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Cappadocia Region and Its Traditional Dairy Products

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ABSTRACT

Cappadocia region, located within the borders of Turkey, is one of the places where nature and history come together with most beautiful in the world. Today's Cappadocia Region includes Nevşehir, Aksaray, Niğde, Kayseri and Kırşehir Provinces. Göreme National Park and Cappadocia, which entered the World Heritage List in 1985, became the focus of interest for tourists due to its geological structure and local architectural features. In addition to its historical and natural beauties, various traditional dairy products are produced in Cappadocia Region. Many dairy products are produced such as Çömlek cheese, Circassian cheese, Gödelek cheese, Goat cheese, Sheep cheese, Kurut cheese, Dorak yogurt, Gömürgen yogurt. Forming of the soil and then cooking and obtaining permanent forms, the pottery production has been carried out in the Cappadocia region of Avanos for many years. In addition to cultural dishes made of pottery, traditional dairy products such as Çömlek (pottery) cheese are also obtained. Besides, the traditional cheese coagulant used in the production of Çömlek cheese whose name changes according to the region is also obtained by the locals in the region. In this study, information about Cappadocia Region was given and research was carried out on traditional dairy products in Cappadocia region and in addition to research articles about some dairy products, information was collected by interview.

Keywords: Cappadocia, dairy products, traditional cheese, Çömlek cheese

1. INTRODUCTION

Nature and history of Cappadocia region is the most beautiful place in the world. While geographic events creating the Fairy Chimneys, people carved in this fairy chimneys and they made house, church, decorated them with frescoes, so thousands of years old traces of civilization has moved to today. During the reign of Roman Emperor Augustus, Strabon who is from writer of antiquity, defined the boundaries of the Cappadocia region as the Toros Mountains in the South, Aksaray in the West, Malatya in the East, and the wide East Black Sea coast in the North in the 17 books of Geographika

(Anatolia XII, XIII, XIV). Today's Cappadocia Region is the area covered by Nevşehir, Aksaray, Niğde, Kayseri and Kırşehir Provinces. The narrower area of the rocky Cappadocia region consists of Uçhisar, Ürgüp, Avanos, Göreme, Derinkuyu, Kaymaklı, Ihlara and its surroundings (Anon, 2018a). In the BC 6th Century, the Persians gave the name of Cappadocia (Katpatuka) to the region (Binan, 1994).

The United Nations Educational, Scientific and Cultural Organization (UNESCO), which states that the heritage is a phenomenon that come to today from the past and will be transferred to the next generations, emphasizes that the natural and cultural heritage in the world is a source of life and inspiration for all mankind, not for a single nation, and they are invaluable and irreplaceable (Demirçivi, 2017). Göreme National Park and Cappadocia, which entered the World Heritage List in 1985, involves Göreme National Park, Derinkuyu and Kaymaklı Underground Cities, Karain, Karlık, Yeşilöz and Soğanlı areas. Depending the historical development, the architecture was diversified and different types of buildings were developed in the Cappadocia region. The settlement areas were established and developed on the level land, the valley slope and the large volcanic tuff rocks side depending the geological structure of the region on the topography of the region (Bilgili, 2018). Cappadocia region is located of Turkey's Central Anatolia Region. Central Anatolia Region is the second largest region in Turkey and covers the 20% land of Turkey. Because of the high mountains around the region, the humid air of the sea cannot enter the region. Therefore, semi-arid climate is effective in the region. Cereal agriculture is intensely implemented in Central Anatolia Region. In addition animal husbandry and extensive livestock farming are other activities in the region (Kapluhan, 2013; Anon, 2018b).

The factors that lead to the continuity of the production of the potteries formed by human being forming a permanent form by shaping and baking the soil since ancient times, are transition settled society of communities and to need of potteries which can be made easy and solid for the storage of products obtained in reaction to start production of their food with agriculture and livestock breeding. The cultural characteristics of a region and their location in time are evaluated by using the graves, architectural remains and pottery (Ceylan and Bayazit, 2011).

