

Original Article

Doi: 10.4274/tjps.galenos.2019.24392

Ethnobotanical study of medicinal plants in the Aziziye district (Erzurum, Turkey) Aziziye (Erzurum-Türkiye) ilçesindeki tıbbi bitkilerin etnobotanik çalışması

Short title: An ethnobotanical study of Aziziye

Kısa başlık: Aziziye'nin etnobotanik çalışması

Songül KARAKAYA¹, Ahmet Polat², Özkan Aksakal², Yusuf Ziya Sümbüllü³, Ümit İncekara²

¹Ataturk University, Faculty of Pharmacy, Department of Pharmacognosy, Erzurum, Turkey

²Department of Biology, Faculty of Science, Atatürk University, Erzurum

³Department of Folklore, Faculty of Literature, Erzurum Technique University, Erzurum 25050, Turkey

ABSTRACT

Objectives: The present research was conducted to document the usage of medicinal plants, plant parts utilized, and methods of preparation by the people living Aziziye district, situated in the West part of Erzurum.

Materials and Methods: The medicinal plant species utilized by local people for remedial aims were collected and identified. The related knowledge about conventional herbal medicine was collected; herbarium materials were prepared; and they have been stored in the Herbarium of Faculty of Science, Atatürk University. The knowledge was acquired via semi-structured and unstructured interviews.

Results: A total of 77 medical plants pertaining to 30 families were defined in this research. Amongst these, 62 species grew natural distribution and 15 species were cultivated. The most widespread medicinal plant families were Asteraceae (14), Rosaceae (7), Lamiaceae (5) and Apiaceae (5). The most widespread preparations was decoction.

Conclusion: The ethnobotanical outcomes documented in this study provides practical evidence about the use of medicinal plants among the inhabitants of the Aziziye county. Furthermore, the results revealed that the medicinal plants of the region are a major resource of herbal drugs for primary health care utilized among the rural communities. This survey can be utilized as baseline knowledge for further scientific research to improve new plant-based commercial drugs. There is a gradual loss of traditional information as regards usage of medicinal herbs in younger generations.

Key words: Aziziye, Ethnobotany, Erzurum, medicinal plants, Turkey

ÖZ

Amaç: Sunulan bu araştırma, Erzurum'un batı kesiminde yer alan Aziziye ilçesinde yaşayan insanların kullandıkları şifalı bitkilerin kullanımı, kullanılan bitki kısımları, ve hazırlama yöntemlerini belgelemek amacıyla yapılmıştır.

Gereç ve Yöntemler: Yerel halkın terapötik amaçlar için kullandığı şifalı bitkiler toplanıp, teşhis edildi. Geleneksel bitkisel ilaçlarla ilgili bilgiler toplandı; Herbarium materyalleri hazırlandı; Atatürk Üniversitesi Fen Fakültesi Herbariumu'na konuldu. Bilgiler, açık ve yarı yapılandırılmış görüşme ve anketler yoluyla elde edildi.

Bulgular: Araştırmada 30 familyaya ait toplam 77 tıbbi bitki tanımlanmıştır. Bu türlerin 62'si doğal olarak yetişmekte ve 15 türün de ekimi yapılmaktadır. En yaygın tıbbi bitkiler Asteraceae (14), Rosaceae (7), Lamiaceae (5) ve Apiaceae (5) familyalarına aittir. En yaygın hazırlama şekli dekoksiyondur.

Sonuç: Bu çalışmada elde edilen etnobotanik sonuçlar, şifalı bitkilerin Aziziye ilçesi sakinleri arasında kullanımı hakkında pratik veriler sunmaktadır. Dahası, bu sonuçlar kırsal topluluklar arasında kullanılan bölgenin şifalı bitkilerin, birinci basamak sağlık hizmetleri için önemli bitkisel ilaç kaynağı olduğunu ortaya koymaktadır. Bu araştırma, yeni bitki bazlı ticari ilaçların iyileştirilmesinde daha fazla bilimsel araştırma için temel bilgi kaynağı olarak kullanılabilir. Genç nesillerde şifalı bitkilerin geleneksel kullanımı ile ilgili bilgi kaybı yaşanmaktadır.

Anahtar kelimeler: Aziziye, Etnobotanik, Erzurum, tıbbi bitkiler, Türkiye

INTRODUCTION

The herbs have been invariable resources of both protective and therapeutic traditional medicine preparations for people since ancient times. ¹ The World Health Organization (WHO), forecasted that about 60% of world's inhabitants in growing countries trust herbs for the curation of a variety of illnesses, owing to lack of modern healthcare sources. ²

Turkey's flora is so rich comprising about 11,000 species 33% of which are endemic and Turkish people have utilised these herbs for diversified aims. Along with its rich flora, wide diversity of habitats are also in Turkey.^{3,4} The flora of Turkey is rich owing to it has different ecological zones, geographical variations and diversified climates. This variedness in flora has contributed a rich resource of medicinal herbs, which has long been utilised by Anatolian folks, and thereupon there have been the accumulation of worthy medicinal folk data in the district.⁵

