

Medicinal Plants Used for Gastrointestinal Disorders in Some Districts of Izmir Province, Turkey

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ABSTRACT This study was carried out in order to determine which plants and the ways in which these plants are used for the treatment of gastrointestinal disorders among the people of some districts of Izmir province, located in the Western Anatolian part of Turkey. Field study was carried out over a period of approximately three years (2009-2011). During the field trips, the information was collected through interviews, including various data obtained from local healers and traditional medicine men, herbalists, shepherds, patients and elderly persons. In addition, informant consensus factor (F_{ic}) values were calculated for the medicinal plants included in the study. A total of 33 plants belonging to 25 families were documented for their therapeutic use against gastrointestinal disorders. Further analysis on the families of medicinal plants that are used against gastrointestinal disorders has shown that family Lamiaceae is represented by the highest number of species. Also, it was determined that gastrointestinal system ailments for which the folk medicinal plants are mostly used, are as follows: constipation, diarrhea, gastritis and ulcer, intestinal winds, nausea, gastralgia and indigestion. Informant consensus of medicinal plant usage within Izmir resulted in F_{ic} values between 0.56 and 0.84 per gastrointestinal disorder category. This study showed that plants are actively used for the treatment of gastrointestinal disorders in the area of Izmir.

INTRODUCTION

Since ancient times, humanity used various natural materials as a source of medicines and probably plants have always had the most important role to play in medicine and public health (Ghorbani 2005). As a result of centuries of accumulated experience, humans used plants for treatment purposes until the development of modern medicine. But this knowledge and transmission is in danger because transmission between older and younger generation is not always assured (Anyinam 1995).

Documentation of the local knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources (Muthu et al. 2006; Ugulu 2013). For this reason, ethnobotanical studies have become increasingly valuable for the development of healthcare and conservation programs in such regions (Ososki et al. 2002). In this context, many studies have been conducted in Turkey about usages of the medicinal plants and herbal prod-

ucts (Erci 2007; Kultur 2007; Kargioglu et al. 2008; Ugulu et al. 2009; Dogan et al. 2011; Ugulu 2011; Ugulu and Aydin 2011). These studies indicated that herbal therapies (40.6%) are used most frequently (Tan et al. 2004; Isikhan et al. 2005). Another study found that patients were mostly using herbal products (72.5%) in Turkey (Oguz and Pinar 2000).

Traditional ethnobotanical knowledge, complementary and alternative medicine therapies and prevalence of medicinal plants have been investigated in different areas of Turkey (Dogan and Mert 1998; Dogan et al. 2003; Dogan et al. 2004a; Dogan et al. 2005; Nedelcheva et al. 2007; Dogan et al. 2008; Cakilcioglu and Turkoglu 2010; Dogan et al. 2010a; Ugulu and Baslar 2010; Nedelcheva et al. 2011; Dogan 2012; Ugulu 2012; Ugulu et al. 2012a; Dogan et al. 2013). The results of these studies show that applications toward the treatment of gastrointestinal disorders occupy an important place among the usage of plants for medicinal purposes (Simsek et al. 2004; Kultur 2007; Kargioglu et al. 2008; Ugurlu and Secmen 2008; Ugulu et al. 2009). Gastrointestinal disorders include symptoms like abdominal pain, acidity, constipation, dyspepsia, indigestion, flatulence, etc., caused by

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eating indigestible, excessive or irregular foods, imbalanced and spicy diets, and adulteration of food and contamination of drinking water. Diarrhea, dysentery, colic and colitis also occur due to digestive complaints (Dwivedi et al. 2006; Olajuyigbe and Afolayan 2012).

This study was carried out in order to determine the plants and the ways in which these plants are used for the treatment of gastrointestinal disorders among the people of the study area.

MATERIAL AND METHODS

General Characteristics of the Study Area

The study area consisted of towns and counties of Beydag (38° 05' N, 28° 11' E), Kiraz (38° 14' N, 28° 12' E), Odemis (38° 16' N, 27° 59' E) and Tire (38° 05' N, 27° 46' E), all of which lie within the administrative borders of Izmir province. The area was approximately 2600 km² (Fig. 1). The area consisted of the Küçük Menderes delta, one of the important deltas of Western Anatolia (Atalay 2002). To the north of the delta lies Bozdağlar and to the south lies the Aydın Mountains. The Küçük Menderes River, which rises in Bozdağlar and is 175 km long, passes through first Kiraz, then Beydag, Odemis and Tire town borders and finally reaches the Aegean Sea.

