F1 hybrid) born by mating these two camel species

(dromedary ♀ X Bactrian ♂) at different ages. The effort of the camel owners to produce wrestling camels in the country also makes it possible to produce camel milk in their farms.

Due to the popularity of camel wrestling, the people in the wrestling regions are familiar with camel products. One of these products is “camel sausage”, a fermented product made from camel meat. Camel sausage, which is produced from meat obtained by slaughtering mainly old camels, was registered as a geographical indication for the town of İncirliova in Aydın Province, Türkiye, on March 29, 2021 (Turkish Patent and Trademark Office, Industrial Property Law numbered 6769).

Almost all of the camels to be slaughtered in Türkiye are shipped to the İncirliova district of Aydın, where they are slaughtered by the camel sausage producer. Camel sausage, which is produced pure or mixed with beef in different proportions, can be bought from markets and cooked and consumed at home, or it is consumed as fast food by people who come to watch the wrestling in places where camel wrestling is held.

Camel Milk Production in Türkiye

As in many countries of the world, there is not yet a system for the official registration of camels in Türkiye. However, it should be noted that there are various initiatives within the Turkish Ministry of Agriculture and Forestry to register camels. In Türkiye, other than wrestling camels, camel rearing and camel milk production have been carried out for many years by the “Yörük Turks” who are a nomadic society and are engaged in sheep-goat breeding. Nomads use camels to carry their loads. However, for many years, camel rearing has enabled them to have significant experience in camel breeding. It can also be said that camel wrestling is actually a Yörük culture, and a significant part of the people who breed camels today are people from this culture and have been rearing camels for several generations.

Camel milk is mainly produced from dromedary camels. Except for breeders in the south-east region, dromedary females are bred with Bactrian males, since *Tülü* (F1 hybrid) males are bred for wrestling and sold at high prices. If there is a Bactrian male in the farm and left in the same environment with dromedary females they mate naturally. The farms without a Bactrian male either take the female dromedary camels to the farm with the Bactrian male and leave them there for a few days to be mated with it, or if they are close, bring the Bactrian male to their own farm and ensure that the dromedary females being mated. The farm that owns the Bactrian male sometimes charge money for inseminating the dromedary females with their Bactrian camel, or demands one or two bags of concentrate feed in exchange for this service.

As in the world, artificial insemination technology is not as common in camels as it is in cattle, so the natural mating practice brings various risks. The first of these risks is that it facilitates the spread of diseases from farm to farm, and the second is the increase of inbreeding in the camel population in the country. For example, the father of all the offspring born in the last 4-5 years at Kaya Brothers Camel Farm, Türkiye’s largest camel farm in İncirliova district of Aydın province, is the same Bactrian camel. This camel is

also the father of all the offspring born in the nearby camel farms. In order to keep the inbreeding low, the farmers try to change the Bactrian male approximately every 5 years. Bactrian males to be bought are also brought from abroad, from Iran. Since some farms have both Bactrian males and females, it is also possible to raise and sell male Bactrian calves for breeding purposes.

While the milk produced by the dromedary female giving birth is not milked in some farms and is used to feed her offspring through suckling, some farms leave the calf in the same paddock with its mother until it is 1.5-2.5 months old, after this age the calf and the mother are separated, and used only to pre-stimulate the mother for milking. The milker does not milk the cows completely and let the calves to suckle their mother after milking by the left milk in the udder. The offspring, which stays with its mother for a few hours, is separated again and is not allowed to suckle until the next milking.

When it comes to cows whose offspring have died, they are principally milked and used in milk production. Commercially available oxytocin hormone is used to stimulate the camel cows for milking. Oxytocin is injected intramuscularly 5-10 minutes before milking, and milking is performed by attaching the milking clusters when milk starts to drip from the cow's udder. Since there is no production of special milking clusters for camels, milking clusters produced for cattle and suitable for the udder of cattle cows are used.