In Turkey ethnobotanical researches have been actualised on since the Republican period began in 1923 and their effects and names have been documented, in particular these researches have increased in recent years.^[5] The flora of East Anatolia of Turkey is rich owing to it has different ecological zones, geographical variations and diversified climates. This diversity in flora has contributed a rich resource of medicinal herbs, which has long been utilized by Anatolian folks, and hence there have been the accumulation of worthy medicinal folk information in the district.⁴

Erzurum is a medium-size town in the eastern of Turkey. The province is located in the upper basin of Karasu, the resource of the Euphrates River, around the edge of the Eregli Mountain of the Palandoken Mountain series in the south-east of Erzurum plain, and situated on a curved plateau of 1850 to 1980 metres above sea level. The province of Erzurum is a local centre in whose zone of effect there are the all of the provinces of Erzurum, Kars, Iğdır, Ardahan, and Agri; except Refahiye, Ilic, and Kemaliye managerial districts, the all Erzincan province; Bayburt and Yusufeli managerial district; Varto, Bulanik, and Malazgirt managerial districts of Mus province; Karliova managerial district of Bingol province; and Pulumur district of Tunceli province.⁶

The purpose of the research was to introduce information about the utilization of conventional herbal medicine and other utilization of the plants in these districts and was conducted to document the usage of medicinal plants, plant parts utilized, and methods of preparation by the people living Aziziye, situated in the West part of Erzurum.

MATERIALS AND METHODS

Investigation region

The largest geographical area of Turkey is Eastern Anatolia area and it is far away from the effect of sea owing to the surrounded by coastal mountain ranges.⁷ Erzurum is established in the Upper Euphrates Section of Eastern Anatolian region. It is the largest city of Eastern Anatolia area with a population of 780.847 and an area of 25.066 km², and it is the old settling. It lies between 40° 15' and 42° 35' eastern longitudes and 40° 57' and 39° 10' northern latitudes (Fig. 1). Erzurum is neighbour to Rize, Artvin, and Ardahan in north, Kars and Ağrı in east, Bingöl and Muş in south, Erzincan and Bayburt in west. Mean Daily temperature is 19.6 in summer and - 8.6 °C in winter. Annual rainfall is 453 mm and the count of days on that it snows is 50 days. The duration of snow cover is 114 days long.⁸

Data collection

Field search was actualised through collecting ethnobotanical knowledge along structured and semi-structured interviews withal informed people native to 5 villages namely Söğütlü (1), Çıkrıklı (2), Sorkunlu (3), Kapılı (4) and Beypmarı (5). This study is a Project of The Ministry of Forestry so, they decided to study these villages. Midwives, shepherds, woodsmen, farmers, healers, beekeepers, housewives, teachers, mukhtar, and people collecting plants, namely a total of 98 people were interviewed at face to face. 56 of the informants were women (57.14%), while the residuary 42 were men. For each recorded plant one questionnaire was filled throughout the conversations and besides; videos, photos and records were taken from these people with their permit. Interviews were actualised at diversified places (tea houses, farms, mosques, houses, gardens, and fields etc.). Conversant adults, patients and local healers were the resources of knowledge and data (local names, therapeutic effects, part(s) of plants utilized, methods of preparation and administration).

Plant materials

The plants were collected at 2017 and 2018 from the villages. The collected herbs were pressed and described by the author Özkan Aksakal using The Flora of Turkey and East Aegean Islands and Türkiye Bitkiler Listesi (Damarlı Bitkiler).⁹⁻¹¹ The plant families names were managed in alphabetical order. Scientific names of herb species were done with reference to the plant list.¹² Voucher specimens were stored at the Herbarium of the Faculty of Science, Atatürk University (ATA).

RESULTS

The demographic characteristics of the research participants were recorded throughout the face-to-face interviews. A total of 98 participants (56 female, 42 male) were interviewed. 9 person in 27-36 years range and 18 person aged between 37 and 46, 26 person aged between 47 and 56, 23 person aged between 57 and 66, and 22 person aged over 66. Whole of the informants were native and they were living in the villages. 43 of the participants had never received education (Table 1).

A total of 77 medicinal plant taxa were collected in the Aziziye (Erzurum-Turkey) region and they pertain to 30 plant families. Amongst them, 62 species are wild and 15 species are cultivated plants. The 77 herbs defined in the area prepared in alphabetical order of their family and botanical names are presented in Table 2. *Anthemis calcarea*, *Scorzonera tomentosa*, *Tragopogon aureus*, *Cephalaria anatolica*, and *Quercus macranthera* are endemic species with therapeutic and other utilizations (Table 2 and 3). The most widespread medicinal plant families were Asteraceae (14), Rosaceae (7), Lamiaceae (5) and Apiaceae (5).

The most widely utilized plant organs to prepare the remedies were aerial parts (27), leaves (16), fruits (13), flowers (12), roots (11), seeds (9) and barks (6), though branches, bulbs, stems, and tubers were also utilised in some of remedies. On occasion, local people also utilised other components, such as butter, lemon, soap, olive oil, beeswax, egg or honey to prepare the remedies.