Mediterranean climate prevailed in the area. Mediterranean climate is characterized by warm and rainy winters and hot and dry summers and occurs in more than half of Turkey. Yearly rainfall in the area varied between 650-700 mm.

In the study area, maquis was prevalent where *Pinus brutia* Ten. (Turkish red pine) was destroyed. In areas where vegetation cover was destroyed, the prevalent maquis species was *Quercus coccifera* L. (kermes oak). In other areas, *Pistacia terebinthus* L. (terebinth), *Laurus nobilis* L. (bay laurel), *Arbutus andrachne* L. (Grecian strawberry tree), *Arbutus unedo* L. (Strawberry tree), *Myrtus communis* L. (true myrtle) and *Spartium junceum* L. (Spanish broom) were quite common. *Nerium oleander* L. (oleander) and *Vitex agnus-castus* L. (chaste tree) were seen in riverbeds. *P. brutia* could be seen as high as 1000 m on the north slopes of Aydın Mountains. Beyond this altitude, *Pinus nigra* Arnold. subsp. *pallasiana* (Lamb.) Holmboe (Anatolian black pine) dominated. On the north slopes of Aydın Mountain, *Castanea*

sativa Mill. (sweet chestnut) and *Juglans regia* L. (walnut) communities were encountered. It was possible to come across to *Quercus ithaburensis* Decne. subsp. *macrolepis* (Kotschy) Hedge and Yalt. (Valonia oak) on some dry slopes. *Olea europaea* L. (olive) was planted in large areas in the region (Akman and Ketenonlu 1986; Baslar et al. 1999; Atalay 2002; Dogan et al. 2004b; Dogan et al. 2007; Baslar et al. 2009; Dogan et al. 2010b; Ugulu et al. 2012b).

DATA COLLECTION AND METHODOLOGY

Ethnobotanical Survey

The field studies were carried out in collaboration with urban and rural inhabitants of the towns of Beydag, Kiraz, Odemis and Tire, situated in the Western Anatolian part of Turkey (Fig. 1). The study was performed between 2009 and 2011. During this period, contacts were established with women (32 interviews) and men (21 interviews) who are practicing herbal medicine. The information was collected during field trips through semi-structured interviews including various data (local names, ailments and diseases treated, therapeutic effects, part(s) of plants used, methods of administration) obtained from local healers and traditional medicine men, herbalists, shepherds, patients and elderly persons, based on one of the methods for ethnobotanical data collection (Martin 1995). The local people were asked for their consent to share their knowledge only for the purpose of this study. Also, the obtained data were supported by literature concerning the plants used for gastrointestinal disorders.

Throughout interviews and discussions, information about many of the plants used in their medicine was gathered. The data collected were arranged in alphabetical order of the botanical name. The common name for each taxon in local language was given in the table. In addition, the medicinal uses, parts used methods of preparation, and similar use or different uses for the same purpose of the plant were given.

Identification of Plant Specimens

The identification of the plant specimens was authentically and basically carried out using "Flora of Turkey and East Aegean Islands" (Davis 1965-1982). The collected information

