

ISSN: 2619-9548

Journal homepage: <u>www.joghat.org</u>

Received: 22.06.2021 Accepted: 05.10.2021

Journal of Gastronomy, Hospitality and Travel, 2021, 4(2), 306-320

Research Article

SOME TRADITIONAL TEREBINTH DISHES IN TURKEY AND THEIR HEALTH EFFECTS

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Abstract

Terebinth (turpentine, P. terebinthus), is a tree that grows naturally in pine forests, on the slopes of rocks, in northern and southern Anatolia, Marmara and, Mediterranean regions of Turkey. Terebinth is a very important tree fruit in terms of a high amount of protein, fat, dietary fiber, unsaturated fatty acids such as linoleic acid, some mineral substances such as selenium and iron, and bioactive components, which are important in human nutrition. Its fruit is especially rich in protein and fiber, with a remarkable amount of protein (9.7%), fiber (10.9%), and ash (3.1%). It also contains many mineral substances (sodium, potassium, phosphorus, calcium, iron, magnesium, zinc, copper, and selenium). It is used in traditional medicine due to its therapeutic effects such as antitussive, diuretic, anti-rheumatic, anti-septic, anti-pyretic, anti-inflammatory, and anti-microbial. The high rate of unsaturated fatty acids and dietary fiber in its content reduces blood cholesterol levels, prevents coronary heart disease, obesity and diabetes. Various dishes are made from terebinth grown in the world and certain regions of Turkey. It is used in making bread and pastry, its shoots are used for salads, pickles, canned food, and also dried and consumed as a spice. In addition, it is used as animal feed and edible oil, and Turkey-specific terebinth soap-Siirt Bittim Soap is also produced from it. This study was aimed to determine the terebinth dishes in Konya (Turkey) and within the scope of the qualitative research method, 33 participants selected by purposive sampling method were interviewed. As a result of the research, it was determined that terebinth dishes such as helva-halva, coffee, börekpastry, sarma-rolling, pilav-pilaff, kömbe, syrup, and katık/ezme-paste are made in Konya. It has been determined that it is consumed as herbal coffee, pickles, and soap in other regions of Turkey. From the literature review, it has been seen that terebinth, which is used for traditional medicine among the people, has a preventive effect against diseases important in terms of health, as well as rich in composition. It is thought that terebinth dishes made in Turkey should be evaluated in this respect and used as a gastronomic element.

Keywords: Gastronomy, Terebinth, Turpentine, P. terebinthus, Traditional Turkish dishes, Traditional medicine, Health.

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1. Introduction

Terebinth is small, similar to pistachio, but much smaller, round and has a blue-brown-dark green color in mature seed and a pink-red color in unmatured seed (Chayjan & Kaveh, 2013:1307; F. Kaya & Özer, 2015:49). Terebinth (turpentine tree, *Pistacia terebinthus*) is cultivated in northern and southern Anatolia, Marmara, and the Mediterranean region in Turkey (Altuntaş et al., 2020:1519; M. Özcan, 2004:517; M. M. Özcan et al., 2020:2017). Terebinth photo is given in Figure 1.



Figure 1. Terebinth (left: green terebinth, right: dried terebinth)

According to the findings in the archaeological studies (in Çatalhüyük-Konya-Turkey), terebinth has been used as food and medicine (Cramp & Evershed, 2015:132; M. Özcan, 2004:517). Terebinth is known as "*menengiç, melengiç, çıtlık, çitlembik, çedene, çöğre, yabani fistık, bittım*" in Turkey. Terebinth is consumed widely as snack and herbal coffee, which is called as "*menengiç kahvesi, çedene kahvesi*" in Turkish (Orhan et al., 2012:882; Altuntaş et al, 2020:53; Yılmaz, 2019:13; Yüksel et al., 2015:8023). Terebinth fruit oil is used as food cooking oil (Altuntaş et al., 2020:1519; Yüksel et al., 2015:8023). In addition, terebinth is used in making bread, cake, buttermilk, animal seeds, pickles, salads, and spice (Abbaspour-Gilandeh et al., 2020:2; Alçiçek, 2015:177; Altıntaş & Hazarhun, 2020:20; Chayjan & Kaveh, 2013:1307; Yüksel et al., 2015:8024).

Gastronomy is a phenomenon that reflects the food and beverage culture (Cankül & Demir, 2018:4; Ören & Şahin, Ören, 2019:151), and interest in protecting local foods, learning the cultural characteristics of the region and experiencing local cuisines is increasing day by day (Erol & Alaşhan, 2020:3524). It is thought that terebinth should be evaluated as a gastronomic element.