The major methods for preparing remedies were decoction, infusion, fresh, chewing, boiling, crushing and cooking. Decoction (34), crushing (28), infusion (6) and cooking (6) are the methods generally utilised for the preparation of the remedies (Table 2).

DISCUSSION

Plant sources have a long history of being utilized as medicinal necessities. It is frequently mentioned that 80% of the world's population still relies on conventional medicines to meet their primary health care wants and almost 25% of modern medicines are derived from nature, many of which were derived from traditional utilizations. The utilization of traditional medicines is usually affected by accessibility, availability and admissibility of health care services. Specially, in distant regions of developing countries, medicinal plants may form the only existing resource of health care.

It was sighted that some medicinal plant taxa were widely utilised for commercial aims owing to the research conducted in study regions. A large part of the villages of area people mentioned that *Cephalaria* spp. have been utilized for hemostatic and wound healing. Moreover, *Alkanna orientalis*, *Plantago* spp. and *Malva* spp. have been utilized for wounds as antiinflammatory.

As a result of the study of the plant names, it was determined that most of the plant names were found to be derived from Turkish. Gümüşhane, Erzincan, Kars, Bingöl, Muş and Ağrı are close to our field of search. However, names of some local plants utilised in these areas are several such as *Plantago major* (pel hewes, omulwaş, sinirli ot, sinirotu), *Malva neglecta* (dolik, tollik), *Rosa canina* (gül tonik, şilan), *Urtica dioica* (gezgezok, gerzinik), *Gundelia tournefortii* (kinger, kereng), *Eremurus spectabilis* (yelğ, gulık), *Alkanna orientalis* (gelzun, havajo) and *Rheum ribes* (ribes, rıwes, rewas).¹³⁻¹⁸

Informants utilised medical plants most mainly for the curation of wounds and skin illnesses, digestive system diseases, respiratory diseases, kidney and urinary system disorders and diabetes mellitus. It has been determined that the number of plants used in cardiovascular problems is the least.

The species *Plantago* spp, *Malva neglecta*, *Rheum ribes* and *Rumex crispus* were detected the most widely utilised medicinal plants and were recorded at the literatures in Erzurum. With respect to these literatures, *Prangos ferulacea* (diabetes), *Achillea biebersteinii* (wounds), *A. millefolium* (wounds), *Anthemis* spp. (stomachache), *Cichorium intybus* (wounds), *Alkanna* spp. (wounds), *Cephalaria* spp. (wounds), *Malva* spp. (wounds), *Rheum ribes* (diabetes), *Ranunculus* spp. (rheumatism), and *Rosa pimpinellifolia* (hemorrhoids) have similar uses.¹¹⁻¹⁴

The usages of members of Acanthaceae, Amaryllidaceae, Aristolochiaceae, Capparaceae, Caryophyllaceae, Cistaceae, Corylaceae, Crassulaceae, Cuscutaceae, Ephedraceae, Ericaceae, Gentianaceae, Geraniaceae, Illecebraceae, Loranthaceae, Onagraceae, Orchidaceae, Paeoniaceae, Papaveraceae, Plumbaginaceae, Polygalaceae, Portulacaceae, Primulaceae, Resedaceae, Thymelaeaceae, Tiliaceae, Typhaceae, Valerianaceae, Violaceae families were found out in other studies but were not recorded in the nearby areas.

The informants stated that, *Ranunculus* spp. should be utilised with care owing to their serious side effects such as oedema, irritation and redness so these species must not be hold on the skin more than 1-2 minutes.

Besides, during this search we detected that some medicinal plants are utilised as spices and it is more prevalent in rural areas. *Mentha longifolia*, *Mentha aquatica*, *Origanum rotundifolium*, and *Micromeria fruticosa* are consumed as spices. Specially members of Lamiaceae family are utilized as spices. In the area, some of the wild edible plants such as *Anthemis cretica*, *Anthemis calcarea*, *Mentha longifolia*, *Mentha aquatica*, *Salvia verticillata* subsp. *amasiaca*, *Origanum rotundifolium*, *Micromeria fruticosa*, *Rosa canina*, *Rosa pimpinellifolia*, *Crataegus pontica*, and *Crataegus orientalis* are utilized as herbal tea.

CONCLUSION

With the rapid improvement, of mobile communication tools, deforestation through anthropogenic activities, and immigration of the younger generations to urban areas leaving a gap in the cultural faiths and practices of indigenous society ethnic values cause diminishment from day to day. Furthermore, young generations are not interested in folkloric values included, traditional medicines. Additionally, the improvement in the health system and reach the doctors easily reduced the utilizations of medicinal herbs. These causes induce the risk of losing rewarding ethnomedicinal data. Hereby, actualising ethnobotanical searches is becoming more substantial by virtue of gathering ancient knowledge from people is so difficult.

Funding

This work was supported by Ministry of Forestry and Water Work Natural Protection and General Directorate of National Parks.

Conflicts of interest statement

The authors report no declarations of interest.