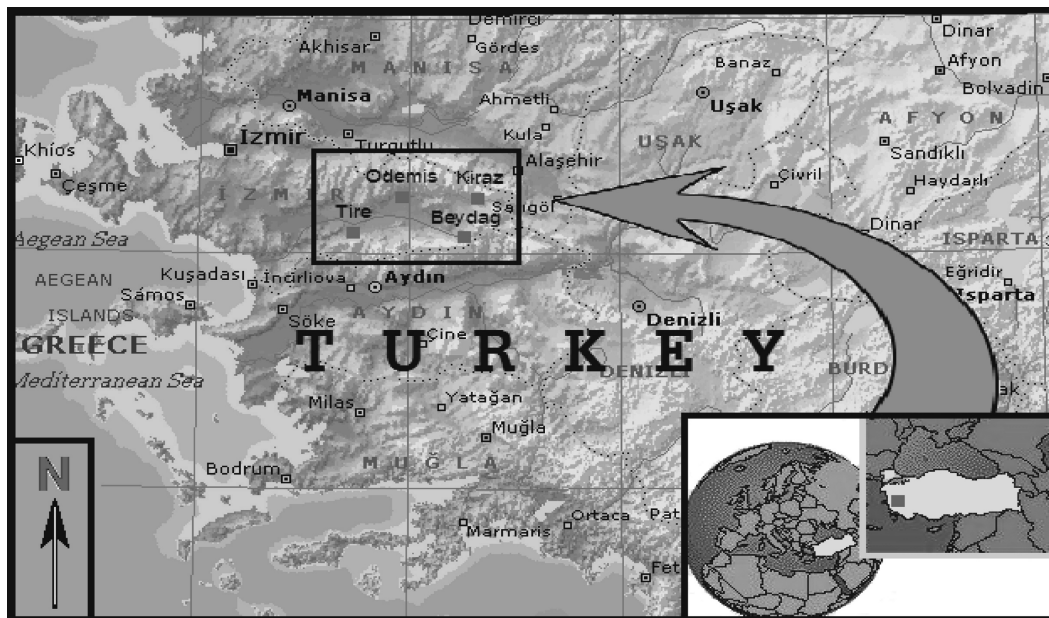


Fig. 1. Map of the study area

was cross-checked with the available literature about medicinal plants and ethnobotany in Turkey and other areas of the world. Herbarium specimens are kept in the personal collection of the first author.

Data Analysis and Quantitative Ethnobotany

The level of homogeneity between information provided by different informants was calculated using the Informants' Consensus Factor, F_{ic} (Trotter and Logan 1986). It is calculated as

$$F_{ic} = \frac{N_{ur} - N_t}{(N_{ur} - 1)}$$

where N_{ur} is the number of use reports from informants for a particular plant-usage category and N_t is the number of taxa or species that are used for a particular plant usage category for all informants. Values range between 0 and 1, where "1" indicates the highest level of informant consent. For instance, if few taxa are used by informants, then a high degree of consensus is reached and medicinal tradition is thus viewed as welldefined (Heinrich 2000).

The Fidelity Level (FL), the percentage of informants claiming the use of a certain plant for the same major purpose, was calculated for the most frequently reported diseases or ailments as:

$$FL (\%) = \frac{N_p}{N} \times 100$$

where N_p is the number of informants that claim a use of a plant species to treat a particular disease, and N is the number of informants that use the plants as a medicine to treat any given disease (Alexiades 1996).

RESULTS AND DISCUSSION

Information about Medicinal Plants

In terms of flora, Turkey's biodiversity provides a great source for herbal therapies. Hence, an ethnobotanical survey was carried out to determine plants used as folk medicines by rural and urban inhabitants of some cities of the Western Anatolia in Turkey, where Mediterranean climate and landscape dominates. The study was carried out by means of 53 interviews with medicinal plant users, extractors and traditional healers.

A total of 33 plants belonging to 25 families have been documented for their therapeutic use against gastrointestinal disorders and as herbal care, as enlisted in Table 1, arranged in alphabetical order of their family and botanical names, with the relevant information. The majority of medicinal plants determined in this study grow in the wild, while others are cultivated (that is, *Momordica charantia* and *Citrus x limon*).

Table 1: List of medicinal plants used for gastrointestinal disorders in some districts of Izmir province

Scientific name	Family	Local name	English name	Plant part(s) used	Medicinal use	Traditional preparation	Recorded literature sources defining similar usages
<i>Amygdalus communis</i> L.	Rosaceae	Badem	Almond	Seed oil	Laxative	Almond oil is diluted with water and drunk.	Baytop 1999
<i>Anethum graveolens</i> L.	Apiaceae	Dereotu	Dill	Seed	Antispasmodic, Carminative	Seeds are boiled and the stock is drunk.	Chevallier 1996; Baytop 1999
<i>Camellia sinensis</i> (L.) Kuntze	Theaceae	Çay	Tea	Leaf	Against diarrhea	A strong tea made from the leaves is drunk.	Maity et al. 1995; Jackson 1996; Baytop 1999; Borrelli and Izzo 2000
<i>Cerasus avium</i> (L.) Moench	Rosaceae	Kiraz	Sweet cherry	Fruit peduncle	Against diarrhea	Fruit stalk is boiled and the stock is drunk.	Baytop 1999; Rivera et al. 2005
<i>Ceretonia siliqua</i> L.	Fabaceae	Keçiboynuzu, harnup	Carob tree	Fruit	Stomachic, Laxative	The fruits are eaten.	Baytop 1999; Merzouki et al. 2000
<i>Chenopodium album</i> L.	Chenopodiaceae	Sirken	Lambsquarters	Leaf	Laxative	Leaves are boiled and the stock is drunk.	Baytop 1999; Saghir et al. 2001; Rivera et al. 2005
<i>Cichorium intybus</i> L.	Asteraceae	Yabani hindiba	Chicory	Leaf	Stomachic, laxative	Boiled and the stock is drunk.	Baytop 1999; Karaman and Kocabas 2001; Bnouham et al. 2002; Pieroni and Quave 2005; Rivera et al. 2005
<i>Citrus x limon</i> (L.) Burm. f	Rutaceae	Limon	Lemon	Fruit	Against diarrhea	Fresh fruit peels are boiled and the stock is drunk.	Di Stasi et al. 2002; Pieroni et al. 2004; Arias and Ramon-Laca 2005; Guarrera et al. 2005b; Pieroni and Quave 2005
<i>Coffea arabica</i> L.	Rubiaceae	Kahve	Coffee	Seed	Against indigestion	Turkish coffee is drunk after the meal.	Gedif and Hahn 2003; Cavender 2006
<i>Convolvulus arvensis</i> L.	Convolvulaceae	Tarla sarmaşýđý,	Field bindweed	Root	Stomachic, laxative	The sap of fresh root is licked.	Baytop 1999; Karaman and Kocabas 2001
<i>Cydonia oblonga</i> Mill.	Rosaceae	Ayva	Quince	Leaf and fruit	Against diarrhea	Leaves are boiled and the stock is drunk. Fruit is directly eaten.	Baytop 1999; Karaman and Kocabas 2001; Sezik et al. 2004; Rivera et al. 2005
<i>Glycyrrhiza glabra</i> L.	Fabaceae	Meyan	Licorice	Root	Stomachic, Against gastralgia, To treat gastritis and ulcer	Licorice candy that is produced from the root is dissolved in water and drunk.	Mert et al. 1993; Baytop 1999; Krausse et al. 2004

