

Labiatae Family in folk Medicine in Iran: from Ethnobotany to Pharmacology

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Abstract

Labiatae family is well represented in Iran by 46 genera and 410 species and subspecies. Many members of this family are used in traditional and folk medicine. Also they are used as culinary and ornamental plants. There are no distinct references on the ethnobotany and ethnopharmacology of the family in Iran and most of the publications and documents related to the uses of these species are both in Persian and not comprehensive. In this article we reviewed all the available publication on this family. Also documentation from unpublished resources and ethnobotanical surveys has been included. Based on our literature search, out of the total number of the Labiatae family in Iran, 18% of the species are used for medicinal purposes. Leaves are the most used plant parts. Medicinal applications are classified into 13 main categories. A number of pharmacological and experimental studies have been reviewed, which confirm some of the traditional applications and also show the headline for future works on this family.

Keywords: Labiatae; Ethnobotany; Ethnopharmacology; Folk medicine.

Introduction

The Labiatae family (Lamiaceae) is one of the largest and most distinctive families of flowering plants, with about 220 genera and almost 4000 species worldwide. This family has an almost cosmopolitan distribution. Some genera like *Nepeta*, *Phlomis*, *Eremostachys*, *Salvia* and *Lagochilus* have a great diversity in the Mediterranean and C/SW Asia (1-3).

Labiatae are best known for the essential oils common to many members of the family. Many biologically active essential oils have been isolated from various members of this family. The family is also famous for the presence of

diterpenoids in its members. These plants have been surely used by humans since prehistoric times. Evidence from archeological excavations shows that some species of this family, which are now known only as wild plants, had been cultivated at local scales in the past (4). This family is one of the major sources of culinary, vegetable and medicinal plants all over the world. Species of *Mentha*, *Thymus*, *Salvia*, *Origanum*, *Coleus* and *Ocimum* are used as food flavorings, vegetables and in industry. Also several species of family are used in traditional and modern medicine.

Iran has a very honorable past in traditional medicine, which goes back to the time of Babylonian-Assyrian civilization. One of the most significant ancient heritages is sophisticated experience of people who have tried over

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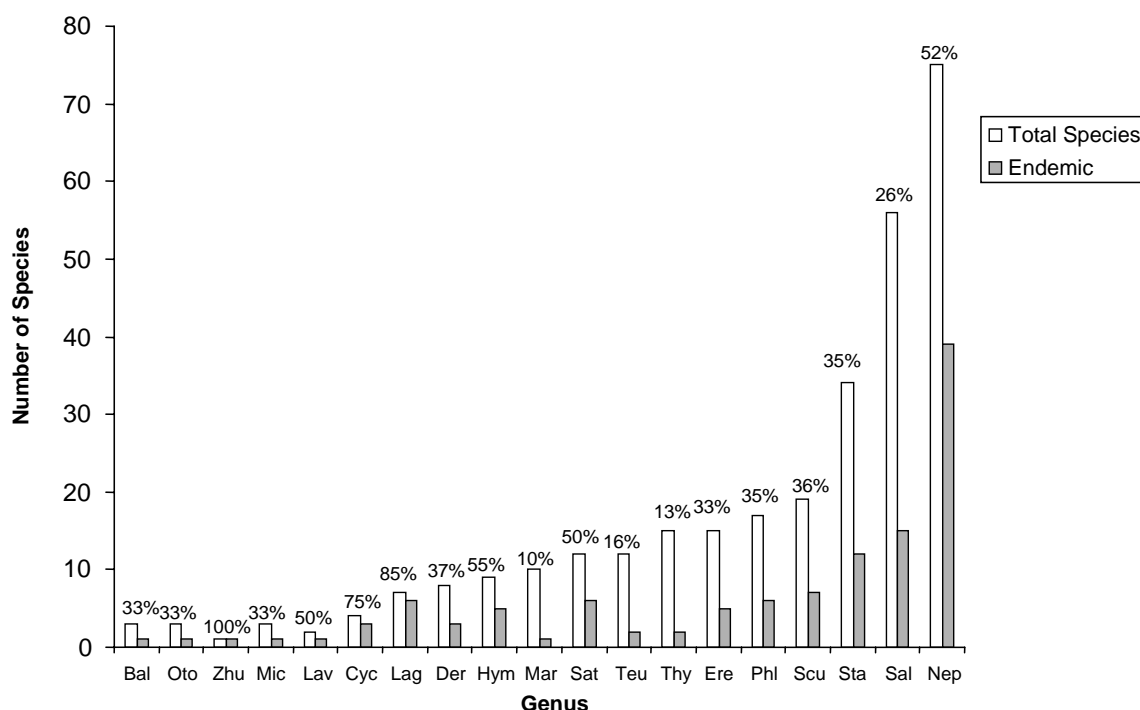


