

Elmalı Söğle Tulum Cheese

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Abstract

In recent years, the trend of consumption foods high in fiber and low in calories has been increasing due to consumers demands for a healthy and balanced diet. Hence, the vegetables-rich dietary regimes are becoming progressively important all over the world. The vegetables in Cruciferae (Brassicaceae) family have worldwide consumption and popularity since scientific investigations confirm these vegetables are related to lower incidences of many chronic diseases such as type-2 diabetes, osteoporosis, obesity, cardiovascular disease and cancer. Beside on essential nutrients that promote the body, member of cruciferous vegetables have also contain healthy beneficial phytochemical compounds including carotenoids, anthocyanins, flavonoids, antioxidant enzymes, sulfur containing glucosinolates, coumarins, tocopherols and terpenoids. It is known that these compounds have anti-inflammatory, antimicrobial, antioxidant, antiobesity, cardioprotective, and gastroprotective activities. Pharmacological effects and nutritionally valuable compounds enhance the popularity of the plants in Brassicaceae family and lead to future functional food applications

Keywords: Cruciferous vegetables, health benefits, glucosinolates, sulforaphane

Introduction

Culture encompasses all material and spiritual values that are shaped by historical processes in societies and passed down through generations. Traditional foods, which vary according to a country's culture, lifestyle, and economic conditions, are very important in revealing cultural riches. Traditional foods have been produced for centuries using traditional raw materials and/or having a traditional composition or a traditional production method; They are natural, publicly accepted, and time-tested products. Turkey is a very rich country in terms of traditional foods with its geographic location, rich natural resources, and historical and cultural heritage. traditional foods; the share of Geographical Indication (GI) registration is very important in distinguishing it from its peers and protecting it against unfair competition, ensuring continuity in quality and production conditions, increasing its value, and branding (4).

Cheese, which is used in various dishes, gives flavor to each dish by giving it its unique taste. Cheese, which is used in appetizers, main courses, breakfast, desserts, and salads, is an indispensable food product on Turkish tables. Cuisine is a culture, and cheese is an important part of this culture. Cheese, one of the essentials of world cuisine, contributes to a country's cultural richness. In every region of our country, which has a central position in East-West culture, we have different types of cheese in different structures, shapes, and flavors. We have many types of cheese, with different technological processes used as a production method and the breed of the animal from which the raw milk is taken, as well as climatic and regional differences. It has been estimated that of the cheeses produced in Turkey 60% are White Cheese, 17% Kashar Cheese, 12% Tulum and Mihaliç Cheese and that the remaining 11% of production is made up by other local cheeses (14,15)

According to the data of the Turkish Statistical Institute (TUIK), 756,646 tons of cheese were produced in Turkey in 2020. While 729,539 tons (96.4%) of this is cow cheese, 27,108 tons (3.6%) is composed of other cheeses (made from sheep, goat, buffalo, and/or mixed milk). Assuming an average of 13% cheese yield (including soft and hard types of cheese), it can be calculated that approximately 24% of the total amount of milk produced in our country (22,960,379 tons) is processed into cheese. According to 2020 data, approximately 16.6% of the cheeses produced are soft type (125.556 tons), 30.1% medium soft type (228.026 tons), 21% hard type (158.819 tons), 30.7% medium hard type (232.419 tons), 1.3% extra-hard type (9.573 tons), and 0.3% cheese made from curd (1.252 tons) (22).

The aim of this paper is to review the production technology of Söğle Tulum cheese during ripening in antic wells.

2. Söğle Tulum Cheese

According to the Turkish Food Codex, Tulum cheese is a cheese with characteristic features specific to its variety, produced by coagulating the curd obtained by coagulating with rennet, crumbling and salting after fermentation, then tightly pressing it on a packaging material suitable for food contact or leather overalls, and presenting it to the market after maturation has been defined (3).