Table 1: Contd.....

Scientific name	Family	Local name	English name	Plant part(s) used	Medicinal use	Traditional preparation	Recorded literature sources defining similar usages
<i>Hypericum perforatum</i> L.	Clusiaceae	Kantaron, Sary kantaron	St. John's wort	Aerial part	Stomachic, To treat stomach ulcer	Above ground parts are kept in olive oil for at least 3 months and then consumed on an empty stomach in the mornings. Above ground parts are also boiled and the stock is drunk.	Mert et al. 1993; Tuzlaci and Aymaz 2001; Loi et al. 2004; Guarrera 2005; Pieroni et al. 2013
<i>Laurus nobilis</i> L.	Lauraceae	Defne, tehnel	Bay laurel	Leaf	Against indigestion	Boiled and the stock is drunk either plainly or mixed with honey.	Baytop 1999; Tuzlaci and Erol 1999; Merzouki et al. 2000; Tuzlaci and Tolon 2000; Tuzlaci and Aymaz 2001; Di Stasi et al. 2002; Pieroni et al. 2002; Loi et al. 2004; Guarrera et al. 2005a; Guarrera et al. 2005b; Pieroni and Quave, 2005;
<i>Linum usitatissimum</i> L.	Linaceae	Keten	Linum	Seed	Laxative	A couple of spoonfuls of seeds are eaten on an empty stomach.	Baytop 1999; Mert et al. 1993; Merzouki et al. 2000; Gedif and Hahn 2003; Loi et al. 2004
<i>Malva sylvestris</i> L.	Malvaceae	Ebegümeçi	High mallow	Aerial part	Against gastralgia, Laxative	Especially leaves are boiled and the stock is drunk.	Oztig 1971; Mert et al. 1993; Baytop 1999; Tuzlaci and Erol 1999; Loi et al. 2004; Guarrera 2005; Guarrera et al. 2005b; Pieroni and Quave 2005;
<i>Matricaria chamomilla</i> L.	Asteraceae	Papatya	German chamomile	Flower	Treatment of gastrointestinal disorders,	Dried flowers are boiled and the stock is drunk on an empty stomach in the morning.	Mert et al. 1993; Zeybek 1985; Merzouki et al. 2000; Tuzlaci and Tolon 2000; Tuzlaci and Aymaz, 2001; Guarrera, 2005; Guarrera et al., 2005a; Estomba et al., 2006

Table 1: Contd.....