Camel Milk Producing Farms in Türkiye and their Characteristics

Camel milk is perceived as a therapeutic substance that is believed to cure various diseases such as cancer, diabetes, autism, asthma, bronchitis, fatigue, jaundice and so on. The number of farms producing camel milk in Türkiye is quite limited. After the camel milk is produced, it is stored frozen and sent frozen to those who demand it from the country and abroad, or some consumers come to the farms and buy it. Since camel milk is considered as a health product, its price as raw milk is much higher than cow, sheep or goat milk, and it is around 150-250 TL (8-13.5 €) depending on the regions where it is produced in 2022. Camel milk is produced in 6 farms in Türkiye and the distribution of these farms throughout the country is shown in Figure 6. There are also camel producers who want to produce camel milk apart from the milk producing farms, but the concerns about the processing and marketing of the produced milk into dairy products prevent these people from attempting to produce camel milk. Although some other farms do not market the milk they produce, these farms can switch to camel milk production at any time, easily.

Some common characteristics of the farms producing camel milk in Türkiye can be listed as follows:

- the dromedary cows inseminated naturally with Bactrian bull, except for South-East region of Türkiye,
- calves are grown naturally and suckle their mothers throughout the lactation period, they ensure that the mothers are pre-stimulated before milking and being allowed to suckle residue milk as well.

- machine milking is applied in camel farms in the west but in the south and southeast regions of Türkiye the cows are milked by hand,
- milk is marketed directly to the consumer as frozen or fresh raw milk,
- the frozen milk is stored in 0.25 L - 0.5 L plastic bottles,
- the marketing of milk is by ordering online or by directly coming to the farm,
- any legal regulations regarding the marketing of camel milk not available yet,
- there is no measurement or evaluation regarding the quality of milk,
- consumers demand camel milk for mainly health purposes,
- feeding of lactating camel cows is similar to intensive feeding of dairy cattle, dry alfalfa hay or meadow grass as forage in addition to concentrate prepared by dairy cows.
- Non-lactating cows and young female camels are grazed from April to November in some farms and during this time, about half a loaf of bread is given per animal from the dry or stale loaf of bread taken from the bakery.
- except south-east region of Türkiye, almost all of the calves born are *Tülü* and the male ones can be raised for wrestling purposes and/or get sold at a high price at a young age,
- female *Tülü* calves can be used in production by mating with Bactrian male again after they are grown, or they can be sold to be used for touristic purposes,
- since the regions where camels are raised are generally temperate, not very cold regions, they are housed in shelters that do not require very expensive investment, in order to protect them from the cold in winter, the shelter is covered with collapsible tarpaulins.

The following are the farms that produce and/or market camel milk in Türkiye (Figure 6):

- *Kaya Brothers Camel Farm* is located in İncirliova/Aydın/Türkiye. This farm also rears and sells wrestling camel as well. Last year 6 camel cows gave birth and milked once a day until 2021, now they are milked twice a day. In a study conducted in this farm, 3.5 kg of milk per day was produced per cow, excluding the suckling of the calf at once-a-day milking. The cows are milked for approximately 12 months. More than one ton of milk is produced per cow with once milking per day in the farm and every year 3-4 tons of milk sold to the end consumer as raw milk. The selling price is 200 TL (11 €) per liter. But at two milkings a day and early weaning of calves, it can be estimated that the amount of milk produced per cow will be more than doubled and milk producing capacity can reach up to 8-10 tons/year. The farm expects 8-10 cows to give birth per year. Depending on the increase in demand, the farm has the potential to increase milk production by increasing the number of camels. The milk produced in this farm has started to be processed into camel milk products in a milk processing facility called Ovacık Mandıra, located in

Aydın province, Türkiye. The farm also has two Bactrian male camels for being used for insemination of females in this farm and the farms in the region to produce wrestling camels.

