

The Trade and Use of Some Medical and Aromatic Herbs in Turkey

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ABSTRACT This study examines the trade and use of medical and aromatic herbs within 24 different provinces of Turkey. Face-to-face interviews were conducted with 214 herbalists and 933 customers, which were then used to develop demographic profiles. The most commonly sold herbs were *Mentha pulegium*, *Tilia tomentosa*, *Zingiber officinale*, *Salvia* spp. and *Cerastium siliqua*. The dataset included 2297 records on purchase quantities and usage, which showed that the main uses were foodspice, and digestive, respiratory system, dermatological, and neurological disorders. The most commonly used parts of the herbs are leaves, flowers and fruits. The preferred means of administration are infusion, powder and decoction.

INTRODUCTION

Medical and aromatic herbs have been essential components of healthcare throughout human history (Schippmann et al. 2002). Recently, there has been a general opinion that synthetic materials that are commonly used in food and drug industry cause many diseases, such as cancer. This has led to increased global demand for natural and organic forms of medication. As a result of this demand, healing herbs and medicines of herbal origins are commonly used worldwide as a part of traditional culture worldwide. In Australia, 48.5% of the population (Mac Lennan et al. 1996), in Finland 33% (Vaskilampi et al. 1993), in Denmark 10% (Rasmussen 1990), in Belgium 31%, in France 49% (Fisher and Ward 1994), and in Canada 17% of the population (Wayne 2001) prefer alternative medicine methods at least once a year, and consume herbal drugs and healing herbs. Previously, local usage of these herbs was common as part of the traditional culture, but today, these herbs have become an important source of national and international trade.

It is known that 50,000–75,000 plant species are used in traditional and modern medicine worldwide (Schippmann et al. 2006). In Europe, at least 2000 medical and aromatic herbs are used in such domains as cosmetics, medicine, dye, herbal tea, nutritional supplements, liquor, pesticide and fungicide, essential oil products, perfumes, flavoring liquids and

cleaning products. Approximately 1200–1300 of these herbs are derived from species that are native to Europe (Kathe et al. 2003). Eastern Europe and Southeastern Europe countries play an important role in the global trade in herbs of Europe. In particular, Albania, Bulgaria, Poland, Hungary and Turkey are essential source countries for such commodities (Lange 2001). Turkey has considerable export potential for medical and aromatic herbs. However, the exact number and amount of exported herbs are unclear. Koyuncu (1990) estimate that there were 500 medical herbs in Turkey, whereas Baser (2000) estimated that 1000 herbs are used for medical purposes. Baser (2000) also stated that nearly 200 medical and aromatic herbs have export potential, and that 70-100 plant species are already exported. Ozguven et al. (2005) identified 447 medical and aromatic herb species (including subsets) that were traded, with 139 of these species being exported. Small amount of medical and aromatic herbs from these species were began to be produced as cultivated plants. A great majority of medical and aromatic herbs are obtained from natural environments, including 90% of the natural products traded in Europe, and the great majority of those present in Turkey (Coskun and Ozkan 2005). This situation is expected to continue for several reasons (Lange 1998; Lange and Schippmann 1997; Srivastava et al. 1996; Xiao 1991). These herbs are generally exported as raw or bulk products, as the pharmacological plant industry in Tur-

key is underdeveloped, which causes crucial loss of export revenues (Toksoy et al. 2003).

There is no database of the Turkish trade in medical and aromatic herbs. Accurate information on the trade volume and commercial value of medical and aromatic herbs is published by the United Nations Comtrade database. UN Comtrade has recorded trade data for approximately 180 countries since 1962 (Lange 2006). According to data for 2011, total global import value was \$3.05 billion US dollars and total exports was \$2.86 billion US dollars (SITC 3, 292.2 “Natural gums, resins, etc.” and 292.4 “Plants, Pharmaceutical plants, etc.”). Turkey’s total exports for 2011 were almost \$13.4 million US dollars, corresponding to approximately 3760 tons of plants. Total Turkish imports in 2011 were \$7.5 million US dollars, corresponding to approximately 2398 tons of plants (UNCOMTRADE 2012).

In Turkey, there is no data on the acquisitions and expenses related to the import and export of medical and aromatic herbs. There is no substantial data that reliably reflects the products that are consumed in the domestic market. This study to determine the trade volume, commercial value, and usage of medical and aromatic herbs, in addition to demographic profiles of herbalists and customers.

