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Review Article

SALEP and ITS IMPORTANCE in TURKISH CUISINE

Semih Arabacı[1], İlkay Gök[2*]

Abstract

Salep is a one of the important cultural heritage of Turkey, recognized for its botanical diversity and traditional use in winter beverages and some desserts like icecream. Traditional salep beverages, widely consumed during cold seasons, hold a special place in Turkish social and cultural rituals. The cultivation of salep plants, particularly in Anatolia and the Aegean, transforms this heritage into regional economic value. Artisanal production methods, including meticulous drying and grinding, preserve its intrinsic qualities. Beyond being a biological product, salep symbolizes cultural identity, becoming an essential part of Turkish cuisine through its use in beverages, desserts, and ice cream. This study summurizes iformation and emphasizes the importance of preserving and promoting salep as a cultural symbol. Its unique sensory characteristics, cultural value and health supporting properties can drive regional economic development and ensure its transmission to future generations. Recognizing salep as both a product and cultural heritage is crucial for safeguarding this valuable plant.

Keywords: Salep, Natural Salep, Traditional food, Spices

TÜBİTAK ULAKBİM

1 semiharabaci54@gmail.com, 0009-0009-5507-0077, Istanbul Okan University
2 *Corresponding Author, ilkygok@gmail.com, 0000-0002-4871-8981, Istanbul Okan University

Introduction

Salep, a powdered product derived from the tubers of orchid plants, is traditionally consumed as a beverage and used in dessert preparation in countries such as Turkey, Iran, Greece, Syria, and neighboring regions. Turkey stands out as one of the richest areas in Europe and the Middle East for mid-latitude salep orchids. According to the Turkish Plant Data Service (TUBIVES), salep is classified under the Orchidaceae family, encompassing 24 genus and 187 taxa. This rich biodiversity underscores Turkey's significant potential for salep production. Salep species, predominantly characterized by an annual vegetation cycle, begin sprouting in late August to early September and mature between April and June, after which they enter a dormant state during the hot summer months. Research on enhancing salep production efficiency is guided by these biological characteristics [1]. Salep is sourced from the tubers of plants within the Orchidaceae (orchid) family. Prominent species include Orchis mascula (early-purple orchid), Orchis militaris (military orchid), Orchis anatolica (Anatolian orchid), and Dactylorhiza (spotted orchid).

Regional cultivation of salep orchids in Turkey

Salep, valued for its traditional and economic significance, is primarily used in ice cream and hot beverages. Turkey's rich biodiversity positions it as a global leader in salep orchid varieties. The cultivation of salep orchids is region-specific, influenced by geographic and climatic conditions [2]. The Marmara Region's humid climate and fertile soils support salep orchid species such as Orchis italica, Orchis purpurea, and Ophrys apifera. Natural growth occurs in forested areas, moist meadows, and coastal zones. Key production areas include Sakarya, Kocaeli, Balıkesir, and Bursa, with Sakarya emerging as a hub for commercial salep cultivation due to favorable environmental conditions [3]. In the Aegean Region, species such as Serapias vomeracea, Orchis anatolica, and Orchis italica are naturally distributed in rural and mountainous areas, olive groves, and forest edges. Prominent production areas include Izmir, Aydın, Denizli, and Muğla. Controlled cultivation is emphasized to counteract the threats posed by overharvesting. Salep orchids, including Dactylorhiza romana, Orchis papilionacea, and Ophrys speculum, thrive in the Mediterranean Region's high-altitude forests, maquis, and mountainous areas. Production is concentrated in Antalya, Isparta, Mersin, and Adana. These regions' biodiverse and climatically suitable conditions facilitate cultivation. The arid conditions of Central Anatolia favor species like Orchis mascula and Dactylorhiza umbrosa. Major production occurs in Konya, Eskişehir, Kayseri, and Sivas. The Ministry of Agriculture and Forestry has implemented policies promoting controlled cultivation to mitigate overharvesting risks [4]. The Black Sea Region's humid climate and rich vegetation foster species like Dactylorhiza maculata and Ophrys fusca. Key production areas include Trabzon, Rize, Samsun, and Ordu. Despite favorable conditions, sustainable practices are crucial to prevent species decline [5]. Eastern Anatolia's high-altitude landscape supports species such as Orchis militaris and Dactylorhiza osmanica. Production hubs include Erzurum, Van, Ağrı, and Bingöl. Controlled cultivation efforts aim to address the impact of overharvesting [6]. The Southeastern Anatolia Region features salep orchid species like Orchis anatolica and Ophrys lutea. Production is concentrated in Diyarbakır, Mardin, and Şanlıurfa. The region's agricultural landscapes support sustainable cultivation initiatives.