Becoming prominent of pottery in every period in the historical process and being the economic sub-sector in this region different from the other settlements in Anatolia, is originated from special structure of Kızılırmak clay. The most important feature of the pottery production in Avanos is the using of Kızılırmak clay in its construction and marketing it in place and 50% of it is still being produced by using traditional methods (Berkmen, 2015). The potteries produced in Avanos are used not only for cultural food but also for traditional cheeses.

2. TRADITIONAL DAIRY PRODUCTS IN CAPPADOCIA

Cheese and yogurt are the most consumed dairy products in Turkey. In addition to the historical and natural beauties of Cappadocia, there are also various traditional dairy products. Many dairy products are produced according to the cultural properties, the type of animal and the geography of the location. In this research, information about dairy products produced was collected in Cappadocia region. According to the interviews, articles and research articles, it was determined that the most is cheese from the traditional dairy products were produced in the Cappadocia region.

A large proportion of cheese that is one of the most preferred dairy product in Turkey, is produced in small dairies and houses and there are many different types of cheeses in Turkey. Although the production techniques of cheeses are similar, the original and the locality of the materials used make a difference to the cheese (Parlak and Güzeler, 2014). In Cappadocia, it is usually possible to see a variety of cheeses in the local markets that are established once a week in the district centers where villages are connected (İşçen, 2008).

Table 1. Local Cheeses of Cappadocia Region According to Provinces (Anon, 2018c)

Aksaray	Kayseri	Kırşehir	Nevşehir	Niğde
Testi Cheese	Circassian Cheese	Kurut Cheese	Kurut Cheese	Testi Cheese
Çömlek Cheese	Raw Cheese	Küpecik Cheese	Küpecik Cheese	Gödelek Küp Cheese
Gödelek Küp Cheese	Çömlek Cheese	Çömlek Cheese	Çömlek Cheese	Küp Cheese
Küp Cheese	Sheep Cheese		Sheep Cheese	Sheep Cheese
Goat Cheese				

Testi cheese: This cheese is produced traditionally in Cappadocia region. It has a semi-hard or hard structure and it has a spicy taste due to the addition of some spices to the clot. In the production of Testi cheese, dried black cumin and thyme are used. In addition, the clot and the precipitate formed in the production covered with a piece of cloth and it is placed in a potteries which closed with wood ash, salt, olive oil and water mix. After this mixture has dried, it is placed with layers in tightly coated potteries with the other cloth. Then, the pottery is buried underground (approximately 1.5 m depth) to ripen for at least 4-5 months (Hayaloğlu and Fox, 2008).

***Niğde Küp (Gödelek) Cheese*:** Gödelek means cube in localism, which means that cheese made in the region is a classic cube cheese. Cheese, that is clasically prepared, is filled into the cubes by flastering the mouth of cubes with the mud and buried in the soil for ripening, after several ripening process is put on the market (Anon, 2018c). This cheese, which is particular to Nigde province, belongs to the full-fat cheese group (Kamber, 2015). The ripening period is 3-5 months and it is ripened in the cool and damp cellar, stone vaults, caves and river sand which is specially brought and changed every year (Akal *et al*., 2014).

Goat Cheese: Goat milk, which is the milk closest to breast milk in terms of composition among dairy animals, is used mostly in the production of cheese among dairy products, and it is observed that cheese industry based upon goat milk is very common in France, Spain, Switzerland, Italy, Greece, New Zealand, Canada and many other countries. The cheeses produced within the industry are the most preferred in the market due to the composition and technologies differences of goat milk. It is known as kelle, çimi, sepet, tel, otlu, küp, kırk tokmak, yörük and local produced many cheeses are made from goat's milk in Turkey (Kavas *et al*., 2005; Akbay *et al*., 2016).

Circassian Cheese: Circassian cheese was produced by the Circassian families in the Anatolian regions where the population of Circassian origin is intensely populated. Although there is no definite information about its history, it is estimated that Circassian cheese has produced for a long time (at least 150 years). Although Circassian families produced their own cheese until 20-25 years ago, the amount of cheese produced in households decreased with changing social conditions in recent years. The Circassian cheese can be sold as fresh, ripe or dried (sun-dried or dried in an oven) and the production method similar with partly Kashar cheese and Mihaliç cheese. Cow, sheep, goat's milk or a mixture of these milk can be used for production. Unlike Cyprus Halloumi Cheese, Circassian cheese has an elastic squeaky sound in the mouth during chewing. While Circassian cheese is produced with various plants in some regions, it is produced in some regions as smoked. It can be preserved for a long time (Ayar *et al*., 2015; Parlak and Güzeler, 2017).