Figure 1. Percentage of endemism in the Labiatae in Iran
Teu= Teucrium; Scu= Scutellaria; Lav= Lavandula; Mar= Marrubium; Nep= Nepeta; Der=Deracocephalum; Hym= Hymenocrater; Ere= Eremostachys ; Phl= Phlomis; Bal= Ballota; Sta=Stachys; Sal= Salvia; Thy= Thymus; Oto= Otostegia; Lag= Lagochilus; Mic= Micromeria; Cyc= Cyclostegia; Sat= Satureja; Zhu= Zhumeria

millennia to find useful plants for health improvement, with each generation adding its own experience to this tradition. Because of the high rate of species diversity and endemism in Labiatae, many species are used in traditional and folk medicine in Iran. Unfortunately, there are no distinct references on the ethnobotany and ethnopharmacology of the family in Iran and most of the publications and documents related to the uses of these species are both in Persian and not comprehensive. In this article we tried to bring some of these scattered publications together. We have also attempted to identify the scientific names of some of these species in order to make them accessible for the scientific community. In addition, some pharmacognosy

student's these are reviewed and documentation from unpublished resources and ethnobotanical surveys have been included.

Chemistry of Labiatae:

This family contains a wide variety of chemicals, but discussion in this regard is beyond the scope of this article and these compounds would only briefly discussed. A wide range of compounds such as terpenoids, iridoids, phenolic compounds and flavonoides have been reported from the members of the family (5-7). Some of the short chain terpenoids in essential oils are responsible for odor and taste in these plants. *Lavandula* species contain several pleasant-smelling terpenoid compounds

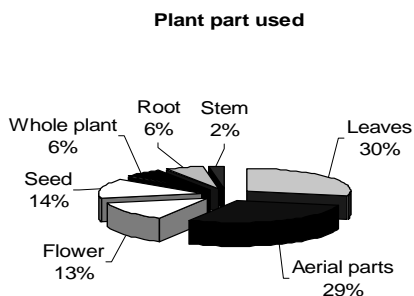


Figure 2. Distribution of plant parts used in the Labiatae family

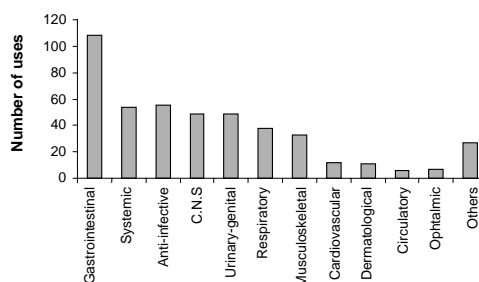


Figure 3. Frequency distribution of uses by type of illnesses in each category.

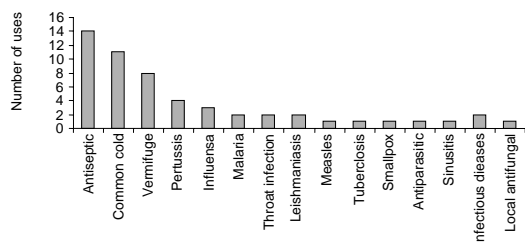


Figure 4. Frequency distribution of uses by type of illnesses in anti-infective category.

and are used in perfumes and for deterring moth damage in stored clothing (5). Lebdan diterpenoids are found in 20 genera of the family including *Ballota*, *Coleus*, *Lagichilus*, *Leonotice*, *Marrubium* and *Sideritis*. Coleon compounds (tri-cyclic diterpenoids), found in leaves and inflorescence of *Plectoranthus* and other genera, have some antioxidant properties (8). Iridoides are also found in the family and have taxonomic importance. The family is also a rich source of plant species containing large amounts of phenolic acids. For example, rosmarinic acid occurs in species of the subfamily *Nepetoideae* and it is absent in the *Lamioideae* subfamily (sensu Erdetman). This compound has anti-bacterial, anti-viral, antioxidant and anti-inflammatory properties. More and more studies carried out in numerous research centers show that the complex pharmacological activity of some medicinal plants of the family is strictly connected with the presence of phenolics (7). Flavonoides also occur in the *Labiatae* in a variety of structural forms including flavones, flavonols, flavanones, dihydroflavonols and chalcones (9).