With this study, it is aimed to give information about the "terebinth dishes" made with terebinth that belongs to Konya (Turkish) Cuisine. All of the researches on terebinth are evaluated in terms of nutrition. There is limited information about the use of terebinth as a food or meal in the literature. With this study, both a comprehensive evaluation in terms of health and the determination of the gastronomic location of terebinth were made. In Addition, it is targeted to emphasize terebinth fruits, shoots and seeds can be used a food and have a lot of positive health effects.

2. Composition of Terebinth and Its Importance for Health

Terebinth's young shoots; leaves, fruits, seeds and resins are used for nutrition (M. Özcan, 2004:517) and traditional medicine (Orhan et al., 2012:882; Topçu et al., 2007:816). Mature terebinth fruit is rich in food ingredients such as protein, lipid, fiber, unsaturated fatty acids (linoleic acid), and minerals (Na, K, P, Ca, Fe, Mg, Zn, Cu, Se) (Altuntaş et al., 2020:1519). Terebinth is so rich in terms of protein (9,7%) and fiber (10,9%) and ash (3,1%.) Terebinth contains 594 kcal/100 g (Yüksel et al., 2015:8023). The physical (Table 1), chemical (Table 1), physicochemical (Table 2), color (Table 3) properties, mineral content (Table 4) and fruit dimensions (Table 5) of the terebinth are given below.

It is announced that a total of 36 minerals were found in the terebinth fruit and the soap and gummy extract have 32 and 30 minerals, respectively. It is determined that a few minerals such as Al, Ba, Fe, K, and Si, in the gummy extract are rather high, compared to the fruit (Sayım Karacan & Çağran, 2009:314). It is determined that a total of 64 different (in fresh 57 and in roasted 62 whole terebinths) aroma compounds were detected such as terpenes (34), acids (8), aldehydes (4), ketones (4), pyrazines (5), alcohols (5), pyrrole (1), furan (1), lactone (1) and ester (1) (Amanpour, 2019:96), and a total of 83 different (in fresh terebinth fruits) volatile compounds were detected such as α -pinene, limonene, γ -cadinane, β -pinene, and β -caryophyllene. The roasting time (25 min) has been changed the composition of volatile compounds such as limonene, α -pinene, 5-methylfurfural, 5-hydroxymethylfurfural, dimethylmetoxyfuranone and 3-methyl-2(5H)furanone (Gogus et al., 2011:1258). The flavonoid contents are higher than their phenolic contents in terebinth extracts (Hacibekiroğlu et al., 2015:445). Terebinth fruit is rich in tannin and resinous substances, and is also rich in vitamin E which has a strong antioxidant effect (Abbaspour-Gilandeh et al., 2020:2). There is a positive relationship between the phenolics and flavonoids and the antioxidant activity in the terebinth (M. M. Özcan et al., 2020:2022). Terebinth unsaturated fatty acids distribution is in the form of oleic (48,02-52,52%) and linoleic acid (19,18-23,48%), and saturated fatty acid constituted for palmitic acid (21,30-23,67%) of total fatty acids (Hacibekiroğlu et al., 2015:445; M. Özcan, 2004:519; M. M. Özcan et al., 2020:2017).

Nuts can prevent cardiovascular diseases by their fatty acid, dietary fiber, and antioxidants, or by a combination of these mechanisms (Blomhoff et al., 2006:56; Chang et al., 2016:88). The dietary fiber, tannin, phenolics, vitamin E, and mineral substances of terebinth make it an important food for human nutrition. The dietary fiber reduces blood cholesterol levels and lowers the risk of heart disease (Pritam & Shrawan, 2018:136). Phenolics such as flavonoids and tannins act as potential cancer-preventive agents (Kour et al., 2020:3–4), and exert protective effects against coronary heart disease, diabetes, high blood pressure, cataracts, degenerative diseases, and obesity (Rakin et al., 2012:385). Flavonoids have anti-oxidation, anti-inflammation and anti-proliferation effects (Chen & Blumberg, 2008:330).