REFERENCES

1. Giday K, Lenaerts L, Gebrehiwot K, Yirga G, Verbist B, Muys B. Ethnobotanical study of medicinal plants from degraded dry afro-montane forest in northern Ethiopia: Species, uses and conservation challenges. *J. Herb. Med* 2016; 6: 96-104.
1. WHO. Monographs on Medicinal Plants Commonly Used in the Newly Independent States (NIS); 2010.
2. Özhatay N. Important plant areas along the BTC pipeline in Turkey. İstanbul: BTC Company; 2006.
3. Ozhatay N, Kocyigit M, Bona M. İstanbul'un ballı bitkileri. İstanbul: BAL-DER; 2012.
4. Polat R, Çakılcıoğlu U, Ertuğ F, Saul F. An evaluation of ethnobotanical studies in Eastern Anatolia. *Biodivers Conserv* 2012; 5(2): 23-40.
5. Tabata M, Sezik E, Honda G, Yeşilada E, Goto K, Ikeshiro Y. Traditional medicine in Turkey III: folk medicine in East Anatolia; Van and Bitlis provinces. *J. Pharmacogn* 1994; 32: 3-12.
6. Aliagaoglu A, Ugur A. Hotels as a Model of Regional Life: The Erzurum Sample. *European Planning Studies* 2008; 16(10): 1405-1422.
7. Tortum A, Bolakar H, Çodur MY, Kabakuş N. The Analysis of Traffic Accidents in Erzurum Province and Its Districts Through Use of Geographical Information Systems. *Journal of Traffic and Logistics Engineering* 2015; 3 (2): 115-119.
8. Atabeyoğlu Ö, Turgut H, Yeşil P, Yılmaz H. Transformation of a historical city: Erzurum city. *J. ITU / arc, plan, des* 2009; 8(1): 41-53.
9. Davis PH. *Flora of Turkey and the East Aegean Islands* vol.1-9, Edinburgh; University Press; 1972.
10. Davis PH. *Flora of Turkey and the East Aegean Islands*. vol.10, Edinburgh; Edinburgh University Press; 1988.
11. Güner A. *Türkiye Bitkileri Listesi (Damarlı Bitkiler)*. İstanbul, Turkey. İstanbul: Nezahat Gökyiğit Botanic Garden Publications; 2012.
12. <http://www.theplantlist.org> (The Plant List, Accessed 29.07.17).
13. Sezik E, Yeşilada E, Tabata M, Honda G, Takaishi Y, Fujita T, Tanaka T, Takeda Y. Traditional medicine in Turkey VIII. Folk medicine in east anatolia; Erzurum, Erzincan, Ağrı, Kars, Iğdir provinces. *Econ. Bot.* 1997; 51 (3): 195-211.
14. Polat R, Çakılcıoğlu U. Ethnobotanical study on medicinal plants in Bingöl (City center) (Turkey). *Journal of Herbal Medicine*, in press. 2018.
15. Korkmaz M, Karakurt E. Medicinal Plants Sold in the Herbal Markets in Kelkit (Gümüşhane). *SDU J Nat Appl Sci.* 2014; 18(3): 60-80.
16. Korkmaz M, Karakuş S, Özçelik H, Selvi S. An ethnobotanical study on medicinal plants in Erzincan, Turkey *Indian J. Tradit. Knowl.* 2016; 15(2): 192-202.

17. Macit MG, Köse YB. Medicinal plants used for folk medicine in Oltu (Erzurum/Turkey)", *Biological Diversity and Conservation* 2015; 8(2): 74-80.
18. Özgen U, Kaya Y, Houghton P. Folk Medicines in the Villages of Ilıca District (Erzurum, Turkey). *Turkish Journal of Biology*. 2012; 36: 93-106.

Uncorrected proof

Table 1. Demographic characteristics of the participants.

Demographic characteristics	Number
-----------------------------	--------

Age	
27-36	9
37-46	18
47-56	26
57-66	23
66 and above	22
Sex	
Female	56
Male	42
Educational level	
Illiterate	43
Primary school	38
Secondary school	12
High school	4
University	1
Employment status	
Housewife	56
Farmer	35
Pensioned	4
Shepherd	1
Other jobs	2
Total	98

Table 2. Traditional uses of medicinal plants in Aziziye (West of Erzurum-Turkey).

No	Family	Plant species, voucher	Local name	Plant part	Preparation ^b	Adm. ^c	Use
----	--------	---------------------------	---------------	------------	--------------------------	-------------------	-----