MATERIAL AND METHOD

Study Area

Turkey is located in the holarctic ecozone, and includes Mediterranean, Iranian–Turan and European–Siberian flora areas. The flora of

Turkey comprises 167 families, 1320 genera and 11,707 plant taxa (Davis 1965–1985; Davis 1972; Davis 1988; Guner et al. 2000; Guner et al. 2012). The flora of Turkey has a quite substantial structure. Turkey has 3649 endemic plants, including nearly 32% endemic taxa, subspecies, and varieties. Turkey has more endemic plants than all European countries combined (Guner et al. 2000; Güner et al. 2012). A questionnaire study was conducted with 214 herbalists and 933 customers in 24 of 81 cities in Turkey (Fig. 1 and Table 1).

METHOD

This study used a face-to-face interview method. Two questionnaire forms were designed, based on a review of previous studies in the literature. Each of the herbalist and customer questionnaires consisted of two sections; the first section examines demographic characteristics. Table 2 and Table 3 were created according to these data. The second section of the herbalist form aims to determine the most commonly traded plant species, sales quantities, for what purposes and how these plants are used of these herbs. Table 4 and Table 5 were created according to the obtained data. In Turkey, there is no register of traders in medical and aromatic herbs. Therefore, a snowball sampling method was adopted in this study. A frequency table and cross-tabulation were used to evaluate the questionnaire data.

RESULTS

The customer sample included 953 responses, but 20 were excluded from analysis. The demo-

Table 1: Questionnaire totals and study locations

<i>City</i>	<i>Number of herbalist</i>	<i>Number of customers</i>	<i>City</i>	<i>Number of herbalist</i>	<i>Number of customers</i>
Amasya	8	60	Kastamonu	3	38
Ankara	13	33	Kayseri	6	38
Balikesir	9	70	Kocaeli	7	61
Bursa	29	50	Kütahya	4	27
Denizli	4	40	Mersin	21	17
Edirne	7	30	Nigde	5	38
Erzincan	5	36	Osmaniye	3	17
Erzurum	8	27	Samsun	13	40
Eskisehir	20	59	Sinop	3	30
Istanbul	12	21	Sivas	9	49
Izmir	8	52	Tekirdag	7	29
Kars	3	40	Zonguldak	7	31
			Total	214	933