<i>Scientific name</i>	<i>Family</i>	<i>Local name</i>	<i>English name</i>	<i>Plant part(s) used</i>	<i>Medicinal use</i>	<i>Traditional preparation</i>	<i>Recorded literature sources defining similar usages</i>
<i>Mentha spicata</i> L.	Lamiaceae	Yarpuz	Spearmint	Leaf	Carminative Against gastralgia	Fresh leaves are boiled and the stock is drunk.	Tuzlaci and Erol 1999; Pieroni and Quave 2005; Pieroni et al. 2005; Estomba et al. 2006; Pieroni et al. 2013
<i>Mentha x piperita</i> L.	Lamiaceae	Nane	Peppermint	Leaf	Stomachic, Against nausea	Fresh and dried leaves are boiled and the stock is drunk.	Mert et al. 1993; Baytop 1999; Natarajan et al. 2000; Di Stasi et al. 2002; Sandhu and Heinrich 2005; Cavender 2006; Estomba et al. 2006
<i>Momordica charantia</i> L.	Cucurbitaceae	Kudret narý	Bitter melon	Fruit	Stomachic, To treat gastritis and ulcer	Thinly sliced fruits are kept in honey or olive oil until completely dissolved and then consumed (1-2 tbsp) on an empty stomach in the mornings.	Mert et al. 1993; Baytop 1999; Gurbuz et al. 2000; Repetto and Llesuy 2002; Murakami et al. 2002; Grover and Yadav 2004; Uzun et al. 2004; Beloin et al. 2005
<i>Morus nigra</i> L.	Moraceae	Karadut	Black mulberry	Fruit	Against diarrhea	Fruits are boiled and the stock is drunk.	Bnouham et al. 2002
<i>Myrtus communis</i> L.	Myrtaceae	Mersin	Myrtle	Leaf and fruit	Against diarrhea	Leaves and/or fruits are boiled and the stock is drunk.	Chopra et al. 1986; Baytop 1999; Tuzlaci and Erol 1999; Merzouki et al. 2000; Bnouham et al. 2002; Said et al. 2002; El-Hilaly et al. 2003; Sandhu and Heinrich 2005
<i>Origanum majorana</i> L.	Lamiaceae	Mercankö"k	Sweet marjoram	Aerial part	Against indigestion and gastralgia	Aerial parts are boiled and the stock is drunk.	Baytop 1999
<i>Origanum onites</i> L.	Lamiaceae	Izmir kekiđi	Pot marjoram	Aerial part	Against gastralgia	Aerial parts are boiled and the stock is drunk.	Mert et al. 1993; Tuzlaci and Erol 1999
<i>Paliurus spina-christi</i> Mill.	Rhamnaceae	Karaçalý	Jerusalem thorn	Fruit	Stomachic, Laxative	Fresh or dried fruits are boiled and the stock is drunk.	Baytop 1999; Karaman and Kocabas 2001
<i>Pistacia lentiscus</i> L.	Anacardiaceaea	Sakýz	Mastic tree	Gum mastic	Against gastralgia	Its gum is chewed.	Al-Said et al. 1986; El-Hilaly et al. 2003; Loi et al. 2004;

Table 1: Contd.....

Scientific name	Family	Local name	English name	Plant part(s) used	Medicinal use	Traditional preparation	Recorded literature sources defining similar usages
<i>Pistacia terebinthus</i> L.	Anacardiaceae	Çitlenbik	Terebinth	Leaf	Stomachic, To treat gastritis and ulcer	Leaves are boiled and the stock is drunk.	Nedelcheva 2012 Vidrich et al. 2004 Yesilada et al. 1995; Tuzlaci and Aymaz 2001
<i>Plantago major</i> L.	Plantaginaceae	Sinirotu	Common plantain	Leaf	Against gastralgia	Fresh leaves are boiled and the stock is drunk.	Yesilada et al. 1993; Baytop 1999; Tuzlaci and Tolon 2000; Sezik et al. 2004; Guarrera 2005; Kala 2005
<i>Punica granatum</i> L.	Punicaceae	Nar	Pomegranate	Fruit	Against diarrhea	Fruit is directly eaten or squeezed and juice is drunk.	Baytop 1999; Borrelli and Izzo 2000; Vidal et al. 2003; Palombo 2006; Ricci et al. 2006
<i>Quercus ithaburensis</i> Decne. subsp. <i>macrolepis</i> (Kotschy.) Hedge. & Yalt.	Fagaceae	Palamut me ^o esi	Valonia oak	Fruit	Stomachic, Against diarrhea	Dried, broken or ground fruits are boiled; this stock is mixed with water and drunk.	Baytop 1999; Said et al. 2002
<i>Rumex patientia</i> L.	Polygonaceae	Labada	Dock Patience dock	Leaf	Laxative	Fresh leaves are boiled and the stock is drunk.	Baytop 1999; Silig et al. 2004; Suleyman et al. 2004
<i>Salvia officinalis</i> L.	Lamiaceae	Adaçayý	Sage	Leaf	Against gastralgia	Fresh leaves are boiled and the stock is drunk.	Zeybek 1985; Mert et al. 1993; Baytop 1999; Zafar et al. 2003
<i>Viscum album</i> L.	Loranthaceae	Ökseotu	Mistletoe	Leaf and fruit	Against diarrhea	Leaves and fruits are boiled and the stock is drunk.	Baytop 1999; Pieroni et al, 2005