		specimen, endemism and location		(s) used ^a			
1.	Amaryllida ceae	<i>Asphodelus aestivus</i> Brot., ATA 10097, 2	Çiriş, ciriş	Aer	Raw	Eat	digestive, constipation
2.	Amaryllida ceae	<i>Eremurus spectabilis</i> M.Bieb., ATA 10098, 3	Çiriş, ciriş	Aer	Raw	Eat	digestive
3.	Amaryllida ceae	* <i>Allium cepa</i> L., ATA 10100, 1-5	Soğan	Bul	Coo	Ext	antiinflammatory, scar, wounds
					Raw	Eat	galactagogue
					Boi	Ext	toothache, gingivitis
					Cru	Ext	ecchymosis
4.	Amaryllida ceae	* <i>Allium sativum</i> L., ATA 10101, 1-5	Sarımsak	Bul	Cru mix with honey	Int	cardiac disorders, antihypertensive, antiinflammatory
5.	Apiaceae	<i>Eryngium campestre</i> L., ATA 10019, 1,2	Boğa dikenı	Roo	Cru with onion and add green soap, milk	Ext Ps	antiinflammatory, furuncle
6.	Apiaceae	<i>Prangos ferulacea</i> (L.) Lindl., ATA 10021, 1,3	Çaşır, çağşır, çakşır	Roo	Dec	Int	diabetes
7.	Apiaceae	<i>Anthriscus nemorosa</i> (M.Bieb.) Spreng., ATA 10023, 2	Hırhındık, hrhındok	Aer	Dec	Ext	carminative
8.	Apiaceae	<i>Ferula orientalis</i> L., ATA 10025,1-5	At çaşırı, çağşır, çakşır	Roo	Dec	Int	diabetes
9.	Apiaceae	<i>Zosima absinthifolia</i> Link, ATA 10026, 3	Peynir otu	Aer with Flo	Inf	Int	hemorrhoid
10.	Asteraceae	<i>Achillea millefolium</i> var	Civanperçe mi, kılıç	Lea	Cru	Ext	wounds, hemostatic

		<i>millefolium</i> L., ATA 10028, 1-5	otu, sarı çiçek	Flo	Dec	Int	menstruel pain, menstrual irregularity
					Cru and mix with honey	Eat	antitussive
11.	Asteraceae	<i>Cichorium intybus</i> L., ATA 10030, 2,4	Çatlangoz çatlangos,ç atlankuš, çatlankuz, çatlangaz	Aer with flo	Ps, burnt and mix with butter	Ext	wounds
				Flo	Burnt butter	Ext	wounds, scar
				Roo	Burnt and mix with butter	Ext	eczema
12.	Asteraceae	<i>Achillea biebersteinii</i> Hub.-Mor., ATA 10031, 1-5	Kılıç otu, sarı civan perçemi, kırk kilit	Lea Aer	Cru Boi Ps	Ext Ext	wounds, hemostatic hemostatic, eczema
13.	Asteraceae	<i>Anthemis cretica</i> L., ATA 10032, 3	Papatya	Aer with flo	Dec	Int	sore throat, expectorant, antiinflammatory
14.	Asteraceae	** <i>Anthemis calcarea</i> Sosn., ATA 10034, 4	Papatya	Flo	Inf Dec	Int Int	stomachache sore throat, expectorant, antiinflammatory
15.	Asteraceae	<i>Helichrysum plicatum</i> DC., ATA 10035, 1-5	Altın otu, sarı çiçek	Flo	Inf	Int	kidney stone, diuretic
16.	Asteraceae	<i>Gundelia tournefortii</i> L., ATA 10039, 1-5	Kenger, kelenk	Roo	Raw	Ext chewin g gum	stomach disorders, against nausea
17.	Asteraceae	<i>Scorzonera latifolia</i> (Fisch. & C.A.Mey.) DC., ATA 10040 , 1-5	Yakıotu, sakız	Lea	Raw	Ext juice of roots used as gum	plaster, against nausea
18.	Asteraceae	** <i>Scorzonera tomentosa</i> L., ATA 10041, 1-5	Yakıotu, sakız	Roo	Raw	Eat	hemostatic
19.	Asteraceae	<i>Tragopogon reticulatus</i> Boiss. et Huet, ATA 10042, 1-5	Yemlik	Aer	Cru	Ext	plaster, wounds, hemostatic
20.	Asteraceae	<i>Tragopogon buphthalmoides</i>	Yemlik	Aer	Cru	Ext	plaster, wounds,

		(DC.) Boiss., ATA 10044, 1-5					hemostatic
21.	Asteraceae	** <i>Tragopogon aureus</i> Boiss., ATA 10045, 4	Yemlik	Aer	Cru	Ext	plaster, wounds, hemostatic
22.	Asteraceae	<i>Artemisia absinthium</i> L., ATA 10047, 4,5	Acı yavşan otu	Aer with flo	Raw	Ext Chewing	stomachache
23.	Asteraceae	<i>Artemisia campestris</i> L., ATA 10049, 5	Yavşan	Aer	Cru	Ext Chewing	stomachache
24.	Asteraceae	<i>Artemisia santonicum</i> L., ATA 10050,5	Yavşan, süpürge otu	Aer with Fru	Cru	Int only juice	stomachache
25.	Amaranthaceae	<i>Beta lomatogona</i> Fisch. & C.A.Mey., ATA 10061, 1,4	Kızılca	Aer	Dec	Int	shortness of breath
26.	Amaranthaceae	<i>Beta trigyna</i> Waldst. & Kit., ATA 10062, 4	Kızılca	Aer	Dec	Int	constipation, digestive
27.	Berberidaceae	<i>Berberis crataegina</i> DC., ATA 10051, 3,4	Kızambuk, karambuk	Roo	Boi	Ext Bathing with yellow juice	jaundice children
28.	Betulaceae	<i>Betula alba</i> L., ATA 10002, 3,5	Huş ağacı, kayın	Bar	Dec	Ext, Gar	throat ache, antiseptic
29.	Boraginaceae	<i>Alkanna orientalis</i> (L.) Boiss., ATA 10054, 1-5	Havaciva, havajo, hevajo	Roo	Cru Cru Cru	Ext Ext	wounds, ambustion, scar, antiinflammatory wounds, ambustion, scar, antiinflammatory, ulcer