In the production of Circassian Cheese soured whey or yogurt liquid is used as a coagulant. The formed curd is transferred to the cheese baskets with perforated scoops and it is salted. When the filtration of cheese is completed, if it is freshly consumed, it is removed from the basket and if it is to be dried, it is dried by hanging in a sunny place in the same basket (Akal *et al*., 2014).

Sheep Cheese: Sheep cheese is one of the most popular types of cheese in Turkey and must be produced from only sheep's milk (Altun and Durmaz, 2017).

Kurut: The dried yogurt (Kurut) produced by drying yogurt or ayran is a Turkish word from the word of the drying. Kurut is a delicious dairy product that is sour taste which is produced during the summer season when the milk is more and consumed in winter. This dairy product known as 'Dried Yogurt' or 'Kurut' in Turkey is produced by using similar methods under the name of Kashk in Iran, Kişk in Lebanon, Jub-Jub in Syria and Kuşuk in Iraq (Say *et al*., 2015).

Aksaray Cheese: Sheep's milk and cow's milk are used at the same proportion in the production of this cheese. After coagulation, formed curd is put into cloth bags and the mouth of cloth bags are attached and weight is placed on them. After separation of whey, it is cut in square form and transferred into brine. After waiting about three months, it is ready for consumption (Çetinkaya, 2005; Akal *et al*., 2014)

Kırşehir Çörek Otlu Cheese: Cow's milk is generally used in the production of this cheese. In addition to the production method, the cheese is sliced and then salt and black seed is added and the cheese is pressed in such a way that it will never get air into the plastic containers (Akal *et al*., 2014).

Raw Milk Cheese: Traditional raw milk cheeses are produced and consumed gladly with various methods in Turkey as well as all over the World. Implementation, inspection and good determination of the production methods are very important in terms of consumer health (Akan *et al*., 2014).

2.1. Küp, Çömlek and Testi Cheeses

In the cheese production by conventional methods in Turkey, it particularly produced in the Central Anatolia region and often ripened in pottery which made from soil, commonly referred to as Küp

cheese, some areas also called Çanak, Çömlek, Testi cheese, has an important place. The Küp cheese, which is produced prevalently in the Central Anatolia region, is produced from cow's or sheep's milk without using any specific technology in house conditions. Küp cheese, which is named from package, is produced by filling and pressing fatty cheese by salting abundantly into the package. Preferably added black seed gives a pleasant aroma. A cloth or grape leaves are covered in the mouth of the cube and then buried into the soil by laying with dough or mud. There are differences in the Küp cheese production in the regions such some manufacturers use commercial enzymes, while others use traditional cheese coagulant. Some producers also apply boiling to the curd (Koluaçık, 2014).

Table 2. Küp, Çömlek, Testi Cheeses According to Provinces (Durlu-Özkaya and Gün, 2007).

Küp, Çömlek, Testi Cheeses				
Province	**Type of Milk**	**Regional Name**	**Raw material/ spice materials**	**Type of Package**
Rize, Artvin, Trabzon, Erzurum, İspir	Cow's, sheep's milk	Kolete, koleti, goloti, kolot, kolo	Obtained curd from skimmed raw milk	Wood barrel
Konya	Sheep's, Goat's, cow's milk	Konya Blue Mould cheese	Obtained curd from fat raw milk	Tulum, fibrated sack with nylon bag
Niğde, Isparta/Yalvaç	Sheep's, cow's milk	Niğde Küp cheese, Yalvaç Küp cheese	Obtained curd/black seed from Semi skimmed or skimmed sheep-cow milk	Cube
Sivas, Bitlis	Sheep's, cow's milk	Sivas/Bitlis Küp cheese	Obtained curd from Semi skimmed or skimmed sheep-cow milk	Cube, pot
Kayseri, Kırşehir	Sheep's milk	Kayseri/Kırşehir Çömlek cheese	Curd/black seed	Pottery
Antalya	Sheep's, goat's milk	Antalya Testi cheese	Curd	Pot
Trabzon/ Sürmene	Cow's milk	Sürmene Küp cheese	Curd/ chili pepper from skimmed milk	Cube
Yozgat	Sheep's milk or sheep-cow-goat's milk	Yozgat Çanak cheese	Curd	Bowl
Ankara/Ayaş	Sheep's milk	Ayaş Küpecik cheese	Low-fat sheep milk cheese	Küpecik (Cube)