Further analysis on the families of medicinal plants that are used against gastrointestinal disorders has shown that family Lamiaceae is represented by the highest number of species (five species). Rosaceae are represented by three species. These are followed by Anacardiaceae, Asteraceae and Fabaceae, each represented by two species. The rest are represented by one species each (19 families). When the studies conducted in areas close to our study area were examined, it was seen that the medicinal plants used in and around Izmir province were mostly from Lamiaceae, Asteraceae and Fabaceae families (Ugulu et al. 2009), while the medicinal plants used in Western Anatolia belonged to Asteraceae, Rosaceae and Lamiaceae families (Kargioglu et al. 2008).

All parts of various plants are used in the traditional medication of different gastrointestinal disorders. However, the most frequently used parts are leaves followed by fruits. These parts are followed by all aboveground parts. Figure 2 displays the result of analysis on medicinal plant parts used to treat gastrointestinal disorders. It was concluded from similar studies on plants used for medicinal purposes that most used parts of the plants are leaves with 54% in China and Thailand (Inta et al. 2008), 44% leaves and 29% root in Ethiopia (Wondimu et al. 2007), 22%

leaves in Iran (Ghorbani et al. 2005), 36% leaves in Izmir in Turkey (Ugulu et al. 2009) and 26% leaves in Western Anatolia. These results are in agreement with Giday et al. (2003), where leaves are found to be the most frequently used parts.

Often, different parts of a single plant may be concocted and used for a particular type of ailment. For example the leaves and fruits of *Viscum album*, *Myrtus communis* and *Cydonia oblonga* are concocted to treat diarrhea, while the aerial parts of *Hypericum perforatum* are concocted to treat stomach ulcers.

When other studies concerning nearby areas were evaluated, it was seen that decoction and infusion are the methods mostly used for the preparation of the folk medicine (Tuzlaci and Tolon 2000; Kargioglu et al. 2008; Ugulu et al. 2009). People still continue to follow the traditions of their ancestors. Sometimes, local people also use other ingredients, such as sugar, honey, and oil to prepare the remedies. Some plants are also used as food-vegetable plants (that is, *Malva sylvestris* and *Anethum graveolens*), appetizer (*Amygdalus communis*), fruit (that is, *Cerasus avium* and *Cydonia oblonga*) and beverage (*Coffea arabica*).

It is revealed that some of the plants are collected for commercial purposes by local people: *Amygdalus communis*, *Cerasus avium*, *Citrus x*