Labiatae in Iran:

With 46 genera and 410 species and subspecies, Labiatae have great diversity and distribution in Iran. From these species, 124 species and subspecies (30%) are endemic to

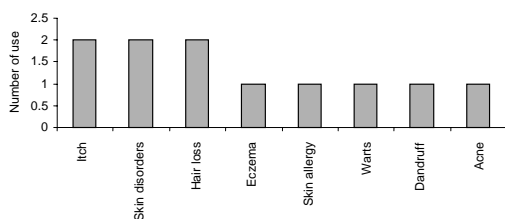


Figure 6. Frequency distribution of uses by type of illnesses in dermatological category.

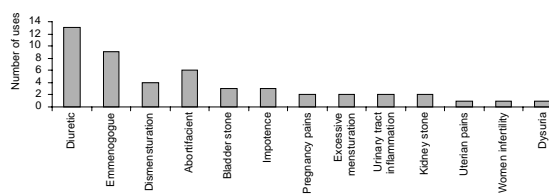


Figure 5. Frequency distribution of uses by type of illnesses in urinary-genital category.

Iran (1-3, 10). *Nepeta* (76 sp.), *Salvia* (56 sp.), *Stachys* (34sp.), *Scutellaria* (19 sp.), *Phlomis* (17 sp.), *Eremostachys* (16 sp.), *Thymus* (16 sp.) and *Teucrium* (12 sp.) are the largest genera in Iran. In addition there is a monotypic genus, *Zhumeria majdae*, occurring in the southern parts of Iran. A comparison of endemic species with the total number of species of some genera and the percentage of endemism is presented in figure 1.

The importance of Labiatae family

Members of the family are used for different purposes, but we can group their uses into three main categories; 1) medicinal; 2) ornamental and 3) aromatic plants which are used as culinary herbs, vegetables and in the perfume industry.

a) Medicinal uses:

Many species are used in traditional and modern medicine and recent investigations have proven the basis of the medicinal uses. There are diverse uses of the family members in traditional ways in different parts of the world. Based on our literature search, more than 81 species have been documented for medicinal uses in Iran, of which 16 species are not naturally grown in Iran. These species are listed in table 1, including their vernacular names, plant part used, uses and mode of preparation and administration. Out of

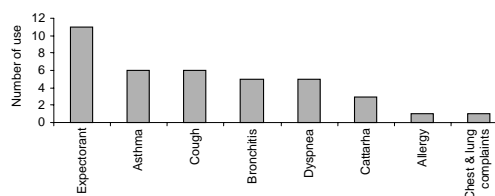


Figure 7. Frequency distribution of uses by type of illnesses in respiratory category.

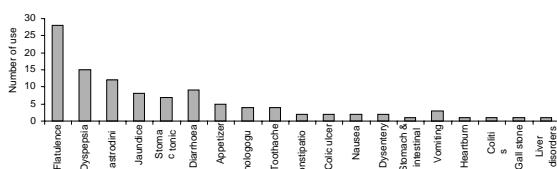


Figure 8. Frequency distribution of uses by type of illnesses in Gastrointestinal category.

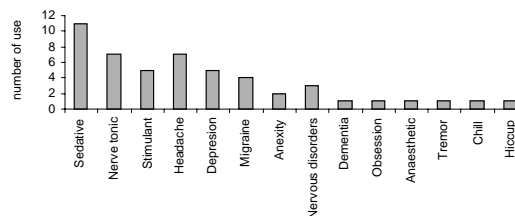


Figure 9. Frequency distribution of uses by type of illnesses in C.N.S category.

the total number of the Labiatae family in Iran, 18% of species are used for medicinal purposes. Leaves are the most widely used plant parts (figure 2). Medicinal applications are classified into 13 main categories. Statistical description of the total number of their uses related to the type of illness treated and details of their uses within each organ system are presented in figure 3 to 10.