In many provinces of Turkey such as Kayseri, Niğde, Aksaray, Kırşehir, Nevşehir, Isparta, Artvin, Yozgat, Trabzon, Çömlek, Küp and Testi cheeses are widely produced. Beside these type of cheeses

are structurally similar to tulum cheese, their flavor are varied when they are ripened in a specially prepared 6-10 °C store, cave or under the soil (Durlu-Özkaya and Gün, 2007).

In the Central Anatolia region, the production scheme of the Küp cheese, which is produced in house conditions without using any specific technology, is given in Figure 1.

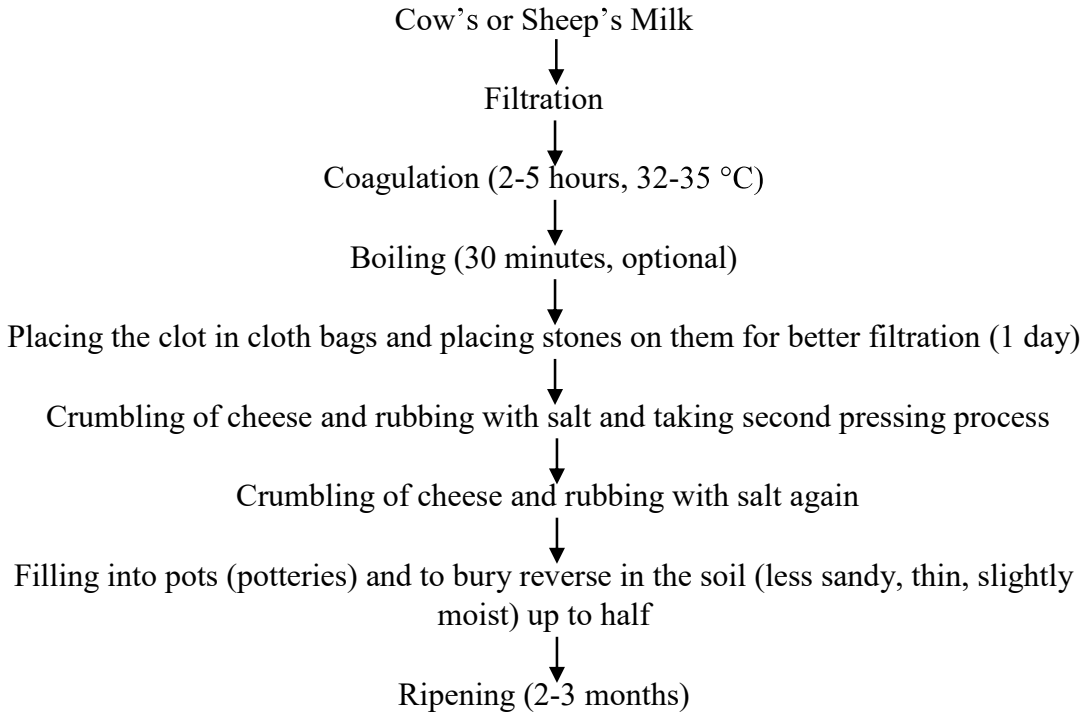

Figure 1. The production scheme of the Küp cheese

The milk to be processed in cheese is filtered through a piece of cloth and taken to the container to be coagulated. The coagulation temperature of the milk is between 32-35 ºC. Commercial milk clotting enzyme or traditional cheese coagulant in farmhouse is used as a coagulant. The salted fresh or dried omasum of cow, sheep and buffalo with substances such as dried figs, honey, sugar, dry black grapes, rock salt, carob's fruit, shelled raw eggs, chickpeas, black sesame are used in the production of traditional cheese coagulant. After the coagulation process, the curd is cut into four pieces by scoop and rested for 15-20 minutes and then boiled to the curd optional. Boiling process takes 25-30 minutes and is made from mixing on fire in the boiler where curd is formed. The curds are taken to the bags made of thin permeable fabric and left to drain for 30-120 minutes and then they are pressed for 10-20 hours with smooth shaped stones. After pressing, cheeses are chopped with a knife in a basin and then crushed with rock salt and mixed. The crashed and salted cheese is placed in a bag and tied. Then the second pressing process is applied. Pressing time changes between 2-7 days. After the pressing process is finished, the cheese is taken into a basin again and is crumbled and some more salt is added. Also, black sesame can be added to give aroma discretionally. The cheese, which is ready for pressing, is pressed into the soil cube which is sprinkled with salt in the its base. Then, salt is sprinkled on the cube and covered it with a cloth and waited 2-3 days. After this waiting,