Regional salep production in Turkey

Salep production in Turkey relies on Orchidaceae tubers for powdered products used in beverages and ice cream. Although statistical data are limited due to wild harvesting, estimates suggest annual production ranges from 30-40 tons, with significant contributions from provinces like Muğla and Samsun. In 2022, Samsun accounted for nearly 48% of total production, emphasizing the dominance of the Black Sea and Aegean (Table 1).

Historical perspective of salep

Salep (Orchis species) has played a significant role across various civilizations, serving botanical, medicinal, gastronomical, and commercial purposes throughout history. This paper summarizes the historical development and uses of the salep plant from antiquity to the present day. The initial utilization of salep dates back to antiquity. Hippocrates' works highlight the aphrodisiac and digestive benefits of salep [7]. Greek physician Dioscorides emphasized the energy-

enhancing properties of salep in his renowned book De Materia Medica. Similarly, Pliny (Naturalis Historia) and Theophrastus (Historia Plantarum) elaborated on the classification and medicinal uses of the salep orchid. During the Middle Ages, salep emerged as a significant nutritional and medicinal product in both the Islamic world and Europe. Prominent scholars such as Avicenna and Ibn Baytar recommended salep for gastrointestinal issues and general weakness. The practice of consuming salep mixed with milk laid the foundation for the modern salep beverage. Furthermore, salep became a key commodity in Mediterranean and Middle Eastern trade routes. In the Ottoman Empire, salep gained popularity as a beverage commonly served in coffeehouses. It also became a crucial ingredient in the production of Maraş ice cream, acting as a thickening agent. In Europe, salep—known as "saloop"—gained prominence, especially in England, where it was regarded as an exotic product and sold at premium prices [8]. In the 19th century, the export of salep from the Ottoman Empire to Europe persisted. However, growing demand led to overharvesting, which diminished the natural habitats of salep orchids. By the 20th century, the food industry developed alternatives such as guar gum to replace natural salep as a thickener. Despite this, countries like Turkey and Iran maintained their status as leading producers of salep [2]. In the 21st century, salep continues to hold a place in both traditional and modern gastronomy. Turkey has initiated efforts to conserve natural resources and cultivate salep orchids in greenhouses. While natural salep powder remains a luxury product, innovative uses such as salep-based vegan ice creams and prebiotic products have gained traction in the market. Nevertheless, uncontrolled harvesting continues to pose a threat to several orchid species. Salep remains a vital component of Turkish gastronomy and a growing trend in global culinary practices. Throughout history, salep has bridged cultures, influencing fields from gastronomy to medicine. However, the development of sustainable production methods and the preservation of natural habitats are crucial for ensuring its future.

Production stages of salep

Salep plants typically bloom during spring and summer. During this period, the tubers located underground are carefully harvested. Ensuring minimal damage to the natural population of the plant is essential during this process. The harvested tubers are thoroughly washed to remove soil and other foreign materials. Subsequently, they are boiled in milk or water to enhance their durability and inhibit enzymatic activity. This process also helps eliminate undesirable odors.

Boiled tubers are traditionally strung on threads or spread out to dry in shaded areas. This drying process, conducted without direct exposure to sunlight, hardens the tubers and ensures long-term preservation. Once the tubers are completely dried and hardened, they are ground, typically using stone mills. The grinding process involves multiple stages, including crushing, refining, and pulverizing, to achieve the desired fineness and homogeneity of the salep powder. The ground salep powder is rested for several days in a moisture-free and sun-protected environment. This resting phase helps stabilize the moisture content of the powder. Afterward, the powder is packaged under appropriate conditions, making it ready for consumption (Figure 2).