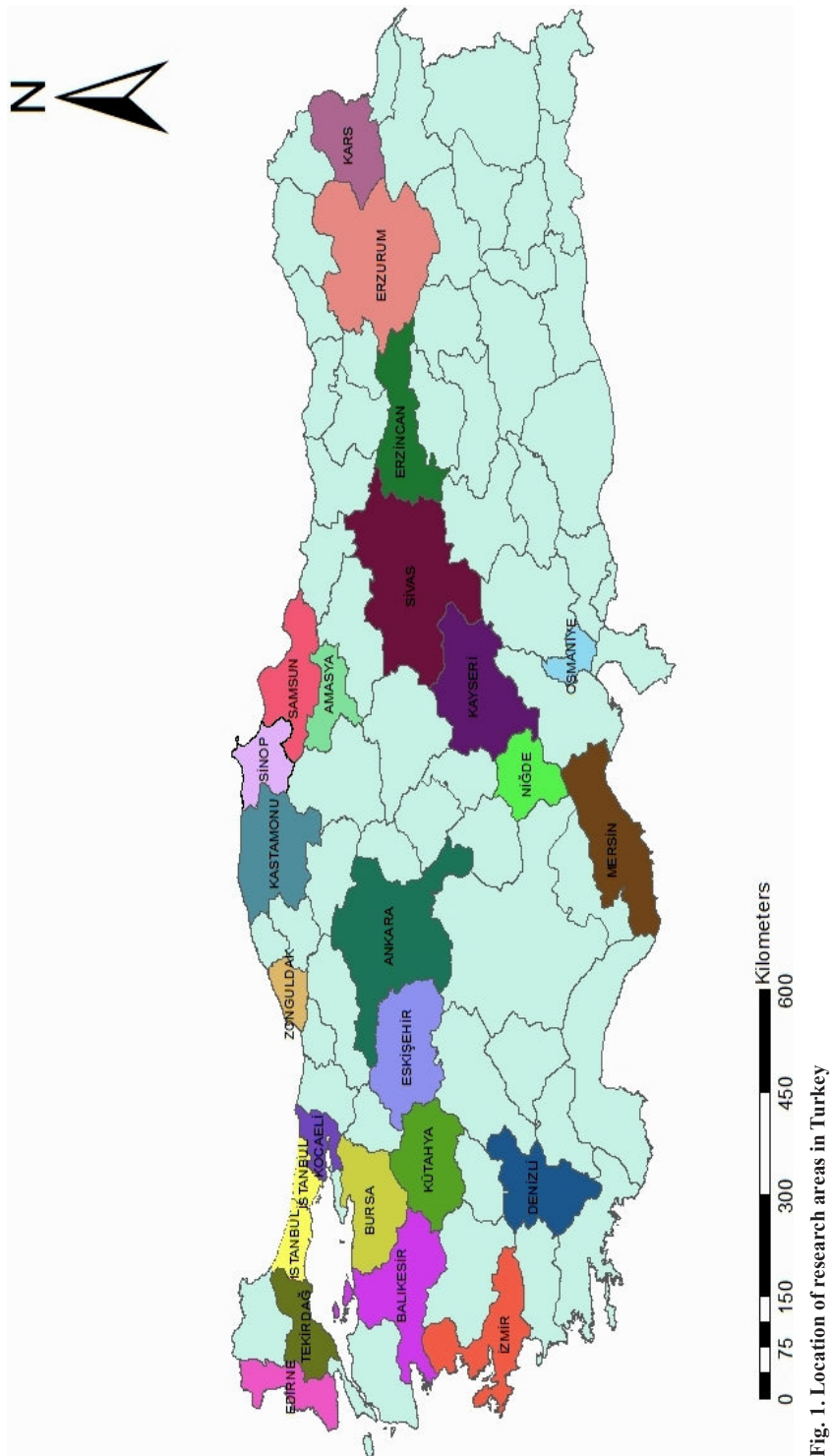


Fig. 1. Location of research areas in Turkey

graphic characteristics of the customers are shown in Table 2. It was found that 45.3%* of customers facing a health problem would first attend a hospital first and then consult a herbalist. The rate of the usage of only herbs during the treatment process was 31.5%; 43.6% of customers prepare the herbs themselves for use in treatment.

Table 2: Demographic characteristics of customers

Features	Percentage (%)	Number of customers
<i>Age Groups</i>		
18-32	40.1	374
33-47	36.6	341
48-60	17.6	164
>60	5.7	53
<i>Gender</i>		
Male	43.9	410
Female	56.1	523
<i>Educational Status</i>		
Elementary school	11.4	105
Secondary school	7.8	72
High school	37.9	354
University	42.9	400
<i>Monthly Income (*)</i>		
<500	23.8	215
501-1000	22.3	202
1001-1500	20.3	184
>1500	33.6	304

*28 people did not answer the question on monthly income

The study included 220 herbalists, with 6 questionnaires excluded from analysis. The demographic characteristics the herbalists are shown in Table 3. The herbalists had been practicing for an average of 15 years. The companies have a range of approximately 1900 products. Each business employs an average of 3 people. The total annual return of the herbalists is \$9.5 million US dollars (10/10/2012 exchange rate).

Fifty-seven percent of herbalists have another source of income. The monthly income of the herbalist that they earn only from herbalist's trade is approximately \$4,146 US dollars. The five most commonly traded herbs are *Mentha pulegium* (51.385 kg), *Tilia tomentosa* (34.890 kg), *Zingiber officinale* (24.890 kg), *Salvia* spp. (23.170 kg) and *Ceratonia siliqua* (18.290 kg). Fifty-nine percent of the herbalists buy dehydrated and packed herbs. In winter season, they sell mostly *Tilia tomentosa*, *Zingiber officinale* and *Rosa canina* at 89.3% rate against respiratory system diseases.

Table 3: Demographic characteristics of herbalists

Features	Percentage (%)	Number of herbalists
<i>Age Groups</i>		
18-32	24.3	52
33-47	49.1	105
48-60	21.5	45
>60	5.1	11
<i>Gender</i>		
Male	90.2	193
Female	9.8	21
<i>Educational Status</i>		
Elementary school	61.8	132
Secondary school	7	15
High school	19.1	41
University	12.1	26

Table 4 shows the merchandised plant species, local names, useful parts of plants and intended uses. Similar studies in Turkey (Sezik et al. 1991; Baytop 1999; Tuzlaci and Tolon 2000; Tuzlaci and Aymaz 2001; Satil et al. 2008; Sarper et al. 2009; Akbulut and Özkan 2009; Toksoy et al. 2010; Cakilcioglu et al. 2011; Ugulu 2012; Polat and Satil 2012; Khatun et al. 2012; Kurt and Isik 2012) and internationally (Pieroni et al. 2005; Cavender 2006; Pattanaik et al. 2008; Tita et al. 2009; Vitalini 2009; Koudouvo et al. 2011; van Andel et al. 2012) were utilized while designing Table 4.