- *Ertürk Camel Farm* is located in İncirliova/Aydın/Türkiye. In this farm 2 camel cows gave birth in 2021, but recently all the cows were sold. The primary purpose of this farm, is to obtain and sell *Tülü* males at different ages. The milk obtained from this production is marketed directly to the consumers. Cows are milked with machine milking and once a day milking is operated. The camel cows in this farm were inseminated with the Bactrian male brought from Kaya farm.
- *Durmaz Camel Farm*, produces camel milk in Sarayköy/Denizli/Türkiye. Some of the camels of this farm are also used for tourism purposes in Antalya. Lactating camels are left in the farm and used both for raising their calves and for the purpose of generating income by selling the milk produced. In this farm, 3-4 cows give birth per year. Cows are milked once in a day with machine milking. More than one ton of raw milk is marketed annually. It has 4-5 tons milk producing capacity per year and depending on demand can increase its milk producing capacity, too.
- *Tanır Brothers Camel Farm*, is located in Urfa/Türkiye. It rears dromedary camels originated from Syria. Has one male dromedary to be used for insemination of the cows. In every year 4-5 camel cows gave birth. It trades camels, sells male camels at 5 years old as slaughtering for the sacrifice festival. It also produces camel milk, but not for selling. The owner milks camel cows by hand-milking and give free of charge to those who demand camel milk for health purposes.
- *Arpacık Camel Farm* produces camel milk in Siverek/Urfa/Türkiye. All his camels are dromedary. Has one male dromedary as well for natural mating of the cows. Two-three cows give birth every year. Cows are milked by hand-milking two times in a day and the milk sold directly to the consumer in 0.5 L and 0.25 L plastic bottle. The owner earns his living

only from selling camel milk. The owner complaining about the difficulties of marketing camel milk. There are about 10-15 camels in a village called Karacadağ close to this establishment and they did not sell the camels because they were inherited from their ancestors.

- *Camel Farms in Alanya* produces camel milk in Alanya/Antalya/Türkiye. This group of breeders is a big family of approximately 400 people and 25-30 families benefit from their approximately 100 camels for tourism purposes. By producing some milk from camel cows, they usually sell/give it to consumers who demand it due to various diseases, for money or sometimes free of charge. In every year, 10-12 camel cows give birth. The camels are milked by hand, and the milk is frozen and stored in 0.5 L water bottles. Their camels are dromedary and hybrid camels. There is also a Bactrian male as well. The aim is to produce hybrid male calves for wrestling and sell them at a high price.

The primary purpose in most of the dairy camel farms is to produce hybrid males, as they can be marketed at a high price, with the thought that they will become wrestling camels in the future. For this purpose, dromedary camels are mated with Bactrian males. However, there are only 4-5 head Bactrian males in total in Türkiye. This causes an increase in inbreeding in camels produced in the country.

It is understood that farms, other than Kaya Brothers, Durmaz and Arpacık Camel farms, have difficulties in marketing the camel milk. Kaya, Durmaz and Arpacık farms produce milk throughout the year and can always supply camel milk to those who request it. All camel farms want to increase their camel milk production, but there is no stable market to sell camel milk. In Aydın Province, Türkiye, a dairy, Ovacık Mandıra, started to process camel milk produced by Kaya Brothers Camel Farm into pasteurized camel milk, cheese, whey and etc. Other farms far from this dairy plant continue to sell camel milk as raw and frozen and may be able to convert it into various dairy products at home, for domestic consumption and marketing locally.