The methods used to make the types of cheese that are produced in Croatia, Bosnia and Herzegovina, Montenegro, and Turkey differ just little from one another. It is made in the mountainous regions of Turkey's East and Central Anatolia, Bosnia and Herzegovina's various mountainous regions, and Croatia's Dinara region. Due to a scarcity of wood for the manufacture of storage and transportation equipment, nomadic sheep breeders most likely began using lamb skins for cheese storage and movement from mountains to valleys very early in history. This cheese is made from sheep, cow, goat, buffalo, and their

blends of milk. The fundamental distinction of this sort of cheese is that it ripens in a lamb skin, known locally and regionally by names such as tulum (Turkey), miina (Croatia), and mjeh (Bosnia and Herzegovina). It can be compared to a bag or sack constructed from the entire skin of a goat or lamb. The cheese's distinctive sensory qualities—a pronounced peppery taste and odor—are most likely the result of two or three months of anaerobic ripening in the skin. The maturation process is carried out in places such as caves, obruk (cave-like small natural structures) or cellars (13,18,20)

Tulum cheese is one of the most popular and widely consumed traditional cheeses in Turkey. Tulum cheese is manufactured throughout the country with the exception of the Thrace region, particularly in tiny family businesses in rural and urban areas where milk cannot be processed in modern facilities. Each region of the country produces tulum cheese using its unique traditional techniques. In Turkey, tulum cheese is produced using both dry and salty processes (12). Tulum cheese has a white or cream color and a high fat content and a crumbly, semi-hard texture; it is dispersible in the mouth and has a buttery and pungent flavor (8).

The name tulum means “goat’s or sheep’s skin bag” in Turkish, which is the bag used for packaging and ripening (11). Tulum, also called "Tulkuk" or "tuluk," is obtained from sheep, goat, kid, or lamb skin. Tulum made of lamb skin in Konya is called "cheese bağanası", and in the Burdur region, baguette made of lamb or kid skin is called "bağalak" or "bağana. In Mus, the goatskin into which Çökelek Cheese is pressed is called Avriç; in Sparta, Ilikme; and in Tunceli, Tomas. In Eastern Anatolia (Erzincan, Erzurum, Agri, Kars) and the Western Taurus Mountains in particular, leather skins are used; while in Middle Anatolia (Sivas, Yozgat, Kayseri, Kirsehir, Nigde), earthenware containers are predominate. The following Tulum Cheeses

are renowned Afyon, Karaman, Kayseri, Tokat, Isparta, Sütçüler, Kargi, Mut, Cihanbeyli, Ermenek, Korkuteli Deri, Konya Küflü, Giresun Yaglidere Küflü, Giresun Acı, Karaburun Lorlu Keçi Tulumu, Çepni, Pasinler Lorlu Tulum, Armola, Divle, Erzincan Savak, Akseki Çimi, Serto, and Karin Kaymagı ".(1,2, 5, 7, 10,12, 17, 19, 21, 23-26,28). In terms of Salamura (Brined) Tulum Cheeses, Izmir Teneke Tulum, and Bergama Deri Salamura Tulum Cheese are famous on a national scale (16). It is possible to divide the Tulum cheeses produced in Turkey into two main groups. The first covers the dry Tulum cheeses produced mainly in Eastern, South Eastern, and Middle Anatolia; the second, the cheeses known as brined Tulum from the Aegean region. These two groups of Tulum Cheese are completely different from one another in terms of structure, flavor, and aroma (14).

Overalls filled with Tulum cheeses are prepared from kid, milk lamb, sheep, and goat skins. The leathers to be used as overalls are mostly preferred in the autumn; they are obtained from animals slaughtered after the bottom hair has been removed. These skins are abundantly salted with fine salt after being freed from meat and similar residues and tightly coiling with the hairy part out. In this case, they are left for about a week, opened and dried by hanging them in an airy place, and stored in dry conditions until they are used (27).