As could be concluded from figure 3, Labiatae species are mainly used for the ailments related to the digestive system, especially flatulence and dyspepsia. The second and third most common applications are for the treatment of body problems such as reconstituent and infection, respectively.

b) Aromatic and culinary uses:

Species of *Mentha*, *Thymus*, *Lavandula*, *Ocimum*, *Origanum*, *Melissa* and *Satureja* are also used as culinary and flavoring plants. These uses are mostly due to the presence of essential oils common to the family. The Mediterranean region has been the main center for domestication and cultivation of Labiatae and many cultivated species are derived from wild ancestors of this region.

Lallemantia iberica Fisch. & C.A. Mey. was cultivated in Iran and southern parts of the former USSR as an oil-seed plant (11). *Mentha spicata* L. is used as a culinary herb and

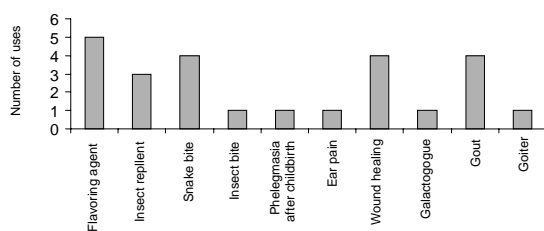


Figure 10. Frequency distribution of uses by type of illnesses without any special category.

also in toothpaste and chewing gum industry. Other species of *Mentha* such as *M. aquatica* L. and *M. longifolia* (L.) Hudson are used as wild vegetables and culinary herbs. *Satureja hortensis* L. and *S. mutica* Fisch & C. A. Mey. are used as flavoring plants. *Ocimum*, *Origanum* and *Melissa* species are cultivated as vegetables. Species of *Thymus* (Avishan) are used as culinary herbs and as tea in many parts of Iran. *Ziziphora tenuior* L. is a common teapot herb. In addition other species of the genus like *Z. clinopodioides* Lam. are very popular as teapot herbs. These species are available in local markets or in Attaris (traditional medicinal plant stores). Species of *Lavandula*, which contain aromatic terpenoid compounds, are also used in culinary and perfumery.

c) Ornamental uses:

Several genera of the family grow as ornamentals, including *Lavandula*, *Mentha*, *Molucella*, *Nepeta*, *Perovscia*, *Stachys*, *Teucrium*, *Salvia* and *Thymus*. Many species of *Stachys*, *Thymus* and *Satureja* are used as rock garden plants. Many of the decorative new world species of *Salvia* are cultivated throughout the world. *Nepeta cataria* L., *N. grandiflora*, and

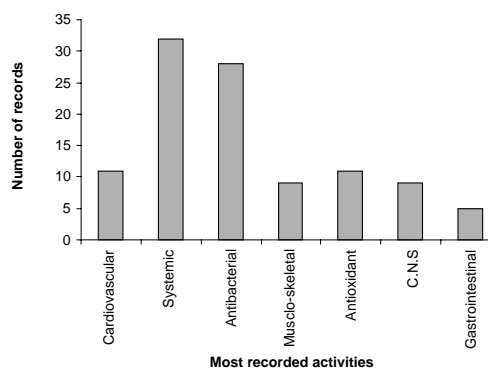


Figure 11. Assessed pharmacological activities in the main categories of health problems.

N. sibirica, with big blue flowers are among common ornamentals. Also *N. speciosa* Boiss. & Noe., *N. menthoides* Boiss. & Buhse., *N. haussknechtii* Bornm. and *N. betonicifolia* C. A. Mey. have potential to be used as rock plants (8). Species of *Lavandula* are also used in parks as ornamental plants. *Rosmarinus officinalis* L., a medicinal shrubby plant from the Mediterranean region, is cultivated in Iran for medicinal and ornamental purposes.