The study recorded 37 plant families and 77 taxa. The largest number of plant species were from the families *Lamiaceae* (13), *Rosaceae* (7), *Apiaceae* (5) and *Asteraceae* (5). Sixty-eight plants were obtained from natural habitats and 9 of them were began to be produced in cultivars. 6 plants take place in 'Red List' of Threatened Species of IUCN, including: *Linum flavum* subsp. *scabrinerve*, *Linum obsutatum*, *Linum unguiculatum*, *Crataegus tanacetifolia*, *Gypsophila arrostii* var. *nebulosa* is in Low Risk (LR) and *Papaver lateritium* is in Vulnerable (VU) list. *Vaccinium arctostaphylos* is the only species listed in Appendix I of the BERN Convention on the Conservation of European Wildlife and Natural Habitats. The 10 plant species exported and the 7 plant species imported by Turkey are shown in Table 4. The most used parts of the plants (25 records) are flowers (20 records), fruit (15 records), roots (10 records) and seeds (8 records). The most common routes of administration were infusion (54 records), powder (15 records), decoction (10 records) and poultice (6 records). The survey included 2297

Table 4: Merchandised medical and aromatic herbs used in Turkey

<i>Botanical taxon</i>	<i>Botanical family</i>	<i>Vernacular name</i>	<i>Status</i>	<i>Part used</i>	<i>Preparation</i>	<i>Medicinal use</i>
<i>Galanthus elwesii</i>	Amaryllidaceae	Kardelen	-	T	Poultice	Fistula
<i>Galanthus woronowii</i>	Amaryllidaceae	Kardelen	-	T	Poultice	Fistula
<i>Anethum graveolens</i>	Apiaceae	Dereotu	-	L	Drog	Spice
<i>Coriandrum sativum</i>	Apiaceae	Kisnis	-	Fr	Infusion	Orexigenic/ Carminative/Digestive
<i>Cuminum cyminum</i>	Apiaceae	Kimyon	-	Fr	Infusion/ Powder	Stomach/Carminative/ Sweaty/Stimulant
<i>Foeniculum vulgare</i>	Apiaceae	Rezene	-	Fr, L, Rt	Powder/Tablet/ Infusion	Stomach/Carminative/ Redouble foremilk
<i>Petroselinum crispum</i>	Apiaceae	Maydanoz ^c	-	L	Fresh	Halitosis/Diuretic
<i>Achillea millefolium</i>	Asteraceae	Civanperçemi	-	Fl, L	Infusion	Hemorrhoid pains
<i>Anthemis altissima</i>	Asteraceae	Papatya	-	Fl, O	Infusion	Dysmenorrhea/ Carminative/Hair reinforce/Hemorrhoid
<i>Anthemis nobilis</i> ***	Asteraceae	Papatya	-	Fl, O	Infusion	Dysmenorrhea/ Carminative/Hair reinforce/Hemorrhoid
<i>Anthemis tinctoria</i> var. <i>tinctoria</i>	Asteraceae	Papatya	-	Fl, O	Infusion	Dysmenorrhea/ Carminative/Hair reinforce/Hemorrhoid
<i>Cichorium intybus</i>	Asteraceae	Hindiba	-	Rt	Infusion	Diuretic/Diaphoretic/ Laxative/Orexigenic/ Tonic/Biligenic
<i>Capparis spinosa</i>	Capparaceae	Kebere	-	Fl of Bu	Decoction/ Infusion/Food	Constipation/Tonic/ Food
<i>Gypsophila arrostii</i> var. <i>nebulosa</i>	Caryophyllaceae	Çöven	LR(cd)	Rt, Rh	Infusion	Diuretic/Expectorant
<i>Hypericum perforatum</i>	Clusiaceae	Binbirdelikotu	-	Fl	Infusion/ Medical Oil	Antispasmodic/ Constipation/ Taeniafuge/Antiseptic/ stomach
<i>Junierus drupacea</i>	Cupressaceae	Andiz	-	C	Decoction/ Powder	Restorative/ Aphrodisiac/Intestinal parasite
<i>Erica arborea</i>	Ericaceae	Funda	-	Br (with Fl, L)	Infusion/Fresh Drog	Urethritis/Diuretic/ Constipation
<i>Erica manipuliflora</i>	Ericaceae	Funda	-	Br (with Fl, L)	Infusion/Fresh Drog	Urethritis/Diuretic/ Constipation
<i>Vaccinium arctostaphylos</i>	Ericaceae	Likarba	-	Fr, L	Infusion/Food	Constipation
<i>Cassia spp.</i> ***	Fabaceae	Sinameki	-	Fr, S	Infusion	Laxative/Slimming
<i>Ceratonia siliqua</i> **	Fabaceae	Keçiboynuzu	-	Fr	Decocision	Laxative/Diuretic/ Intestinal parasite/ Expectorant/Toothache
<i>Glycyrrhiza glabra</i> **	Fabaceae	Meyan Kökü	-	Fl, Fr, Rt	Powder/ Infusion/ Decocision	Diuretic/Arthritis/ Expectorant/Skin disease/Kidney disease/ Common cold
<i>Juglans regia</i>	Juglandaceae	Ceviz ^c	-	L,Fr	Infusion/ Decocision	Diuretic/Glycemia/ Skin disease/Tonic/ Anti-rheumatism/Hair reinforce/Dyspepsia/ Arthritis/Orexigenic
<i>Lamium album</i>	Lamiaceae	Ballibaba	-	Fl	Infusion	Constipation/Tonic
<i>Lamium maculatum</i>	Lamiaceae	Ballibaba	-	Fl	Infusion	Constipation/Tonic
<i>Lamium purpureum</i>	Lamiaceae	Ballibaba	-	Fl	Infusion	Constipation/Tonic
<i>Lavandula angustifolia</i>	Lamiaceae	Lavanta çiçeği	-	Fl	Infusion	Diuretic/Anti- rheumatism
<i>Lavandula stoechos</i>	Lamiaceae	Karabas otu	-	Fl	Infusion	Antiseptic/Pain killer/ Calmative
<i>Melissa officinalis</i> **	Lamiaceae	Ogul otu	-	L	Infusion	Antiseptic/Calmative/ Stomach/Carminative /