Fable 1. Physical and	Chemical Prope	erties of Terebinth	Fruits at Dry Matte	er Basis (M. Özcan 2004:519).
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	1		
Property (%)	Value	Property	Value
Moisture	6.17	Weight of 1000 fruits (g)	59.73
Crude protein	9.67	Essential oil yield (%)	0.084
Crude oil	38.74	Crude energy (cal/g)	6189
Crude fiber	10.9	Dimethyl sulphite (µg/kg)	4.1
Ash	3.1	Width/length ratio	0.93
HCl-insoluble ash	0.0047		

Table 2. Physicochemical Pro	perties of Terebinth Fru	iit Oil (M	. Özcan 2004:519).
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Property	Value
Relative density (d20- 20)	0.9742 ± 0.0041
Refractive Index (n20-D)	1.477 ± 0.007
Acidity (oleic %)	0.86 ± 0.16
Peroxide value (meq/kg)	0.47 ± 0.09
Saponification number	156.7 ± 14.64
Unsaponifiable matter (g/kg)	15.7 ± 3.3
Carotenoid content (mg/kg)	322 ± 35.4
Iodine value	89.06 ± 0.65

Table 3. Color Characteristics of Terebinth Fruits and Seeds (Altuntaş et al. 2020:1523).

Color characteristics	Fruit	Seed
L*	34.15±0.442	30.84 ± 0.484
a*	-0.97±0.186	6.86±0.159
b*	2.26±0.245	6.40±0.213
Chroma	2.51±0.267	9.39±0.234
Hue angle	-1.17±0.063	0.75±0.013

Table 4. Mineral Contents of Terebinth Fruits at Dry Matter Basis (M. Özcan 2004:520).

Mineral	Concentration (mg/kg)	Mineral	Concentration (mg/kg)
Sodium (Na)	906.64 ± 2.21	Selenium (Se)	6.20 ± 0.21
Potassium (K)	1364.19 ± 3.21	Cadmium (Cd)	1.98 ± 0.06
Phosphorus (P)	801.88 ± 1.74	Cobalt (Co)	2.07 ± 0.04
Calcium (Ca)	924.39 ± 2.36	Chrome (Cr)	3.91 ± 0.08
Iron (Fe)	41.78 ± 0.84	Strontium (Sr)	7.29 ± 0.72
Magnesium (Mg)	318.39 ± 1.02	Titanium (Ti)	1.88 ± 0.15
Zinc (Zn)	3.09 ± 0.17	Vanadium (V)	0.87 ± 0.03
Copper (Cu)	1.28 ± 0.11	Silver (Ag)	2.57 ± 0.14
Manganese (Mn)	1.23 ± 0.07	Aluminum (Al)	16.96 ± 0.22
Lithium (Li)	5.97 ± 0.08	Arsenic (As)	10.12 ± 0.18
Nickel (Ni)	1.05 ± 0.01	Boron (B)	29.90 ± 0.51

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Lead (Pb)	30.15 ± 0.12	Barium (Ba)	0.54 ± 0.01
Sulfur (S)	897.83 ± 0.71	Bismuth (Bi)	9.59 ± 0.17

able	ble 5. Terebintii Dimensions at 076 Dry Dasis (Ayuni & Ozcan, 2002.37).							
	Length	6.10±0.07 mm	Geometric mean diameter	5.43±0.08 mm				
	Thickness	4.96±0.09 mm	Sphericity	89.1±0.35%				
	Width	5.30±0.06 mm	Mass	0.056±0.00095 g				

Table 5	Terebinth	Dimensions	at 6%	Drv	Basis (Avdın	& Özcan	2002.99)
rabic 5.	1 CI CDIIIIII	Dimensions	at 0 / 0	DIY	Da515 (Ayum	a Ozcan	2002.777.

Terebinth as the form of its leaves-shoots, resins and seeds is used for ethnopharmacological traditional medicine in Anatolia to treat diseases such as gastralgia, ulcer, eczema, rheumatism, diarrheic, jaundice disease, throat infections, cough, asthma, bronchitis, other respiratory and urinary system diseases, diabetes, stomach ache and against wounds and burns. It affects as anti-tussive, diuretic, stimulant, astringent, anti-rheumatic, anti-septic, anti-pyretic, anti-inflammatory, anti-microbial; antibacterial, antifungal, antiviral (Akan & Sade, 2015: 224; Amanpour et al., 2019: 96; Durak & Uçak, 2015: 10; Orhan et al., 2012: 882; M. M. Özcan et al., 2020: 517; Özçelik, 2016: 62; Topçu et al., 2007:816–817). The essential oil of terebinth help to prevent many diseases such as cancer and Alzheime. Bittim soap, produced with terebinth oil, in Siirt, destroys bacteria on the scalp, reduces hair loss and dandruff, strengthens hair, is good for acne, and achieves a reduction in varicose veins (Şahin, 2019:388).