					Dec	Ext	wounds, scar, antiinflammatory
					Boi and add butter	Int before breakfast	asthma, bronchitis, shortness of breath, ulcer
30.	Brassicaceae	* <i>Brassica napus</i> L., ATA 10058, 3,4	Şalgam	Roo	Raw, mix with egg and lemon	Int	kidney stone, flu
31.	Caprifoliaceae	<i>Cephalaria tchihatchewii</i> Boiss., ATA 10072, 1-5	Gevreik, gevreyik, gevrek	Aer	Raw Cru	Ext	hemostatic, wounds, scar
32.	Caprifoliaceae	** <i>Cephalaria anatolica</i> Shkhiyan, ATA 10073, 1-5	Gevreik, gevreyik, gevrek	Aer	Raw Cru	Ext	hemostatic, wounds
33.	Cornaceae	* <i>Cornus mas</i> L., ATA 10066, 2	Kızılıçık	Fru	Dec	Int, Eat	diarrhea
34.	Cucurbitaceae	* <i>Cucurbita pepo</i> L., ATA 10067, 1-5	Kabak	See	Raw Cru mix with honey	Eat Eat 1 tablespoon before breakfast	diarrhea antihelmentic
35.	Cucurbitaceae	* <i>Cucumis sativus</i> L., ATA 10070, 1-5	Salatalık	Per	Raw	Ext	headache
36.	Cupressaceae	<i>Juniperus communis</i> L., ATA 10071, 1-5	Ardıç	Ste, Bar	Tar	Ext	skin disorders, eczema, wounds
37.	Elaeagnaceae	<i>Hippophae rhamnoides</i> L., ATA 10075, 3	Ekşi, yabani ığde	Lea	Inf	Int	diabetes
				Fru	Dec	Int	diabetes
38.	Elaeagnaceae	<i>Elaeagnus angustifolia</i> L., ATA 10076, 4	İğde	Lea	Dec	Int	diabetes
39.	Euphorbiaceae	<i>Euphorbia stricta</i> ATA 10078, 1,2	Sütlücan	Lat	Ps	Ext	antihemorrhagic

40.	Euphorbia ceae	<i>Euphorbia oblongifolia</i> (K.Koch) K.Koch, ATA 10079, 3	Sütlücan, sütleğen	Lat	Ps	Ext	antihaemorrhagic
41.	Fabaceae	* <i>Lens culinaris</i> Medik. ATA 10081, 1-5	Yeşil mercimek	See	Coo	Int before breakfa st	antihelmentic
42.	Fabaceae	* <i>Lathyrus sativus</i> L., ATA 10107, 3	Küşne	See	Boi with salt and sugar	Eat for 10 days before breakfa st	antihelmentic
43.	Fabaceae	<i>Astragalus microcephalus</i> Willd., ATA 10082, 1-5	Geven	Roo	Gum	Ext	hand cracks, emolient
44.	Fagaceae	** <i>Quercus macranthera</i> Fisch. & C.A.Mey. ex Hohen., ATA 10085, 3	Palut, pelit	Ped	Burnt and mix with butter	Ext	wounds, oedema
45.	Lamiaceae	<i>Mentha longifolia</i> (L.) L., ATA 10088, 3,4	Yarpuz	Aer	Dec	Ext Ps	headache
46.	Lamiaceae	<i>Mentha aquatica</i> L., ATA 10089, 2,3	Su nanesi	Lea	Dec	Int	sore throat, against nausea
47.	Lamiaceae	<i>Salvia verticillata</i> subsp. <i>amasiaca</i> (Freyn & Bornm.) Bornm., ATA 10090, 5	Adaçayı	Aer	Dec	Ext Gar	toothache
48.	Lamiaceae	<i>Origanum rotundifolium</i> Boiss., ATA 10095, 3	Dağ kekiği, anık	Aer	Inf	Int	cough, sedative, stomachache
49.	Lamiaceae	<i>Micromeria fruticosa</i> (L.) Druce, ATA 10096, 2	Çemen, dağ kekiği	Aer	Dec	Int	cough, stomachache
50.	Linaceae	* <i>Linum usitatissimum</i> L. ATA 10103, 4	Zegerek	See	Coo	Ext	wounds, scar
51.	Juglandace ae	* <i>Juglans regia</i> L., ATA 10105, 3	Ceviz	Bar, Per	Dec	Int	diarrhea, hair loss