Table 4: Contd.....

Botanical taxon	Botanical family	Vernacular name	Status	Part used	Preparation	Medicinal use
						Ear ache/Brain stimulant/Common cold
<i>Mentha pulegium</i> **	Lamiaceae	Nane	-	L, O	Infusion	Smell donor/Diuretic
<i>Ocimum basilicum</i>	Lamiaceae	Reyhan	-	Fl, L	Infusion	Calmative/ Carminative/Diuretic/ Constipation/Stomach and Intestine ache
<i>Rosmarinus officinalis</i>	Lamiaceae	Biberiye	-	L	Infusion	Diuretic/Laxative/ Antiseptic
<i>Salvia forskahlei</i>	Lamiaceae	“	-	L	Infusion	Constipation/Stomach/ Calmative
<i>Salvia fruticosa</i>	Lamiaceae	“	-	L	Infusion	Constipation/Stomach/ Calmative
<i>Salvia officinalis</i>	Lamiaceae	Adaçayı	-	L	Infusion	Constipation/Stomach/ Calmative
<i>Thymbra spicata</i>	Lamiaceae	Kekik	-	L	Infusion	Antiseptic/Stimulant
<i>Cinnamomum cassiae</i> ***	Lauraceae	Tarçın Kabugu	-	St	Powder/ Infusion/Tablet	Antiseptic/ Constipation/ Carminative
<i>Cinnamomum zeylanicum</i> ***	Lauraceae	“	-	St	Powder/ Infusion/Tablet	Antiseptic/ Constipation/ Carminative
<i>Laurus nobilis</i> **	Lauraceae	Defne yapragı ^C	-	L	Infusion	Antiseptic/Sweaty/Skin disease/Enteritis/ Calmative/Indigestion
<i>Allium sativum</i>	Liliaceae	Sarimsak ^C	-	T	Fresh/Poultice/ Usare	Hypertension/ Taeniafuge/Wound healing
<i>Colchicum speciosum</i>	Liliaceae	Vargit/Aci Çıgdem	-	S, T	Fresh/Poultice	Diuretic/Diaphoretic/ Laxative/Rheumatism pains
<i>Linum flavum</i> subsp. <i>scabrinerve</i>	Linaceae	Keten tohumu	LR(lc)	S	Infusion	Slimming/ Gastroenteritidis
<i>Linum obsutatum</i>	Linaceae	“	LR(lc)	S	Infusion	Slimming/ Gastroenteritidis
<i>Linum unguiculatum</i>	Linaceae	“	LR(lc)	S	Infusion	Slimming/ Gastroenteritidis
<i>Lycopodium clavatum</i>	Lycopodiaceae	Kibritotu	-	Sp	Powder	Skin disease/Skin rubbing
<i>Althaea officinalis</i> **	Malvaceae	Hatmi	-	Fl	Infusion	Respiratory
<i>Hibiscus syriacus</i>	Malvaceae	Ağaç hatmi	-	Fl	Infusion	Bronchial/Respiratory irritation
<i>Malva sylvestris</i>	Malvaceae	Ebegümeci	-	L, Fl	Infusion/ Decoction/ Poultice	Constipation/ Respiratory and digestive irritation/ Fistula
<i>Morus nigra</i>	Moraceae	Karadut ^C	-	Fr	Syrup	Upper respiratory tract infections
<i>Jasminum fruticans</i>	Oleaceae	Yasemin	-	Fl	Infusion	Bronchial/Neuroleptic/ Contipation
<i>Olea europaea</i>	Oleaceae	Zeytin	-	L	Infusion	Orexigenic/Diuretic/ Contipation/ Antipyretic/Diabetes
<i>Orchis</i> spp.	Orchidaceae	Salep	-	T	Powder	Tonic/Aphrodisiac/ Diarrhea
<i>Paeonia mascula</i> subsp. <i>arietina</i>	Paeoniaceae	Sakayik	-	Rt	Infusion	Calmative/Laxative/ Epileptic seizure/ Cough
<i>Papaver lateritium</i>	Papaveraceae	Gelincik	VU	Fl	Infusion/Syrup	Calmative/Antitussive/ Bronchial/Hypnotic
<i>Sesamum indicum</i>	Pedaliaceae	Susam	-	O	Oil/Laxative	Constipation/Diuretic/ Tonic