3. Terebinth Foods and Other Products

3.1. Terebinth Coffee

Terebinth coffee has been widely consumed for centuries in the Southeastern Anatolia Region, especially Hatay, Mersin, and Gaziantep provinces (Şahin, 2019:386) and also in the Central Anatolia Region in Turkey (Amanpour et al., 2019:96; Saltan & Kaya, 2018:280). When terebinth fruits ripen, their color turn dark bluegreen. The ripe terebinth is picked and roasted, then its paste is obtained by crushing it in a mortar or by grinding it in a machine like a blender. Terebinth coffee is made with the method of making Turkish coffee with water or milk, adding sugar if desired. In a study conducted on the consumption of Menengiç coffee in Gaziantep (Turkey), it was determined that 24,8% of the hot drinks served in restaurants and hotels consisted of menengiç coffee (Ş. Kaya & Sormaz, 2019:312). The geographical indication has been taken for the terebinth coffee with the name "Gaziantep Menengiç Kahvesi – Gaziantep Terebinth Coffee" by Gaziantep Metropolitan Municipality (registration number: 627, date: 16.12.2020). The critical stage in the production of terebinth coffee is the roasting stage. At this stage, volatile compounds are formed by the Maillard reaction between amines and carbonyls, and the characteristic aroma of the coffee, as well as the antioxidant activity effect, also occurs at this stage (Amanpour et al., 2019:96).

3.2. Terebinth Pickles

Terebinth sprouts, marjoram, and thyme are collected, cleaned, washed in the Mediterranean region in Turkey. All herbs are finely chopped and mixed together. After adding a little salt, the herb mixture is tightly filled in a jar and a slice of lemon is placed on it and the lid is tightly closed. This bottled food can be stored at room temperature for up to one year without spoiling (Alçiçek, 2015:179).

3.3. Terebinth Oil and Paste

The red (semi-mature) of terebinth which is collected in autumn, especially in September-October, is used as animal feed, while the dark green ones are consumed as a paste by crushing. Mature terebinth is pounded in a mortar and formed into a dough and can be stored in the refrigerator for a long time. It is consumed by putting it on bread at breakfast. In addition, terebinth fruits oil is extracted and used as cooking oil (Tekerkaya, 2020:109).

3.4. Terebinth as Snack

Terebinth, which is previously collected and dried, is roasted in a pot or pan, and consumed as a snack, called *"menengiç kavurgası*" in Turkish, either alone or mixed with other nuts. Traditionally made in a ceremony in Turkey to celebrate the arrival of a newborn child, called *"diş duğdayı-dental wheat*", is also served by the addition of terebinth on bulgur (Aslan et al., 2019:232, 233).

3.5. Terebinth Soap

For the production of terebinth soap named "*Siirt bittum sabunu*", terebinths are prepared after crushing in stone mills and extracting the oil. In the first stage, wood ash is added to the boiling water and terebinth oil is added gradually. With boiling, the water of the mixture is evaporated. When the desired consistency is achieved, it is molded to the desired shape or formless crumbles (Şahin, 2019:387, 388).

3.6. Terebinth Gum (Resins)

It is a kind of resin found in the thick branches of the terebinth tree. It is still used for medical purposes among the public (Tekerkaya, 2020:111). It is known that the gum is used by chewing, wrapping on the wound, or swallowing.

3.7. Terebinth Extract Syrup

Preferably, terebinth extract syrup is prepared by crushing fresh terebinths and mixing them with hot water and honey. For this, 250 grams of terebinth fruit, 200 ml of hot water, 2 tablespoons (40-50 grams) of honey are required (Tekerkaya, 2020:113).

4. Method

With this study, a comprehensive list of terebinth dishes was created. How terebinth foods are prepared and where they are prepared has been determined, and more common consumption has been suggested by emphasizing their importance in terms of health. In this study, the qualitative research method was used. For the selection of the people to be interviewed, three districts of Konya (Bozkır, Hadim, and Taşkent), where terebinth meals are widely cooked and terebinth trees are common, were determined as the universe. In the first stage, the village headmen of these 3 districts (37 out of 88) were interviewed. People were determined by the purposive sampling method from villages. In the second stage, 33 volunteers were interviewed between April 2021 and May 2021. The interviews took place in the form of e-conversation / conversation for 45-60 minutes and audio and/or video recording (with the consent of the participants) was taken. The interviews were terminated when the saturation point was reached (Baldwin, 2017:10; Patton, 2014:167). The collected data are transcribed, edited, interpreted, and given below. The descriptive analysis method was preferred in the data processing. The ethics Committee permission document required to collect the data used in this study was obtained from the Ethics Committee of Karamanoğlu Mehmetbey University with the date 26.04.2021 and the number 49 decision/number.