the inverted cube is waited for 3-5 days. Then the mouth of the cube is opened and a vine leaf or a clean cloth is put and covered with dough or mud. After a cloth is attached to the dough or mud, the cubes are inverted and buried in the sand. Ripening is applied in cool and light humid places in 2-3 months (Akyüz and Gülümser 1984; Koluaçık, 2014).

2.2. Çömlek Cheese Produced in Kayseri, Özvatan District

According to the interviews conducted in the family business in Özvatan district of Kayseri, information about the Çömlek cheese was collected. According to this information, it was learned that milk used for Çömlek cheese was goat milk.

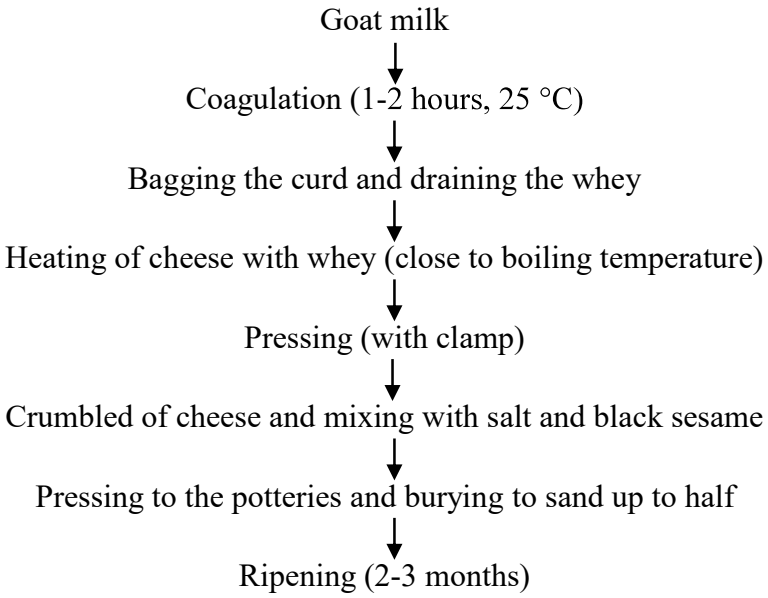

Figure 2. Kayseri Özvatan Çömlek cheese production

Raw milk from milk-giving animal is coagulated with traditional cheese coagulant at room temperature (25 ºC). Milk is mixed thoroughly and waited for 1-2 hours curd formation. After the coagulation of the milk, bagging (bags made of thin permeable fabric) is started. After bagging process, emergent whey is taken to the boilers and then heated to the boiling point. Bagged cheeses are put into the heated whey and are supressed to help heat all over the cheese with a scoop. Then the heated cheeses are taken to a large basin and pressed for 1 hour with a clamp. After 3-8 hours, the majority of the whey is released and cheeses are become ready to press to the pottery. Cheeses are crumbled with hand and chopped with a knife and then mixed well with salt and black sesame. Then the cheeses are pressed into the potteries and after adding salt, the mouth of the potteries are covered with a cloth and left for 3 days. After 3 days, the cloth is changed again and the potteries are ripened by burying reversely half to the sand which is thin, slightly gravel and slightly moist. During the ripening period, the cloth at the mouth of the pottery is replaced at certain intervals. The place of cheeses ripening are usually cool and light humid cellar or basements. Ripening period is generally

2-3 months. But for those who like to eat soft cheese, ripening may be terminated after 1 month (Ahmet Dilmaç; Interview, 2018; Birsen Koca, 2018; Bayar Çukurlu, İnterview, 2018).