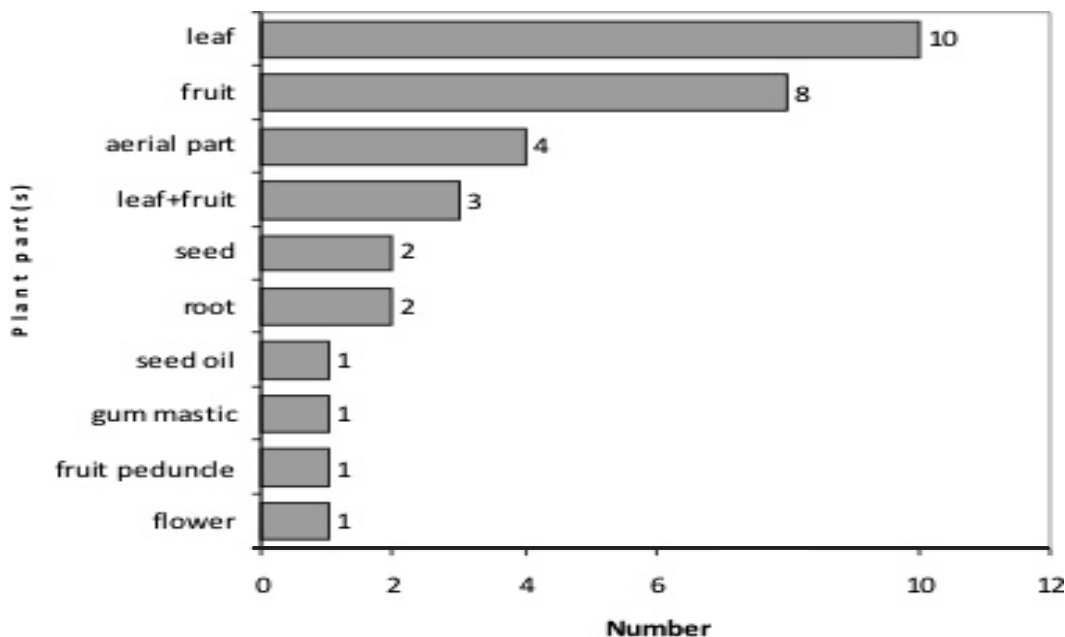


Fig. 2. Parts used of medicinal plants

limon, *Cydonia oblonga*, *Malva sylvestris*, *Mentha x piperita*, *Morus nigra*, *Pistacia lentiscus*, *Punica granatum*, *Salvia officinalis* are largely cultivated for harvesting. These plants have great economic importance in Turkey and, *Malva sylvestris* and *Cerasus avium* are also exported abroad. *Anethum graveolens*, *Ceratonia siliqua*, *Hypericum perforatum* and *Origanum onites* are wild harvested and these plants are sold bazaars and markets.

Ugulu et al. (2009) have investigated plants used by the locals for medicinal purposes in 28 districts of Izmir province. They determined that a total of 108 plants are used for the treatment of various ailments. Only 34 of these plants are reported to be used against gastrointestinal disorders. When we compare this figure with 33 plant species we obtained in our study encompassing 4 districts of Izmir province, it is possible to allude that, in general, there is a consistency and homogeneity in the use of plants against gastrointestinal disorders in the area.

Data Analysis

At the end of the study, it was seen that gastrointestinal system ailments, for which the folk medicinal plants are mostly used, are as follows: constipation, diarrhea, gastritis and ulcer, intestinal winds, nausea, gastralgia and indigestion. Informant consensus of medicinal plant usage with Izmir resulted in informant consensus factor (F_{ic}) values between 0.56 and 0.84 per gas-

Table 2: Informant consensus factor by gastrointestinal ailments

Category	Number of species (N_s)	All species (%)	Number of use-reports (N_{ur})	F_{ic}^*
Gastritis and ulcer	5	15.1	27	0.84
Intestinal winds	2	6.1	6	0.80
Constipation	7	21.2	29	0.78
Diarrhea	9	27.2	33	0.75
Indigestion	13	39.4	38	0.67
Gastralgia	8	24.2	17	0.56

*Informant Consensus Factor, $F_{ic} = N_s - N_{ur} / (N_s - 1)$, providing a value between 0 and 1, where “1” indicates the highest rate of informant consensus.

trointestinal disorders category. The category that had the highest F_{ic} value was gastritis and ulcer (0.84) followed by intestinal winds (0.80). The lowest is gastralgia (0.56) (Table 2). *Origanum majorana* (100%) had the highest fidelity level and *Convolvulus arvensis* (42%) had the lowest (Table 3).

When the articles in which the informant consensus factor is calculated are examined, it is seen that; cold and influenza have the highest F_{ic} value (0.82), followed by cough (0.73) and hemorrhoids, and enteritis have the lowest F_{ic} value (0.30). In the present study, it was found that the average F_{ic} value was 0.58.

Cakilcioglu and Turkoglu (2010) examined the diseases in 10 categories in a study they conducted in another area of Turkey. In these categories, the highest F_{ic} value was reported to be 0.62 while the lowest F_{ic} value was reported to

Table 3: The most commonly used medicinal plants against gastrointestinal disorders and their major uses with their fidelity level

(0= The least, 100= The highest efficiency)

Species	Local name	Uses	Fidelity Level (FL) (%)
<i>Origanum majorana</i>	mercanköşk	Against indigestion and gastralgia	100
<i>Origanum onites</i>	Izmir kekiði	Against gastralgia	96
<i>Hypericum perforatum</i>	kantaran otu	Stomachic, to treat stomach ulcer	95
<i>Glycyrrhiza glabra</i>	meyan	Stomachic, against gastralgia to treat gastritis and ulcer	92
<i>Mentha x piperita</i>	nane	Stomachic, against nausea	87
<i>Salvia officinalis</i>	adaçayý	Against gastralgia	85
<i>Camellia sinensis</i>	çay	Against diarrhea	82
<i>Laurus nobilis</i>	defne	Against indigestion	78
<i>Morus nigra</i>	karadut	Against diarrhea	74
<i>Matricaria chamomilla</i>	papatya	Treatment of gastrointestinal disorders, carminative	74
<i>Amygdalus communis</i>	badem	Laxative	68
<i>Coffea arabica</i>	kahve	Against indigestion	62
<i>Citrus x limon</i>	limon	Against diarrhea	53
<i>Anethum graveolens</i>	dereotu	Antispasmodic, carminative	48
<i>Convolvulus arvensis</i>	tarla sarmaþýðý	Stomachic, laxative	42

be 0.26. In the present study, it was found that the average F_{ic} value was 0.40.