5. Results and Discussion

The answers to the question and the demographic information of the 33 participants are given in Table 6.

Demographic and descriptive characteristics	Number of participants (n)	Frequency (%)
Gender		
Male	18	54,5
Female	15	45,5
Age		
25-40	5	15,15
41-50	7	21,21
51-60	9	27,28
61-70	4	12,12
≥71	8	24,24

Table 6. Demographic İnformation of the Participants.

In the research, the findings obtained from the answers to the questions asked in the following order are arranged and given below.

The question of "Are there any foods made from terebinth? If so what are they?" was asked to the participants and information about the foods made for terebinth is given collectively in Table 7. In addition, some participants added the expressions given below: "Terebinth oil is extracted." (P13,P24), "Once upon a time, in times of famine, between 1950 and 1960s, the oil of terebinth fruit was extracted and used as cooking oil." (P15), "*Kömbe*, a kind of börek or bread, is also made." (P11,P18,P19,P31,P32), "terebinth *baturuk*, a kind of pilaff, is also made." (P11,P20,P31,P32).

According to the information obtained from the interviews with the participants, the following recipes were created, dishes were cooked and photographs were taken.

	Participants	Gender	Birthdate	Helva	Coffee	Snack	Katık / paste	Börek / katmer	Pilaf	Soup	Sarma (rolling)	Other meals	Gum (resins)
-	P1	F	1945	x		X	x						x
-	P2	F	1947	Х		Х							
-	P3	F	1939	х		х							
-	P4	F	1942	Х		х							
-	P5	F	1967	Х	Х	х	Х	Х	х	Х			Х
-	P6	F	1956	Х									Х
-	P7	Μ	1939	Х	х	х							
-	P8	F	1968	Х		Х	Х						
-	P9	Μ	1974	Х	х	Х						х	
	P10	Μ	1962	х									
	P11	F	1950	Х	х	х	х		х		Х	Х	
	P12	F	1950	Х		х	Х					Х	Х
	P13	Μ	1977	Х	х	х						Х	
_	P14	F	1965	Х		х			х		Х		
_	P15	Μ	1979			х						х	
_	P16	Μ	1981	х		Х	Х					х	
_	P17	F	1984			Х			х		х		
_	P18	Μ	1980	х	х	Х	Х	х				х	
_	P19	Μ	1973		х	Х		х				х	
_	P20	Μ	1959		х	Х	Х	х				х	
_	P21	Μ	1976	х		Х							
_	P22	Μ	1972	Х	х		Х	х		х			
_	P23	Μ	1962		Х	Х		Х					
_	P24	Μ	1965	Х		Х	Х					Х	Х
_	P25	Μ	1981			Х							
_	P26	F	1959			Х							
_	P27	Μ	1978			Х							
-	P28	Μ	1990	Х	Х	Х	Х					х	
-	P29	F	1968		Х								
_	P30	Μ	1953		Х								
_	P31	F	1965	Х	Х	Х	Х	Х	Х		Х	Х	
_	P32	F	1969	Х	Х	Х	Х	Х	Х		Х	Х	
_	P33	Μ	1943	Х	Х	Х	Х						Х

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5.1. Terebinth Helva-Halva

Terebinths are roasted in a pan over medium heat, stirring constantly, until the oil comes out. After cooling, the terebinths are thoroughly beaten in a mortar. Grape molasses is boiled in a pot or pan. Wheat flour and crushed terebinth are added to the boiling molasses and mixed a little. If desired, the mixture is passed through a metal strainer and separated from the hard parts of the terebinths. If the terebinths are well crushed, it may not be necessary to strain. The filtered mixture is taken back to the pan or pot. The helva is roasted/cooked over medium heat, stirring continuously until it does not stick to the pan/releases itself (P1-P14,P31-P33). Terebinth helva image is given in Figure 2.



Figure 2. Terebinth Helva.

5.2. Terebinth Bulgur Pilaff And Soup With Terebinth And Bulgur

Two glasses of bulgur are put in a pot or pan, and 2 glasses of crushed terebinth are diluted in water. Water is filtered into the pilaf and the terebinth shells are separated. If it is cooked until the water is drained, it becomes bulgur pilaf with terebinth. If the water is added too much and left watered, it becomes bulgur soup with terebinth (P5,P11,P14,P17, P31, P32). If desired, 1 medium onion can be chopped, roasted with 1 tablespoon of tomato paste, then bulgur/rice can be added and water with terebinth can be poured over it (P17). Bulgur pilaf with terebinth image is given in Figure 3.