Table 4: Contd.....

Botanical taxon	Botanical family	Vernacular name	Status	Part used	Preparation	Medicinal use
<i>Piper nigrum</i> ***	Piperaceae	Karabiber	-	Fr	Powder	Orexigenic/Spice/ Indigestion/Tonic/Pain killer
<i>Plantago major</i>	Plantaginaceae	Damarotu	-	L	Infusion	Hypertension/Common cold/Kidney stone/ Blood purification/ Wound
<i>Elymus repens</i> subsp. <i>repens</i>	Poaceae	Ayrik otu	-	Rh	Decoction	Diuretic/Kidney stone
<i>Zea mays</i>	Poaceae	Misir ^c	-	Sl	Infusion/ Decoction	Diuretic/Kidney stone
<i>Rumex acetosella</i>	Polygonaceae	Kuzukulagi	-	L	Poultice	Fistula
<i>Punica granatum</i>	Punicaceae	Nar Çiçeği	-	Tr, St and Rt parts	Extraction	Taeniafuge
<i>Nigella sativa</i>	Ranunculaceae	Çörek otu	-	S	Infusion	Diuretic/Redouble foremilk/Orexigenic
<i>Alchemilla</i> ssp.**	Rosaceae	Findikotu	-	Rt,L	Infusion/ Powder	Constipation/Diuretic/ Tonic
<i>Cerasus avium</i>	Rosaceae	Kiraz	-	Fr St	Infusion	Diuretic/Constipation/ Tonic
<i>Cerasus mahaleb</i>	Rosaceae	Mahlep	-	S	Powder	Tonic/Aphrodisiac/ Prostate/Dyspnea
<i>Crataegus tanacetifolia</i> **	Rosaceae	Aliç ^c	LR(lc)	Fr	Infusion/ Powder	Tension/Spazm/ Calmative/Diuretic
<i>Cydonia oblonga</i>	Rosaceae	Ayva	-	L	Decoction	Insomnia/Antianxiety agent/Antipyretic
<i>Rosa canina</i> **	Rosaceae	Kusburnu ^c	-	Fr,L	Infusion/ Powder	Constipation/Tonic/ Glycemia
<i>Rubus fruticosus</i>	Rosaceae	Böğürtlen	-	L, Fr	Infusion/ Decoction	Constipation/Tonic/ Amygdale inflammation
<i>Dictamnus albus</i>	Rutaceae	Gazel otu	-	F	Infusion	Gastric/Stimulant/ Antipyretic/Tonic
<i>Capsicum annum</i>	Salonaceae	Pul biber ^c	-	Fr	Powder/Tablet	Spice/Blood purification/Arthritis/ Anti-rheumatism/Heart stimulant
<i>Salvatore persica</i> ***	Salvadoraceae	Misvak	-	Tr, St and Rt parts	Drog	Dental care
<i>Tilia tomentosa</i>	Tiliaceae	Ihlamur ^c	-	Fl	Infusion	Sweaty/Calmative/ Hypnotic
<i>Urtica dioica</i> **	Urticaceae	Isirgan	-	L, Rt	Infusion/ Decoction	Anti-rheumatism/ Orexigenic/Blood purification/Cancer
<i>Valeriana officinalis</i>	Valerianaceae	Kediotu	-	Rt, Rh	Infusion	Calmative/ Antispasmodic/ Insomnia
<i>Curcuma longa</i> ***	Zingiberaceae	Zerdeçal	-	Rh	Powder/ Decoction	Gastroenteritidis/ Carminative/Increasing bile
<i>Zingiber officinale</i>	Zingiberaceae	Zencefil	-	Rh	Infusion/ Powder	Spice/Calmative/ Carminative/ Indigestion/Common cold
<i>Peganum harmala</i>	Zygophyllaceae	Üzerlik	-	S	Infusion	Taeniafuge/ Dysmenorrhea/ Anodyne/Sweaty/ Calmative

records on purchase quantities and usage. These records were classified and organized under main headings, as shown in Table 5.