Prepared leathers are soaked in clean water before they are to be used; their lower parts are sewn up; holes and tears are repaired, and no open space is left on the neck of the skin other than a small mouth. In some regions, in order to identify and repair the holes in the skin, the overalls are first inflated, and the holes are marked with a matchstick. If the holes are small, they are closed with hooks; if they are large, they are closed with special reels made of wood. After the repaired overalls are inflated with air, they are

thoroughly washed with plenty of water and soap and brushed if necessary. It is hit several times with a thick stick so that the weak hairs on the skin fall off. The overalls are now ready for the cheese. Cheeses are packed in the hairless part of the bag. However, in some regions, the outer part is used after the hair is clipped and shaved with a razor (9, 27).

In Table.1, the most well-known local names and ways to make traditional Tulum cheeses from the Mediterranean region are listed. These cheeses are made from cow, sheep, or goat milk, or a combination of these milks, and are sold in different types of packaging.

Elmalı Söğle Tulum cheese, one of the local Tulum cheeses of the Mediterranean region, has a significant consumption potential and is produced with the knowledge, skills, and possibilities of the local people (Figure.1). However, the milk that is used in the manufacturing of sole cheese is not used in the creation of any of the other varieties of tulum cheese. sole cheese is considered to be a type of tulum cheese. Therefore, due to the composition of the milk that is used in the production of Söğle tulum cheese as well as some differences in the method that is used to produce it (for example, ripening in antic wells located on the Söğle plateau(Kızlarağası) for three months. It has its own characteristics that set it apart from other types of tulum cheese (20).

Elmalı Söğle Tulum cheese has a different production technique than other Tulum cheeses, and the maturation stage is done in antic wells. This cheese is produced

mostly from raw goat's milk in the spring. The milk is fermented, the clot formed is broken up and transferred to cloth bags to remove the whey, and it is left to wait until it completely releases its water. Next, the cheese is first shredded with a grater, then by hand, and then salted. Crumbled and salted goat cheese is stuffed into goat skins that weigh between 70 and 90 kilograms. By pressing with a wooden stick called "Keskiç," the mouth of the skin is tied, and at 10 meters deep, 2 meters wide, at an altitude of 3086 m, it is filled with special products that have survived from antiquity to the present day. It is left in the wells for four months to mature. The most important feature that distinguishes this cheese from other similar cheeses is that the ripening stage is carried out in antic wells (20).

Conclusion

Protecting the diversity of traditional dairy products and bringing them into technology is of great importance for the development of milk technology. It is inevitable to examine and develop the technologies of local dairy products, which are produced locally but remain in a closed home economy and are even forgotten due to changing conditions, to determine their characteristics and to switch to commercial production.

The production technology of Söğle Tulum cheese should be improved and standardized, its registration should be taken, the registration of CIs; the creation of a database of properties and compositions; the creation of a cheese route; and its recognition with gastronomy tourism should be increased.

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Table.1. The local Tulum cheeses of the Mediterranean region

Province	Region	Cheese name	References
Antalya	Akseki,Serik, Manavgat	Çimi tulum cheese	Kamber 2005
	Korkuteli	Korkuteli Tulum cheese	Kamber 2005
	Korkuteli-Elmalı-Söğle	Söğle Tulum cheese	Ünsal 2007
	Antalya	Çoban Tulum Cheese	Gönç et al. 1974
Isparta	Atabey, Barla, Yalvaç	Isparta Tulum Cheese	Kamber 2005
Isparta-Antalya	Isparta Antalya plateaus	Dolaz Cheese	Şimşek and Sağdıç 2006, Okur et al. 2010
Kahramanmaraş	Kahramanmaraş	Kahramanmaraş Tulum Cheese	Çetinkaya 2005
Mersin-Antalya-Isparta-Burdur	Toros plateaus	Yörük Cheese	Kamber 2005