Figure 3. Bulgur Pilaf with Terebinth.

5.3. Terebinth Coffee

For each cup, one teaspoon of crushed terebinth and the same amount of water or milk as the number of cups to be made are added into a pot, which is called cezve (Figure 4.1.), and the pot is put on fire. When it starts to foam, the cooking process is ended (P5,P7,P9,P11,P18-P20,P23,P30-P33). If desired, a little sugar is added to the coffee (P9). Terebinth coffee has been widely consumed for a long time (P5,P11,P13,P19,P20,P22,P23, P28, P31, P32). Cezve-pot and terebinth coffee images are given in Figure 4.

Alternative recipe: A root cinnamon is crushed in a mortar. The woody plant called "*bahar alati*" is finely chopped and pulled in the machine until it turns into powder. Terebinths are crushed in the mortar. They are all mixed together. It is cooked like Turkish coffee with water. It tastes a bit bitter due to the cinnamon and "*bahar alati*" in it, and it was stated that this coffee was also made a lot in the past (P29).

5.4. Terebinth Börek / Katmer-Bread / Pastry

Two tablespoons of crushed terebinths and 3 medium-sized finely chopped onions is mixed in a bowl to make terebinth börek. The unleavened dough is kneaded by mixing 2 cups of flour, 2 cups of water, 1 teaspoon of salt. The dough is cut into small pieces, rested a little, and rolled out to the size of a plate (Figure 5.1.). The mixture is put into the dough (Figure 5.2.). It is cooked on a sheet called "sac" in Turkish or pan. It is consumed by brushing with butter on it. If its shape is folded into a quadrangle (Figure 5.6.) it is named as "katmer" (P5,P18-P20,P22,P23,P31,P32). Terebinth börek and katmer images are given in Figure 5.



Figure 4. Cezve-Pot and Terebinth Coffee.



Figure 5. Terebinth Börek (4.-5.) and Terebinth Katmer (6.).

5.5. Terebinth Vineleaf Sarma – Vine Leaf Rolling With Terebinth Pilaff

Crushed or machine-ground terebinth is diluted with some water, and filtered through a strainer and cooked bulgur pilaf as in the recipe above. Before cooking, finely chopped 1 medium onion, and spices such as mint, and thyme are added. The mix is prepared and cooked. The mix is wrapped in a leaf, filled into a pot, a little bit of terebinth water or normal water is poured on the bottom of the pot. Grape leaves rollings are cooked on medium or low heat. It can be served with compote (P11,P14,P17). Also, if desired, 1 medium size onion can be chopped, roasted with 1 tablespoon of tomato paste, then added with bulgur/rice and water with terebinth can be poured over it (P17). Grape leaves rolling with terebinth image is given in Figure 6.

5.6. Balbeki, A Kind of Crushed Fruit Dessert

Terebinth is mixed with dried black grapes in one to one ratio and eaten after being thoroughly crushed in the mortar (P9,P11,P12,P16,P28), "it is called *-balbeki-* (P9), -honey- (P11), *-balbaki-* (P12) in Turkish." If desired, it can be prepared with other nuts such as walnuts. In addition, chickpea */leblebi*, carob flour and terebinth are mixed and roasted in a pan, and prepared *-kavut-* (P15). Balbeki image is given in Figure 7.



Figure 6. Terebinth Vineleaf Sarma – Vine Leaf Rolling with Terebinth Pilaff.



Figure 7. Balbeki.

5.7. Snack

After the terebinth is gathered from the tree, it can be consumed fresh or dried with fruit or with other dried nuts for snacks (P1-P5,P7-P9,P11-21,P23-P28,P31-P33). Terebinth fruits image is given in Figure 1.

5.8. Terebinth Katık/Ezme-Paste

Its paste is prepared by pounding the terebinth or by pulling it in a machine such as a blender. This paste is often eaten at breakfast or whenever desired, by putting it between *yufka*-flatbread/bread. Foods such as breakfast cheese and olives between bread is called "*katuk*" in Turkish (P1,P5,P8,P11,P12,P16,P18,P20,P22,P24,P28,P31-P33). Terebinth paste image is given in Figure 8.



Figure 8. Terebinth Ezme / Katık-Paste.