Figure 3. Kayseri Özvatan Çömlek Cheese

2.3. Dorak and Strained Yogurt

In order to extend the shelf life of yogurt, concentrated yogurt production method, which is also known as strained, obtained by reducing the water content, is still widely used in Anatolia and Middle East countries (Sömer, 2013). Salty yogurt, which is one of the varieties in concentrated yogurt production by decreasing the water content, is a nutritious yogurt which is obtained and consumed in some provinces of Van, Hatay, Sivas and some provinces of Mediterranean Region in Turkey. Salty yogurt, which is a regional product, is prepared by heat treatment to concentrate and making the yogurt long-lasting by benefiting the protective effect of salt (Şahan and Say, 2003). Today, in many regions of Turkey, especially in the rural areas where animal husbandry is made widely, various types of concentrated yogurt are produced with different names. In Turkey, winter yoğurt is known as salted yogurt, tutma yogurt, autumn yogurt and baked yogurt (Köse, 2018).

Dorak yogurt is a dairy product of good reputation like cheese of Doraks who are an old Turkic tribe spreading from Central Asia to Anatolia and Eastern Europe. In many Anatolian villages and towns, Dorak cheese and Dorak yogurt are produced distinctively (Anon, 2016). When the milk production is low in Cappadocia region, dorak yogurt is produced in order to increase the storage time. In the production of Dorak yogurt, salt is used to make the yogurt resistant. The shelf life of the yogurt is extended. In the interviews in Kayseri, information about Dorak yogurt production was collected. According to the information, Dorak yogurt is usually made in the 9th month and is stored up to 11th month (2 months). The yogurts, which have been used in the 11th month, are used in butter making, tarhana soup making and in ayran production (Ahmet Dilmaç; Interview, 2018; Birsen Koca, 2018; Interview, 2018; Bayar Çukurlu, Interview, 2018).

According to the interviews, the vessels to be used for yogurts in Dorak yogurt production are stone vessels. The vessels with cylindrical feet used for Dorak yogurt are made from küfeki stone. Küfeki stone is a stone that can be used for a long time such as 2000-2500 years, also known as "Istanbul stone", which has been started to use in Roman and Byzantine period. The most important feature of Küfeki stone is that it is suitable for all kinds of processes and easy to process when it comes out of the ground; after contact with air, it gains the hardness, strength by taking carbon dioxide in the air (Anon, 2018d). In the construction of doraks which are used in Cappadocia region, have cylindrical

feet which can be made in different dimensions obtained by carving stone is obtained. Yogurts are filled to the dorak. The process of filling yogurts are 1 handful of salt in 1 bucket of yogurt. After filling, it is pressed again by salt. The Doraks will leak the water of yogurt as the time passes. Yogurt can be added when the level of yogurt falls in the dorak. After the addition of yogurt, the mouth of the dorak is covered with cloth and buried in reverse. In the first 15 days of storage, the clothes in the mouth of the doraks are changed every two days. Dorak yogurt can be consumed after 2 months storage (Ahmet Dilmaç; Interview, 2018; Bayar Çukurlu, Interview, 2018).

Figure 4. Dorak and Dorak yogurt

In the homemade strained yogurt, yogurts are placed in cloth bags instead of dorak. It is mixed by adding salt. Yogurt water is slowly poured out after yogurt is added. In the bag, yogurts, which are filtrated, are poured into a basin and after the salt control is done, it is pressed into the pet bins. A towel cloth is placed into the mouth of the bins and the covers of bins are closed. They are put the sand reversely and released to the storage (Bayar Çukurlu, İnterview, 2018).