Traditional use of salep powder

Salep powder is commonly consumed as a hot beverage prepared by mixing it with milk or water, particularly during winter months [9]. It is often garnished with cinnamon, which adds a pleasant aroma and flavor. This traditional drink is favored for its warming properties and its potential to support the immune system during cold weather. Salep is a key ingredient in Turkish ice cream, contributing to its elastic and dense texture due to its glucomannan content. It extends the melting time of the ice cream and enhances its flavor [10]. Salep is used as a thickening and flavoring agent in various desserts and pastries. Its addition to dishes like pudding, rice pudding, cakes, cookies, and baklava helps achieve the desired consistency and aroma. The mucilage and other components in salep aid in regulating digestion, soothing the stomach, and preventing constipation. It is also used as a remedy for soothing the throat, alleviating cough, and relieving symptoms of colds. Due to its moisturizing and skin-renewing properties, salep is included in some cosmetic products [11]. However, reliable and detailed sources on this usage are limited. Additionally, salep plays a significant role in cultural festivals and events, particularly in the Middle East and the Balkans,

where consuming salep as a hot beverage during cold winter months is a traditional practice and a social activity.

Components and health effects of salep

Glucomannan, a polysaccharide composed of mannose and glucose molecules, is the primary active component of salep. When in contact with water, it forms a gel-like structure, giving salep its thickening properties [12]. Starch constitutes a major portion of the carbohydrate content in salep, serving as an essential energy source. Mucilage is the plant-based fiber content of salep promotes digestion and supports intestinal health [13]. Salep contains minerals such as calcium, potassium, phosphorus, and magnesium, which contribute to bone health and metabolism. Present in small amounts, proteins contribute to the nutritional value of salep and support muscle building and cell regeneration. Natural fiber content contributes to a feeling of satiety and aids in digestion. Salep contains natural sugars providing a mildy sweet aroma.

Chemical transformations of salep

When heated, the mucilage in salep interacts with water to form a gel, enhancing the viscosity of products. However, extreme temperatures may degrade the mucilage structure. Starch-like components in salep gelatinize under high temperatures, influencing product texture and stability. Salep is sensitive to pH changes. Acidic or basic environments can alter the chemical structure of mucilage, affecting product consistency and stability. The drying process in salep production can lead to oxidation of certain components, affecting the color and chemical composition of the product. Phenolic compounds in salep may undergo enzymatic oxidation upon exposure to oxygen, leading to color changes. Additionally, natural amylase enzymes in salep can degrade starch, but these enzymes are deactivated at high temperatures. Salep tends to absorb moisture during storage, altering the characteristics of mucilage. Prolonged storage may decrease the chemical stability of certain components in salep.

Chemical changes during salep beverage preparation

Salep, derived from the tubers of orchid plants, is primarily used as a thickening agent in beverages. When heated with milk, various chemical interactions occur between the components of salep and milk. Glucomannan in salep absorbs water or milk, swelling to form a viscous solution. This property forms the basis of salep's thickening effect. During heating, hydrogen bonds between glucomannan molecules create a gel structure. This gel increases the beverage’s density and gives it its characteristic texture [14]. The mucilage in salep dissolves in water, absorbing more liquid when heated, which enhances its solubility. This property contributes to a smoother and more homogeneous consistency in the milk-based beverage. The main proteins in milk, casein, and whey proteins, denature during heating, altering their structures. This denaturation facilitates interactions between proteins and components in salep, such as glucomannan.