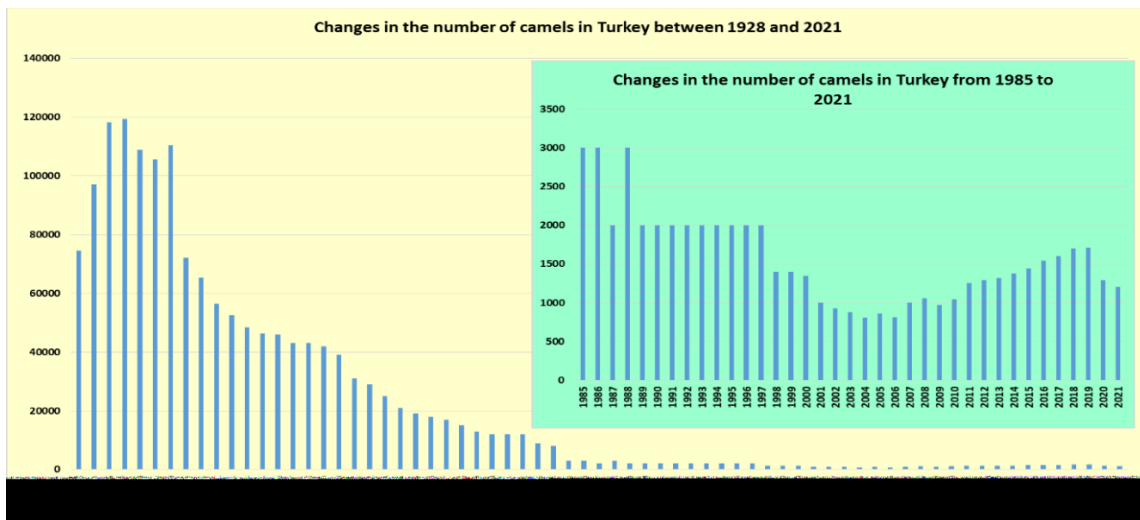


Figure 5. The changes in the number of camels in Türkiye by years. In order to draw attention to the increase in recent years, the changes between 1985 and 2021 is shown in a separate chart (Batu, 1965; Yarkın, 1965; TUİK, 2022).



Figure 6. Countrywide distribution of farms producing camel milk in Türkiye.

Camel Milk Processing in Türkiye

Although camel milk has a similar chemical composition to bovine milk, it contains whey acidic protein and peptidoglycan recognition protein, which is absent in bovine milk, but contains less κ -casein, more α -lactalbumin, and no β -lactoglobulin (Bulca and Koç, 2020; Bulca et al., 2022). In addition, the richness of camel milk in lysozyme, lactoperoxidase, lactoferrin and immunoglobulins (Konuşpayeva, 2020) delays the deterioration of milk and increases the tendency to be consumed as raw milk (Bulca et al., 2020). These properties of camel milk also make it difficult to process camel milk into dairy products.

The processing of camel milk into the products is still in its infancy in Türkiye. There are no detailed rules and criteria for camel milk products as in other livestock species (cattle, sheep, goat and buffalo). With CAMELMILK project supported by PRIMA Program, it was also ensured that the legislation related to camel milk products was created. There is a need to obtain the necessary permits for the export of camel milk products abroad, especially to EU countries. Beliefs about the benefits of camel milk products for human health increase the demand for camel milk products both within and outside the country. The biggest challenge for the camel milk processor in Türkiye is not always finding enough camel milk in the market to process it into the products.

Camel milk produced in Kaya Brothers Camel Farm within the scope of CAMELMILK Project was processed into pasteurized camel milk, camel cheese, camel whey, camel yogurt and camel kefir with the contributions of Aydın Adnan Menderes University (ADU), Türkiye. Pasteurized camel milk, camel cheese, camel whey and camel yoghurt have already been produced by Ovacık Mandıra, and all necessary permits for these products have been obtained from the Turkish Ministry of Agriculture and Forestry.

Conclusion

Camel breeding has a long cultural history in Türkiye. Camel served humanity by transportation in the past, now continues to serve as a source of animal food with camel milk and its products, as well as being used for tourism purposes and for wrestling in Türkiye. A few camel farms, aiming to produce and selling camel milk, take advantage of the belief that camel milk has a significant and therapeutic effect on several diseases. However, since the price of camel milk is high, difficulties to process camel milk into the products and the number of people who have the habit of consuming camel milk is low, these farms are not able to use their camel milk production capacity fully, it should be noted that with the CAMELMILK project supported by the PRIMA Program, a new era has begun and the camel milk has been processed into various products such as cheese, whey, yogurt, ayran and kefir. This development will cause camel breeding in Türkiye to shift food source breeding in the near future, besides recreational (camel wrestling, tourism) breeding. Thus, it will contribute to an increase in the number of camels in the existing camel farms and the establishment of new camel farms. The realization of this change requires the abandonment of traditional camel breeding and the transition to intensive production system. With this change, the demand for female camels preferably with high milk yield will increase depending on the demand for camel milk products, while it does not seem possible to meet this demand domestically in the short term in Türkiye, where the number of camels is quite low, it does not seem possible to meet it illegally due to the walls built on the borders of Syria, Iraq and Iran, either. The only option left is to import camels from abroad through legal means. The processing of camel milk, on the other hand, seems to be a more realistic approach to produce and market camel milk

products with a small-scale milk processing plant to be established by a farm that produces camel milk instead of a large-capacity milk processing plant.

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