5.9. Kömbe with Terebinth, A Kind of Sweety Pastry or Bread with Terebinth

One kg of potatoes, 1 kg of onion, and 1-1.5 cups of terebinth paste are used to make terebinth kömbe, which is a kind of traditional börek or bread. Potatoes are peeled, grated, and fried with a small amount of oil. Onion shells are peeled, chopped, and fried in a small amount of oil. The roasted potato, onion, and terebinth paste are mixed in a bowl with adding the desired spices, (especially red pepper and black pepper) and salt. The dough is prepared with flour, water, salt, and baking powder. The dough, which is opened the size of a tray, is laid in a tray greased with vegetable oil or butter. The mixture is put on it. The second opened dough is spread and the mixture is put on again. With this method, 6-7 layers are made. It is baked in the oven for half an hour (P18,P19,P31,P32). If you want to cook it as it was cooked once upon a time, a wood grove is prepared to put

it under the tray. The wood grove is filled into the sheet placed on the tray (Figure 9.1.). Thus, it is ready to be cooked. Instead of terebinth and potatoes, 1.5-2 cups of walnuts can be used to make a walnut kömbe called "damat-groom kömbe". Groom kömbe is made every feast. In addition, cabbage and cheese kömbe are also made (P31,P32). Kömbe with terebinth and walnut images are given in Figure 9.



Figure 9. Kömbe with Terebinth (1.-3.) and Kömbe with Walnut (4.).

5.10. Terebinth Gum (Resins)

The terebinth gum collected from the trees can be chewed or swallowed for medical purposes or arbitrarily. It occurs all the time in every terebinth tree. Like the resin of a pine tree, it is in the form of a white yellow gum. Either from the trees or those that have dropped on the ground can be collected (P1,P5,P6,P12,P24,P33). Terebinth resins and extract syrup are given in Figure 10.



Figure 10. Terebinth Resins (1) and Extract Syrup (2).

The question of "Do you think menengiç is beneficial for health?" was answered by the participants and the answers are as follows: "It is nutritious and beneficial for health." (P1-P14), "It is nutritious, we eat it for nutritional purposes." (P2,P16), "Terebinth coffee is good for intestinal disorders." (P5,P10,P20), "Terebinth resins or paste is cured wounds." (P6), "It is good for asthma and shortness of breath." (P20), "It is good for abdominal pain." (P6,P12,P13), "It is good if there is an ulcer in the stomach." (P8,P24,P33), "Those with stomach aches and reflux are chewed or swallowed terebinth resins." (P12), "It is said to be very good for prostate disease." (P15), "Gives energy, keeps you full." (P1,P5), "Terebinth fruit is crushed with dried grapes and put on the bruise to relieve the pain." (P21), "It is recommended by a doctor that I know a person to those who want to quit smoking because terebinth reduces the desire to smoke." (P25), "It is good for itching." (P26).

Terebinth is still used in the making of various dishes among people. It is seen that terebinth has been consumed as food for at least 3 generations in Konya, and it has existed in Anatolia for 10,000 years according to the literature. There is a sample meal which is made with terebinth paste for each of the soup, börek, sarma (rolling), helva and beverage groups, which have an important place in traditional Turkish dishes. However, it

is thought that terebinth helva, börek, katmer, kömbe, fruit oil, and sarma (rolling) are about to be forgotten. Its cooking has decreased considerably. The food form that is still widely consumed is terebinth coffee, paste, and snack. There is no record of terebinth dishes and other uses in Turkish Cuisine. Therefore, with this study, besides the determination of the use of terebinth in terms of health among the people and the preparation of local dishes will also be recorded and published.

Terebinth has been used for treating diseases since the past, and it is known to cure many diseases. It has been confirmed from both the answers given by the participants and the literature information that terebinth is used against many diseases. It is also stated that it contains substances that prevent important health problems. The health effects of terebinth and the diseases it affects positively are given in Figures 11 and 12.



Figure 11. Terebinth Effects on Human Health.



Figure 12. Diseases in Which Terebinth Has a Positive Effect to Cure.

Terebinth contains remarkable nutritional elements in its composition and contains bioactive substances such as dietary fiber, protein, lipid, mineral substances, and antioxidants, which are important in human nutrition. Its high content of unsaturated fatty acids and dietary fiber provides an effect of reducing blood cholesterol levels, preventing coronary heart disease, obesity and diabetes (Anosova et al., 2020:2; Pritam & Shrawan, 2018:136). The high percentage of lipid (38.74%), linoleic acid (8.52%) and protein (9.67%) in the composition of terebinth make it a good source of energy and also provide a significant amount of recommended daily intake nutrients for the human body. The daily intake of important nutrients and rates of providing with terebinth are given in Table 8, according to the values given in Table 4. The amount of selenium in terebinth is much higher than the amount required in the daily diet, and if providing rate (336.36%) is found, again (Sayım Karacan & Çağran, 2009:315). So terebinth is a very good source of selenium. In selenium deficiency, myalgia, cardiac myopathy, poor growth, abnormal sulfur metabolism diseases occur. Due to the relatively limited selenium resources (oysters, tuna, meat, poultry, fish, cereals, Brazil nuts) (Gropper et al.,