Table 5: The most common usage purpose of medical and aromatic herbs

Main therapeutic indications	Number of citation	Percentage (%)
Food-spices	480	21
Digestive system diseases	445	19.4
Respiratory disorder	303	13.3
Skin disease	274	12
Nerve diseases	183	8
Anemia	106	4.6
Cardiovascular disease	90	4
Diabetes	80	3.5
Rheumatism	59	2.5
Wound healing	58	2.5
Halitosis	54	2.3
Hemorrhoid	46	2
Gynaecological diseases	33	1.4
Ambustion	21	0.9
Lose weight	20	0.8
Cancer	18	0.7
Alopecia	12	0.5
Infertility	11	0.4
Insomnia	4	0.2
Total	2297	100

The most common purpose of medical and aromatic herbs is food-spices (480 records, 21%). *Mentha pulegium* and *Zingiber officinale* are extremely common as food-spices, and therefore these species are much better known than others, which is supported by the five most commonly sold plant species. Following food-spices, other intended purposes of these plants are: digestive system diseases (especially stomach and intestine problems; 445 records, 19.4%), respiratory disorder (influenza and asthma; 303 records, 13.3%), dermatological disorders (eczema, acne, psoriasis; 274 records, 12%) and nerve diseases (migraine, nervous headache; 183 records, 8%). It was obtained from the data collected from customers that the most common herbs and herb mixtures used to treat health problems were: *Foeniculum vulgare* (by boiling), *Mentha pulegium*-*Nigella sativa* (by boiling) and *Anthemis* spp.-*Rosmarinus officinalis* (by boiling) against stomach-ache; *Mentha pulegium*-*Tilia tomentosa* (by boiling and adding honey) and *Mentha pulegium*-*Tilia tomentosa*-*Thymbra spicata* (by boiling with lemon rind) against nausea; *Cassia* spp.-*Glycyrrhiza glabra* (seething) and *Cassia* spp.-*Anthemis* spp.-*Melissa officinalis* (seething)

against intestinal problems (constipation); *Mentha pulegium*, *Zingiber officinale*, *Rosa canina*, *Tilia tomentosa* and *Piper nigrum* species are used in different combinations and by boiling against influenza. Sweetening, apple peel, lemon and honey are commonly added to provide flavor. A cream prepared from *Anethum graveolens* and *Erica* spp. is used against eczema. *Anthemis* spp.-*Melissa officinalis* (by boiling with lemon rind) and *Melissa officinalis* (by boiling) are used against migraine. *Foeniculum vulgare*-*Zingiber officinale* mixture (by boiling) and *Melissa officinalis* (by boiling) are used against nervous headache. *Zingiber officinale*-*Curcuma longa*-*Cinnamomum cassiae* mixture (seething), *Juglans regia* seed and *Punica granatum* (brewing) are used against tension problems. *Juglans regia* seed, *Laurus nobilis*-*Salvia* spp. mixture (by boiling) and *Linum* spp. (with yoghurt) are used against cholesterol. *Olea europaea* leaf-*Cerasus avium* pedicle (brewing with artichoke), *Rubus fruticosus* leaf-*Vaccinium arctostaphylos* (by boiling with clove), *Juglans regia* leaf-*Vaccinium arctostaphylos* leaf (brewing) and *Thymbra spicata* (brewing with *Teucrium polium* and adding honey) are used against diabetes. *Cerasus avium* pedicle-*Rosa canina* fruit (brewing) are used against renal problems. A mixture of *Zingiber officinale*-*Nigella sativa*-*Cinnamomum cassiae* (by boiling) is used for the immune system. Leaves of *Erica* spp. (by boiling) are used against cystitis. *Glycyrrhiza glabra*-*Anthemis* spp. flowers-*Tilia tomentosa* mixture (by boiling), *Ceratonis siliqua*-*Cydonia oblonga* leaf (brewing), *Zingiber officinale* (mixing with honey and coffee), and *Zingiber officinale*-*Piper nigrum* (mixing with lemon and honey) are used as expectorant. *Zingiber officinale*, *Tilia tomentosa*, *Anethum graveolens* (mixing with lemon peel), *Cerasus avium* pedicle-*Zea mays* tassel (by boiling), *Urtica dioica* (by boiling), *Laurus nobilis*-*Salvia* spp. mixture (by boiling), *Colchicum speciosum* seed (ground with garlic and applied to painful areas as cream) are used against rheumatism.