Denatured milk proteins interact with glucomannan in salep, forming complex structures that influence the stability and texture of the beverage. During heating, lactose (milk sugar) reacts with amino acids from salep or milk, initiating the Maillard reaction. This reaction contributes to the beverage’s darker color and characteristic aroma. At high temperatures, some water-soluble vitamins (e.g., Vitamin C and certain B vitamins) may be lost. However, controlled heat treatments like pasteurization minimize these losses. Heat treatment can alter the bioavailability of certain minerals in milk, though significant losses in mineral content are uncommon. The reaction between lactose in milk and amino acids in salep or milk during heating leads to the Maillard reaction. This contributes to a darker color and characteristic flavors [15]. The components of milk and salep form a better emulsion under heat and mixing. This results in a smoother texture and prevents the separation of liquid and solid components. When spices like cinnamon or ginger are added to the salep mixture, their water-soluble polyphenols and volatile oils are dispersed into the beverage. These compounds enhance the antioxidant capacity of the drink.

Differences between natural and artificial salep

Understanding natural salep and distinguishing it from artificial products can be achieved through various methods and scientifically backed indicators. When mixed with hot milk, natural salep produces a thick,

elastic consistency with a subtle aroma, offering a more natural flavor compared to artificial products. Artificial salep is often contains starch, flour, or additives and lacks the authentic aroma or exhibits an artificial smell. Natural salep is finely milled, cream-colored, and homogeneous, free from clumps or foreign particles. Artificial products may include starch or sugar additives, creating noticeable textural differences. Natural salep is quickly dissolves in water or milk, forming a dense, elastic consistency due to its natural glucomannan content [16]. Artificial salep tends to clump, dissolve unevenly, and often results in a texture that is either too liquid or excessively thick. Natural salep is expensive due to the limited availability of orchid tubers. Extremely cheap salep products typically contain additives. Natural salep products are labeled as "additive-free" or "natural" and list "salep". Artificial products often include starch, flavorings, and sweeteners. In Turkey, high-quality natural salep is sourced from regions like Kahramanmaraş, Bucak (Burdur), Isparta, and Muğla. Distinguishing natural salep requires attention to factors like flavor, texture, price, and ingredient information. Imitation products can cause economic and cultural losses, making it important to purchase from reliable producers. Chemical analyses are the most definitive way to identify natural salep. Natural salep contains 40-60% glucomannan. The unique protein and carbohydrate structures of natural salep can be identified through microscopic examination of its particles, revealing distinct orchid tuber structures.

Ingredients in commercial salep products

Thickening agents substances mimic the thickening effect of glucomannan found in natural salep. Starch is commonly used as a replacement for the mucilage in natural salep. Guar Gum is derived from guar beans, creating a dense texture when mixed with liquids. Xanthan Gum is a polysaccharide produced through fermentation, stabilizing the texture. Carrageenan is Extracted from red seaweed, providing a gel-like texture. Sweeteners are used to increase the sweetness of ready salep beverage. Granulated sugar is the most common sweetener, though excessive amounts can result in overly sweet products. Fructose or glucose syrup is economical alternatives considered less healthy. Flavorings are used to strengthen the aroma and taste of ready salep beverage. Vanillin is synthetic vanilla flavor mimicking natural salep aroma. Stabilizers are added to maintain homogeneity and prevent separation. Preservative agents used to extend shelf life. Potassium Sorbate is inhibits microbial growth. Sodium benzoate is prevents spoilage, though high amounts may be harmful. Colorants are used to make ready salep look better. Titanium Dioxide (E171) provides a bright white appearance. Some commercial salep products contain milk powder or substitutes. Nonfat milk powder used in milk-based products but not equivalent to fresh milk.