In the studies by Akerreta et al. (2007) and Black et al. (2008), the F_{ic} values were found to be 0.65 and 0.75, respectively. Although the values reached in these studies are reported to be relatively high, they are lower than the values obtained in the studies conducted in various areas of the Iberian Peninsula: 0.85 and 0.91 for a Portuguese and a Catalan region respectively (Bonet et al. 2003; Camejo-Rodrigues et al. 2003). According to the results of these studies, it is seen that F_{ic} values in these areas are high. It could be concluded that the knowledge of plants with high F_{ic} values will be transferred more as a result of satisfactory use and therefore could be utilized more effectively in treatment of certain illnesses (Teklehaymanot and Giday 2007).

The fidelity level calculated for each medicinal plant agrees with F_{ic} value. Obviously, the remedies for frequently reported ailments have the highest FL value and those with low number of reports have the lowest FL values. The remedies, such as *Convolvulus arvensis* (42%), have low FL value because the majority of the informants do not know the dosage and the methods of preparation of the remedies. The average F_{ic} value for all gastrointestinal disorder categories was 0.73, indicating a fairly high level of informant consensus compared with similar studies (Heinrich 2000).

Review of Local Names of Plants

As a result of the analysis of plant names in the Turkish Language Association (TLA) web page (<http://tdkterim.gov.tr/bts/>), it was seen that although some plant names were adopted from Arabic (harnup, hindiba, kahve, keten, kudret narý, nar, nane), from Persian (badem, dut, mepe, meyan) and from Greek (defne, kantaron, kiraz, labada, limon, mersin, palamut, papatya), most of the plant names were found to be of Turkish origin.

The plants used in Beydag, Kiraz, Odemis and Tire are known by the same or different local names in various parts of Anatolia. For example, the local names of *Hypericum perforatum*, *Amygdalus communis* in Sivrice, *Matricaria chamomilla*, *Hypericum perforatum*, *Malva sylvestris*, *Morus nigra*, *Cichorium intybus*, *Cerentonia siliqua*, *Amygdalus communis*, *Cerasus avium*, *Cydonia oblonga*, in Kýrklareli, *Che-*

nopodium album, *Convolvulus arvensis*, *Malva sylvestris* in Ankara, *Amygdalus communis*, *Cerasus avium*, *Hypericum perforatum*, *Laurus nobilis*, *Malva sylvestris*, *Mentha piperita*, *Morus nigra*, *Viscum album* in Manisa, *Cerentonia siliqua*, *Cydonia oblonga*, *Laurus nobilis*, *Malva sylvestris*, *Pistacia lentiscus* in Bodrum (Cakilcioglu and Turkoglu 2010; Ertug 2000; Kultur 2007; Simsek et al. 2004; Ugurlu and Secmen 2008) are the same with the local names used in Izmir.

The local names used for *Mentha spicata* (nane) and *Pistacia terebinthus* (cedene) in Sivrice, *Pistacia terebinthus* (menengic), *Plantago major* (kesik otu, keskin otu, bobvitsa) in Kýrklareli, *Pistacia terebinthus* (menengic, cýtlýk) in Yanýktepe, *Plantago major* (sigil otu) in Ankara, *Pistacia terebinthus* (menengic), *Origanum onites* (tulu kekik, kara kekik, dag kekigi) in Manisa, *Origanum onites* (salman kekik, incir kekigi) in Bodrum (Abay and Kilic 2001; Cakilcioglu and Turkoglu 2010; Ertug 2000; Kultur 2007; Simsek et al. 2004; Ugurlu and Secmen 2008; Dogan 2012) are different from the local names used in Izmir.

CONCLUSION

In the scope of the present study, 33 plants belonging to 25 families were detected to be used by the local people for curative purposes. The majority of medicinal plants determined in this study grow in the wild, while others are cultivated (i.e. *Momordica charantia* and *Citrus x limon*). By drying, decoctions or infusions of these plants, local people use them during the whole seasons of the year. Most commonly used plants are *Origanum majorana*, *Origanum onites*, *Hypericum perforatum*, *Glycyrrhiza glabra*, *Mentha x piperita*, *Salvia officinalis*, *Camellia sinensis*, *Laurus nobilis*, *Morus nigra*, *Matricaria chamomilla*. Most commonly used parts of the plants were the leaves and fruits. The fidelity level of plant species and informant consensus factor values for plants were calculated. The F_{ic} values were found to be fairly high level (0.73) in our calculations. Therefore, it can be thought that the data obtained are reliable.

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