52.	Malvaceae	<i>Malva neglecta</i> Wallr., ATA 10106, 1-5	Ebengüme ci, ebekömeçi, ebegümeçi	Aer with flo	Boi	Int	expectorant, bronchitis, asthma, throatache
				Lea	Boi	Ext use pulp	wound healing, anti-inflammatory, stomachache, prostate
				Aer	Raw Cru	Ext	rheumatism
					Dec	Int	cold, expectorant, bronchitis, asthma, urinary system disorders
						before breakfast	
						Gar	throat ache
				Lea	Dec with leaf of <i>Plantago major</i>	Int	antiinflammatory, oedema
					Coo with flour	Ext	oedema
53.	Malvaceae	<i>Malva sylvestris</i> L., ATA 10107, 1-5	Ebengüme ci, ebekömeçi, ebegümeçi	Aer with flo	Dec	Inh	cold, expectorant, bronchitis, asthma, mouth sore
				Lea	Dec	Ext	wounds, scar, antiinflammatory, oedema
54.	Moraceae	* <i>Morus alba</i> L., ATA 10111, 1-5	Dut	Dried Fru	Dec	Int	throatache, expectorant, stomachache
55.	Moraceae	* <i>Morus nigra</i> L., ATA 10112, 3	Kara Dut	Fru	Cru	Ext	eczema
56.	Pinaceae	<i>Pinus sylvestris</i> L., ATA 10116, 1-5	Çam, sarı çam	Bra, Ste	Res	Ext	hand cracks, emolient, skin disorders
					Dry distillation Tar Boi with butter	Ext Ps	ecchymosis, tubercle, crack, wounds, emolient
					Dry distillation Tar	Ext	eczema, skin disorders, wounds
57.	Poaceae	* <i>Triticum vulgare</i> Vill., ATA 10117, 1-5	Den, buğday	See	Cru	Ext	fracture, tubercle, panaris
					mix with egg white		
58.	Poaceae	* <i>Hordeum vulgare</i> L.,	Arpa	Tes	Cru mix with olive oil	Ext	wounds, hand cracks, emolient

		ATA 10120, 1-5		See	Dec	Int	kidney stone, urinary system diseases, diuretic, prostate ailments
59.	Polygonaceae	<i>Rumex crispus</i> L., ATA 10121, 1-5	Evelik	Lea	Boi	Ext Use pulp	throat ache, stomachache
					Dec	Int	kidney stone, urinary system diseases, diuretic, hemorrhoid, constipation
60.	Polygonaceae	<i>Rheum ribes</i> L., ATA 10123, 1-5	Eşgin, ışgın	Roo	Dec	Int	diabetes
				See	Cru mix honey	Int	hemorrhoids, constipation
61.	Plantaginaceae	<i>Plantago major</i> L., ATA 10125, 1-5	Bağa yaprağı, bağa otu	Lea	Raw	Ext	mastitis, mammalgia, slipped disc, furoncle, wounds
					Dec	Ext	throat ache, urinary system diseases, wounds, hemostatic
62.	Plantaginaceae	<i>Plantago lanceolata</i> L., ATA 10126, 1-5	Bağa yaprağı, bağa otu, pelheves	Lea	Raw	Ext	mastitis, mammalgia, slipped disc, furoncle, wounds, oedema
					Dec	Int	hemorrhoid
63.	Ranunculaceae	<i>Ranunculus kotschy</i> Boiss., ATA 10128, 1-5	Katır turnağı, mayıs çiçeği, düğün çiçeği	Flo or Lea	Cru	Ext	rheumatism
					Cru	Applied only 2-3 minutes	
				Aer with flo	Cru mix with honey	Ext	rheumatism
						Applied on knees for 1-2 minutes	
64.	Rosaceae	<i>Rosa canina</i> L., ATA 10131, 1-5	Kuşburnu	Fru	Dec	Int	diuretic, urinary system diseases, cold, flu
65.	Rosaceae	<i>Cotoneaster integerrimus</i> Medik., ATA	Gırgıt, gıvgıt	Fru	Dec	Int	antidiarrheal