References

1. Erbaş, S. (2024). Salep Tarımı ve Endüstrisi. Batı Akdeniz Kalkınma Ajansı.
2. Şen, M.A., (2017). Osmanlı Mutfağından Günümüze Gastronomik Değerimiz "Salep", Aralık, 2017, 260.
3. Koyuncu, O., Yaylaci, O., Oeztuerk, D., Potoglu Erkara, I., Savaroglu, F., Osoydan, K., Ardic, M., (2011). Distribution, elements of destruction and evaluation of risk categories of Orchids in Osmaneli(Bilecik/Turkey) and its environs, Biological Diversity and Conservation 4(1) 122-133.
4. Karık, Ü., Kösoğlu, İ., Akaalp, H., (2020). Salep Yetiştiriciliği, Ege Tarımsal Araştırma Enstitüsü Tıbbi Bitkiler Şubesi, İzmir.
5. Gümüş, C., (2009). Batı Karadeniz bölgesinde salep elde edilmesinde kullanılan bazı orkide türlerinin (Orchidaceae) çoğaltım yöntemleri üzerinde araştırmalar. Doktora Tezi, Ankara Üniversitesi, Fen Bilimleri Enstitüsü, Ankara.
6. Erzurumlu, G., Doran, İ., (2011). Türkiye'de salep orkideleri ve salep kültürü, Harran Tarım ve Gıda Bilimleri Dergisi 15(1) 29-34.
7. Akdeniz, D., Sirtli, A., (2020). Erken Dönem Mitolojisinde Afrodizyak Yiyeceklere Ait İnanışlar (Beliefs on Aphrodisiac Food in Early Ages Mythology), Journal of Tourism & Gastronomy Studies 8(4) 2745-2768.
8. Çalışkan, Ö., Kurt, D., (2019). Tarihi kayıtlar ile geçmişten günümüze salep orkideleri, Türkiye Tarımsal Araştırmalar Dergisi 6(3) 349-355.

9. üren, T., Kızıleli, M., (2021). Geleneksel Türk İçecekleri, Ankara Hacı Bayram Veli Üniversitesi Turizm Fakültesi Dergisi 24(1) 46-71.
10. Or F., (2009). Kahramanmaraş'ta Üretilen Maraş Usulü Dondurmaların Mikrobiyolojik Kalitelerinin Değerlendirilmesi Üzerine Bir Araştırma.Yüksek Lisans Tezi, Çukurova Üniversitesi, Fen Bilimleri Enstitüsü, Adana.
11. Arslan, N., Baydar, H., Kızıl, S., Karık, Ü., Şekeroğlu, N., Gümüşçü, A., (2015). Tibbi aromatik bitkiler üretiminde değişimler ve yeni arayişlar, Türkiye Ziraat Mühendisliği VIII. Teknik Kongresi 12, 16.
12. Seyman, Y., (2023). Farklı Salep Türlerinde Doku Kültürü, Sera ve Tarla Koşullarında Üretim Çalışmaları.
13. Hürkul, M.M., Çift, R., Köroğlu, A., (2020). Investigation of salep and salep containing products in view of food and pharmacy, Biodivers Conserv 13(2) 144-52.
14. Şahin, M., Farklı hidrokolloidlerin gıdalardaki su dağılımına ve reolojik özelliklerine etkileri, Kahramanmaraş Sütçü İmam Üniversitesi Fen Bilimleri Enstitüsü, Yüksek Lisans Tezi, 2019.
15. Batu, A., Aydoymuş, R.E., Batu, H.S., (2014). Gıdalarda hidroksimetilfurfural (HMF) oluşumu ve insan sağlığı üzerine etkisi, Electronic Journal of Food Technologies 9(1) 40-55.
16. Turgay, Ö., Çinar, İ., (2017). Salep: The Common Name of The Plant, Powder, Hot Beverage, Food Ingredient Bitki, Toz, Sıcak İçecek ve Gıda Katkısı Olarak Salep, Journal of Enginering Sciences 20(3) 68-71.

Table 1. Salep Production of Amount (2022)

Region	Country	Production Amount (tons)	Total Production (%)
Black Sea Region	Samsun	56	47.9
	Sinop	7	6.0
Aegean Region	Muğla	42	35.9
Marmara Region	Bursa	5	4,3
	İstanbul	1	0,9
	Sakarya	1	0.9
Mediterranean Region	Hatay	2	1,7
	Adana	1	0.9
Central Anatolia Region	Amasya	1	0.9
	Kahramanmaraş	1	0.9
Total		**117**	**100**

Figure 1. The large tubers of the salep orchid [1]

Figure 2. Salep Powder Production Steps