2018:481), terebinth gains importance in this respect. While low levels of selenium in serum promote an increased risk of cancer, there is no evidence that high selenium intake prevents cancer; on the contrary, high doses of selenium have been reported to have toxic effects (Gropper et al., 2018:523).

Selenium, which is high in terebinth, seems likely to act as an anti-cancer. Anemia, fatigue, impaired work performance, decreased resistance to infection occur with the deficient intake of iron, which is the other mineral substance relatively high in terebinth. Food sources of iron can be counted as organ meats (liver), meat, molasses, clams, oysters, nuts, legumes, green leafy vegetables, dried fruits, enriched/whole grains (Gropper et al., 2018:481). The absorption of iron, which is frequently deficient due to digestion/absorption difficulty, and so terebinth fruit in the diet seems worth investigating. Linoleic acid, which makes up about half of the terebinth oil, is an essential substance because it cannot be synthesized in the human body, and it must be taken regularly from outside for a normal metabolism at all ages (Gropper et al., 2018, pp. 128, 160). When evaluated from this point of view, it is thought that terebinth fruit can be easily consumed as a snack and herbal coffee at all times to get linoleic acid.

Table 8. Rates of Providing The Recommended Daily Intake of Terebinth (Adapted from Gropper et al., 20 A. B).						
-	Nutrient	Ouantity	Explanation	Rate of providing		

Nuthent	Quantity	Explanation	Rate of providing
			(%)
			(100g terebinth)
Protein	56 / 46	RDA* (g/day, 31-50 years, male/female)	17,27 / 21,02
Linoleic acid	17 / 12	AI* (g/day, male/female, 31-50 years)	44,71 / 63,33
Sodium	1500	AI (mg/day)	6,04
Potassium	4700	AI (mg/day)	2,90
Calcium	1000	RDA (mg/day)	9,24
Phosphorus	700	RDA (mg/day)	11,46
Iron	8 / 18	RDA (mg/day, male/female, 31-50 years)	52,25 / 23,22
Magnesium	420 / 320	RDA (mg/day, male/female, 31-50 years)	7,58 / 9,95
Zinc	11/8	RDA (mg/day, male/female, 31-50 years)	2,82 / 3,88
Copper	0,90	RDA (mg/day)	14,44
Selenium	0,055	RDA (mg/day)	1127

6. Conclusion

Since the first civilizations lived in the world and Anatolia, people have used cereal grains and tree/plant fruits or seeds for nutrition. Today, it is understood that fruits/seeds rich in composition such as terebinth is an advantage in terms of human nutrition. The positive effect of high protein in terms of health and the high amount of fat; energy, and long-term feeling of full support this. Terebinth has a very rich content with regard to selenium and iron minerals, which is thought to have an anti-cancer effect, and it is thought that more detailed research is required to benefit from terebinth. Other nutrients in the composition of terebinth also have a protective effect on many diseases. In this study, it is seen that terebinth is used in the dishes in a few of food groups in Turkish Cuisine, and terebinth pilaf, paste and coffee are still widely consumed. Terebinth helva has also been found a very unique dessert. Spreading the use of this extremely valuable plant fruit without letting the terebinth dishes to be forgotten, perhaps with the introduction of new types of terebinth meal, will benefit people in terms of nutrition and health. Instead of coffee and tea, whose excessive consumption has a negative effect on human health, it should be consumed as an alternative beverage. Terebinth should be investigated in more detail in terms of gastronomy, food science and nutrition. Although many studies have been conducted on terebinth, there is no study on the content of vitamins except vitamin E (tocopherol). In addition, it is thought that the absorption conditions of the iron contained in terebinth should be investigated and more benefit should be made from it. Also, the terebinth dishes such as helva-halva, coffee, börek-pastry, sarma-rolling, pilav-pilaff, kömbe-a kind of bread or borek, resin gum, syrup, and katık/ezme-paste are used as an gastronomic element. Terebinh dishes should definitely be featured in food festivals, cooking competitions or traditional food promotions.

6. Acknowledgements

Author would like to thank Tuba Badem and Yasemin Altunay for their contributions in meal making.

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