10134, 5

66.	Rosaceae	<i>Rosa pimpinellifolia</i> Bunge, ATA 10133, 1-5	Karakara, koyun gözü	Fru	Dec	Int	hemorrhoids
67.	Rosaceae	<i>Malus sylvestris</i> (L.) Mill., ATA 10137, 1-5	Ekşi elma, yabani elma	Fru	Dec	Int Before breakfa st	diabetes
68.	Rosaceae	<i>Crataegus azarolus</i> var. <i>pontica</i> (K.Koch) K.I.Chr., ATA 10140, 3	Alıç, aluç	Fru	Raw, mix with lemon and honey	Ext Coo, wrapped in a cloth	earache cardiac diseases, hypertension
69.	Rosaceae	<i>Crataegus orientalis</i> Pall. ex M.Bieb., ATA 10141, 2	Alıç, aluç	Fru	Raw	Int	cardiac diseases, hypertension
70.	Rosaceae	<i>Pyrus elaeagnifolia</i> Pall., ATA 10144, 1-5	Yabani armut, ahlat	Fru	Raw	Int Eat	diarrhea
71.	Salicaceae	<i>Populus nigra</i> L., ATA 10146, 1-5	Kara kavak	Bar	Cru mix with egg and soap	Ext	fracture, dislocation, wounds
72.	Salicaceae	<i>Populus alba</i> L., ATA 10147, 1-5	Ak kavak	Bar	Cru, mix with white and soap	Ext	fracture, dislocation, wounds
73.	Salicaceae	<i>Salix alba</i> subsp. <i>alba</i> L., ATA 10148, 1-5	Söğüt	Bar	Dri and Cru	Ext	antiinflammatory, wounds
74.	Scrophulariaceae	<i>Verbascum oreophilum</i> C. Koch, ATA 10151, 1	Sığır kuyruğu, gırç	Lea	Cru	Ext	antipyretic, heat prostration
75.	Solanaceae	* <i>Solanum tuberosum</i> L., ATA 10153, 1-5	Kartol	Tub	Raw, Cut into small pieces, add salt then applied the head and foot	Ext	headache
76.	Solanaceae	<i>Hyoscyamus niger</i> L., ATA 10154, 1-5	Batbat, patpat, deli batbat	See	Hea	Inh into mouth	toothache
77.	Urticaceae	<i>Urtica dioica</i> subsp. <i>dioica</i> .L.,	Isırgan	Aer	Dec	Int	diuretic, urinary system diseases, shortness of

See	Raw, mix with honey	Int	arthritis, asthma
		Before breakfa st	

* Cultivated plants.

** Endemic plants.

^a Plant part(s) used: Aer: Aerial parts; Bar: Bark; Bra: Branches; Bul: Bulb; Flo: Flowers; Fru: Fruits; Lat: Latex; Lea: Leaves; Ped: Peduncle; Res: Resin; Roo: Roots; Ste: Stem; See: Seeds; Per: Pericarp; Tub: Tuber; Who: Whole plant.

^b Preparations: Boi: Boiled; Cooked: Coo; Cru: Crushed; Dec: Decoction; Hea: Heated; Inf: Infusion; Mixed: Mix; Ps: Paste

^c Adm.: Administration; Int: Internal use; Ext: External use; Eat: Eaten as meal; Gar: Gargle; Inh: Inhalation

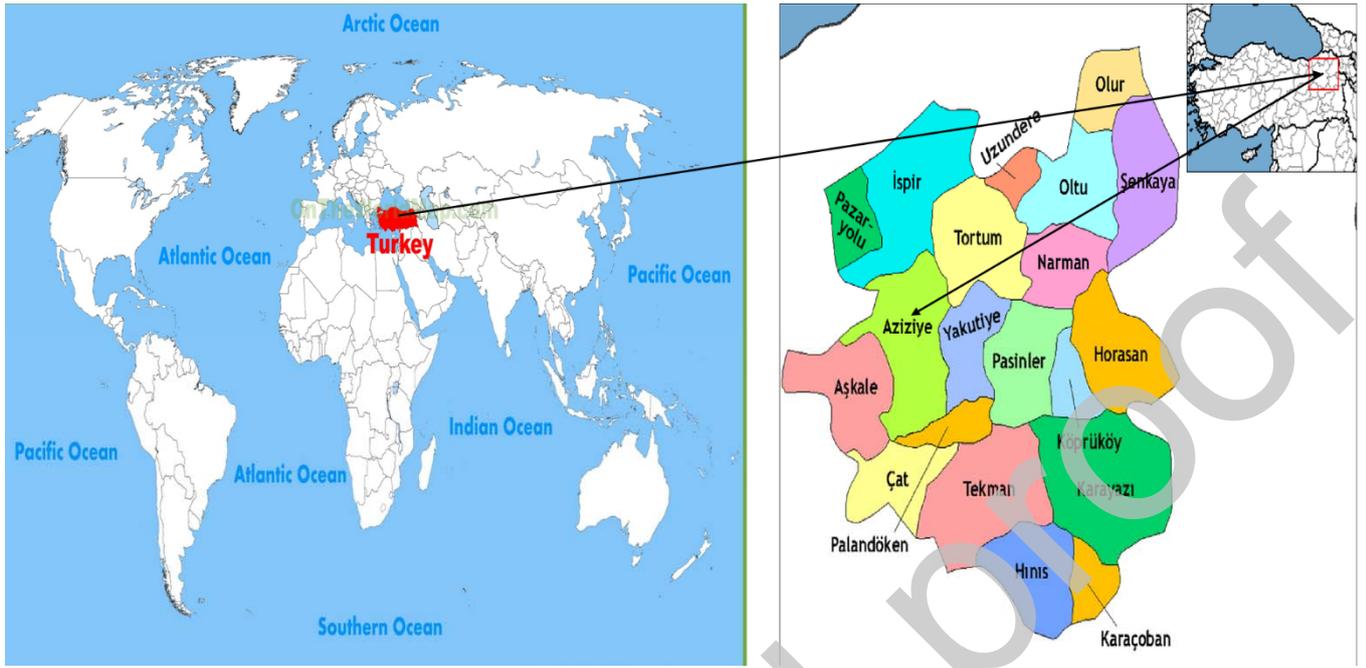


Figure 1. Geographical location of the investigation region.