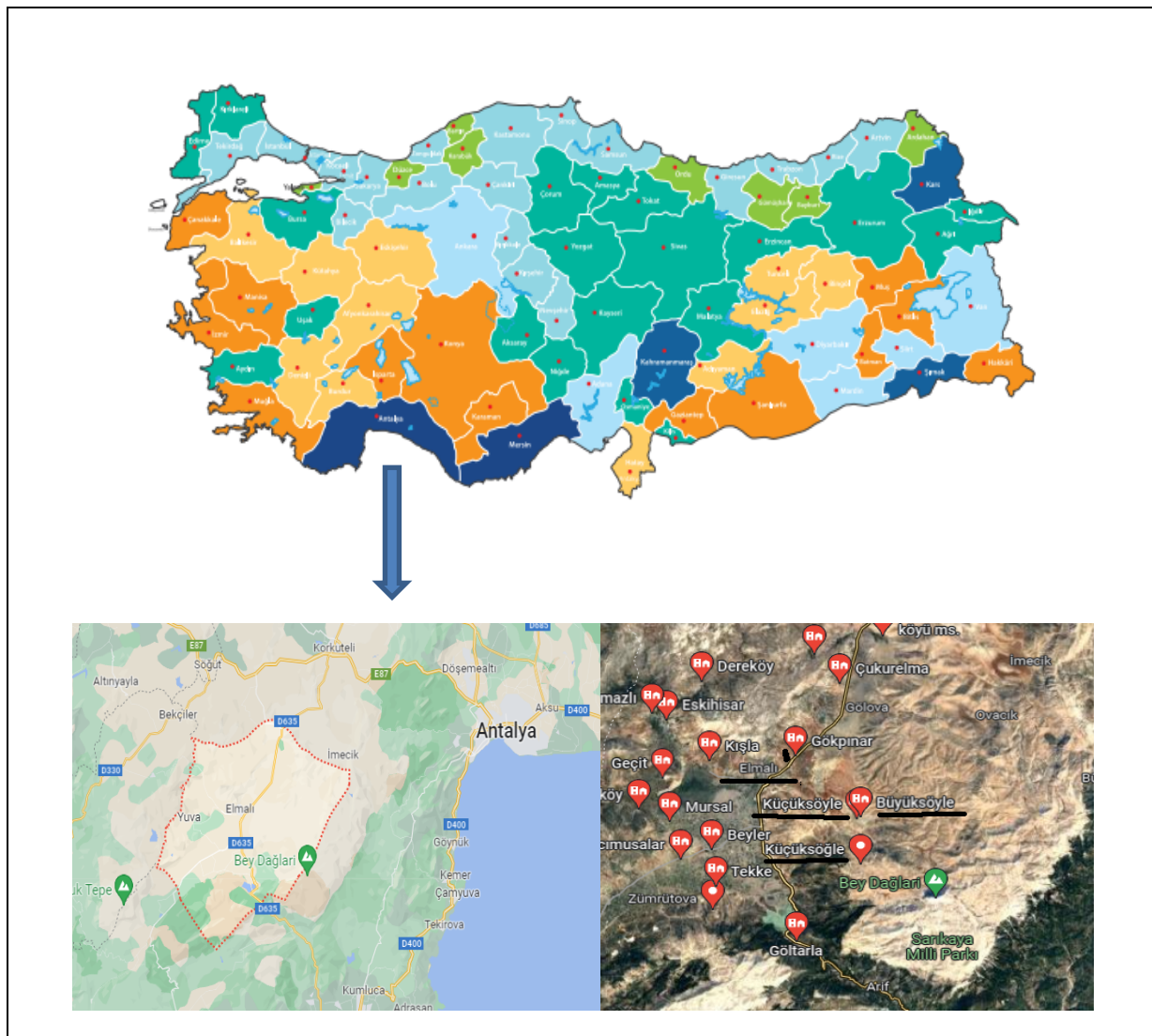


Figure 1. Region where Söğle Tulum cheese is produced



Figure.2. Production process steps