DISCUSSION

Turkey is quite rich in taxa and endemic plants. However, this richness is not effectively and efficiently utilized. Ozguven et al. (2005) reported that 347 medical and aromatic herbs were merchandised (both in domestic trade and

foreign trade). This corresponds to approximately 2.9% of the flora of Turkey, which is low, relative to the global average of 17.1%. This is due to the lack of regular records on medical and aromatic herbs in Turkey, and a lack of standardization in goods. This situation results in reduced quality and quantity. The lack of research on this issue is another reason (Bayramoglu 2007; Akbulut 2009). Therefore, it is not possible to accurately and reliably calculate the number of plants that are used as ethno-medicine.

The intended purposes of the herbs reported in the present study are similar to previous studies in the literature, which reports that *Urtica dioica* is used for cancer treatment (Simsek et al. 2002), *Anthemis* spp. is used for hemorrhoid treatment (Tuzlaci and Erol 1999), *Melissa officinalis* is used for stomach problems (Di Stasia et al. 2002; Fakir et al. 2009), *Hypericum perforatum* is used for stomach-ache (Everest and Ozturk 2005), *Plantago major* is used for wound treatment (Kala et al. 2006). *Foeniculum vulgare* is used for redouble foremilk (Fakir et al. 2009). *Malva sylvestris* is used for respiratory and digestive system (Korkmaz et al. 2011). *Plantago major* is used for wounds (Ertug 2000). *Zea mays* is used for kidney stone (Sezik et al. 1997).

Some medical herbs among the plants in the list that are recorded in some codex in the world are as follows: *Achillea*, *Colchicum*, *Crataegus*, *Gypsophila*, *Linum*, *Malva*, *Mentha*, *Papaver*, *Rosa*, *Salvia*, *Vaccinium*, *Veratrum*. The herbs that occur within the Turkish codex and study area are: *Anthemis nobilis*, *Colchicum speciosum*, *Foeniculum vulgare*, *Glycyrrhiza glabra*, *Lycopodium clavatum*, *Malva sylvestris*, *Melissa officinalis*, *Olea europaea*, *Orchis* spp., *Punica granatum*, *Rosmarinus officinalis*, *Valeriana officinalis*, *Zea mays* (Ceylan 1995). This study included 77 taxa used for medical purposes by herbalists and local residents. However, only those mentioned above occur in the Turkish codex. This difference indicates the inefficacy of studies on medical herbs that can be legally used for treatment in Turkey. *Vaccinium arctostaphylos* is under threat at the European scale, but is listed in Appendix I list of the BERN convention (Turkish Republic Official Gazette 1984). Therefore, it is permissible to collect it from natural habitats and trade it, because there is no danger in expanding its habitat in Turkey.

Cultural characteristics and highly educated consumers play a role in increased awareness of drugs with chemical and synthetic content, and their adverse effects. Herbal drugs are termed “folk remedies” in Turkey. The production and use of these herbal drugs are transferred between generations, as is the herbalist’s trade.

The incomes of the herbalists are quite high compared with per capita incomes in Turkey. According to the data of the year 2011, income per capita was 10,469 US dollars (TSI 2012), whereas the average annual income among herbalists was 49,752 US dollars. The reason why the incomes of herbalists are higher than the average of Turkey is that nearly half of the consumers of medical and aromatic herbs prefer to use herbal products during their treatment. In addition, herbalists sell medical and aromatic herbs in big amounts for use in food and spices, and these herbs address every segment of society.

The herbalists’ trade is not defined or regulated by any legislation. This occupation has an education infrastructure in Turkey, but there is no requirement for a certificate of competence to establish a shop. This occupation has not any legal responsibility and any competence is not demanded. Customers who suffer from serious diseases and those that are costly to treat (cancer, infertility, diabetes, etc.) make use herbalists. Legal regulation of the herbalist’s trade should be adopted to reorganize this situation and to ensure active controls of the sector. Production and sale activities must be monitored by government agencies. For his research and studies must be increased. In Turkey, most of the medicinal and aromatic herb export have low added value. These herbs must be standardized, increased in added value and export must be increased with new products and market share must be increased. In order to do this legal regulations are required.

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