2.4. Gömürgen Yogurt

In the interviews, information about the production of Gömürgen yogurt was collected. Every year Gömürgen Yogurt Festival is celebrated in Akkışla region in Kayseri. 100% sheep milk is used in yogurt production because it is usually used sheep milk in the region. Depending on the case, 75% sheep and 25% cow's milk are also preferred. The culture of sheep yogurt is added to the milk of the yogurt to be obtained. Since the milk is cooked in boilers with wood, it is seen that it has a very odor smell and taste. It is also stated that these smell and taste are loved by consumers (Ahmet Dilmaç; Interview, 2018; Birsen Koca, 2018; Interview, 2018).

2.5. Obtaining Traditional Cheese Coagulant in Farmhouse

Coagulation of milk is one of the basic stages of cheese production and is usually carried out by cheese coagulant (Çelik and Uysal, 2009). Enzymes from animal, vegetable and microbial sources are used in enzymatic coagulation of milk in cheese technology and these are acid proteases. These enzymes, which can show their optimum activity at acid pH levels, provide the coagulating of the milk and affect the cheese ripening and quality significantly (Üçüncü, 2018). In small dairies, home or family businesses, traditionally cheese coagulant are often used than commercial milk clotting enzymes. In terms of cost and ease of use, producers prefer traditional cheese coagulant instead of commercial milk clotting enzymes because of various plant species in the region. Root, stem, leaf, flower, seed and fruit of various plants are used in traditional cheese coagulant production in farmhouse. Coagulant preparation may change from village to village and from region to region.

Through the interviews in Özvatan district of Kayseri, information about the traditionally prepared traditional cheese coagulant was collected. These traditional cheese coagulants are usually used in Çömlek cheese production. If the plants used in traditional cheese coagulant are lined up; such as pear leaves, daisy yellow and white, kenger plants are used. In addition, sugar, honey, molasses, carob, elaeagnus, black sesame, dry black grapes, dried figs, salt (rock salt or edible salt) are used in the final stage of the preparation coagulant. Sheep omasum are also used as animal based material.

The preparation of traditional cheese coagulant is as follows. First, the plants (pear leaves, daisy yellow and white, kenger) are thoroughly washed and amount of wheat is added into a cloth and is taken to the large boilers. Then the plants are boiled for 5-10 minutes until the color of the plants is mixed with water. After boiling, this water is filtered and release to become tepid. After the water of the plants is become tepid, they are taken into the containers. Sugar, honey, molasses, carob, elaeagnus, black sesame, dry black grapes, dried figs and salt are placed in these containers and the caps are closed and covered with a cloth and put on the rest for a day or two days at room temperature. After waiting, these containers are opened and the whole sheep omasum (pre-washed, salted and dried) is put into it. When the omasum in the water rises to the surface (between 1 and 7 days), it is understood that the coagulant is present and tasted. If there is a deficiency in the salt and sugar, they are again added, if there is no deficiency, this water is filtered again and used to produce cheese (Ahmet Dilmaç; Interview, 2018; Birsen Koca, 2018; Interview, 2018; Bayar Çukurlu, İnterview, 2018). Some producers obtain the traditional cheese coagulant without boiling. The whole materials (plants, dry foods and omasum) is left at room temperature for 5-6 days. Then the enzyme is filtered from using cloth bag before cheese production (Say ve Güzeler, 2016).

3. CONCLUSION

Cappadocia region is one of Turkey's the most developed region in terms of tourism due to the geographical features and the food and beverage culture, their manufactured food products differ from many of regions. In the Cappadocia region, a variety of traditional dairy products are produced according to their own manners, knowledge, customs and traditions. These dairy products are determined such as Çömlek cheese, Circassian cheese, Gödelek cheese, Goat cheese, Sheep cheese, Kurut cheese, Dorak yogurt, Gömürgen yogurt. In addition, according to the research, traditional cheese coagulant is also obtained.

According to the information gathered and interviews in Cappadocia region, cheese was more prominent than other traditionally produced dairy products. Most of the cheese varieties, it is understood that most of the Çömlek cheese was made depending on the region, raw milk type, the traditional cheese coagulant used and the change in production techniques. In this research, Cappadocia region, which have an important place in Central Anatolia Region, and its traditional dairy products were introduced. According to the researches, it has been determined that these traditional products should be investigated more.

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