B- Experimental pharmacology:

Many species of the family have been experimentally studied and the efficiency of some traditional applications was confirmed by these works (figure 11). For example, the anti-bacterial characteristic of *Thymus* spp. (thyme) is due to the occurrence of thymol in this genus. This substance can be used as a disinfectant. Many other mints have also been shown to be anti-bacterials. These properties are due to the mono- and sesquiterpene in the essential oils of these plants, but, it is becoming increasingly apparent that other compounds (eg. diterpenoids) may be responsible (5). Lavender oil, which contains terpenoid compounds, is used for dandruff and scalp hair re-growth and also possesses antimicrobial, antiviral and antifungal properties. Extract of *Stachys lavandulifolia* Vahl. from aerial parts, has proven to be effective in the improvement of patients suffering from anxiety disorders. This could be attributed to the presence of anti-anxiety compounds Apigenin and Luteolin in the plant (12). *Dracocephalum moldavica* L., which contains linalool, linalyl acetate, neural, geranial, geraniol and geranyl acetate, has been used for liver and stomach diseases in Mongolian medicine. In Zabaikalie medicine it is used for nephritis, gastro-enteritis and as gargle for stomatitis. In clinical tests it has been found that a decoction shows good results in curing children's pyelonephritis (13). *Dracocephalum kotschyi* Boiss. is traditionally consumed as analgesic and for the treatment of fever and rheumatism. Experimental works have implicated that an alcoholic extract of aerial parts of the plant has analgesic, anti-inflammatory and antipyretic activities (14). Also, the essential oils induce a significant

reduction in pain responses in comparison with the controls. Presence of limonene and alpha-terpineol can be responsible for anti-nociceptive properties of these essential oils (15). There is no literature on some species used traditionally in Iran such as *Lallemantia royleana* (Benth. in Wall.) Benth., *L. iberica* (Stev.) Fisch & C. A. Mey. and *Hymnocrater elegans* Bunge. *Lavandula angustifolia* Mill. is taken for the treatment of inflammation, coughing, and digestive problems and as a sedative. Experimental assays show anti-inflammatory (Carragenin test) and analgesic (formalin and acetic acid induced writhing test) properties (16). *Marrubium vulgare* L. is traditionally used for digestive and respiratory problems (Table-1). Experimental works have also shown hypotensive, anti-nociceptive and anti-inflammatory properties (17, 18). *Nepeta cataria* is used as a sedative, blood depurative and anti-obsession drug. Experimental works have shown an anti-microbial activity against gram-positive bacteria (19). Medicinal properties of *Nepeta* species are related to terpenoids and flavonoides. Compounds such as 1-8-cineole, are very common in *Nepeta* and have expectorant, antiseptic and anthelmintic activities (8). Acetone fractions of *Satureja mutica* C.A. Mey. and *S. macrantha* were active against the epimastigotes of *Trypanosoma cruzi*, the ethological agent of Chagas disease (20). *Thymus kotschyanus* Boiss. & Hohen has extensive traditional applications, mostly for digestive problems. Pharmacological studies demonstrated anti-bacterial, hypotensive and cardiostimulant effects for this plant. A high aromatic compound content of the phenol-rich oils (carvacrol & thymol), which are found in aerial parts of the plant, seems to be accounting for the strong antibacterial activity (21, 22). An interesting result, which comes from comparison of recorded traditional uses and experimental works, is that despite the high rate of recorded traditional application, for gastrointestinal uses, few experimental works have been performed on this aspect (figure 16). This could be due to the known properties of essential oils on gastrointestinal problems. Most of the works had been carried out on systemic and antibacterial properties.

Table1. List of various plant species along with their species traditional uses.

Scientific name	Vernacular name	Part used	Traditional Uses in (as)	Pharmacological activity	Preparation Administration
<i>Ajuga chamaepitys</i> subsp. <i>tridactylites</i> (Ging. ex Benth.) P.H. Davis	Camaphytus		Jaundice, Joints pain, Gout (25)		
<i>Ajuga reptans</i> L.		L.	Reconstituent, Fever, Asthma, Gout (26)	Vasoconstrictor (27)	
<i>Calamintha graveolens</i> Benth.	Faranj-e mishk	Se.	Impotence, Stimulant (28) (29) Acne, Eczema, Depression, Nerves tonic (30)		Decoction Soaked in water
<i>Calamintha acinos</i>	Reyhan-e-vahshi		Bronchitis, Pertussis, Dyspnea, Measles, Smallpox Antiseptic for U.T. (30)		Decoction
<i>Dracocephalum kotschyi</i> Boiss.	Zarin giah	Wh.P.	Fever (31) Analgesic (15) Rheumatism (32)	Antihyperlipidemic (33) Antinociceptive (15) Analgesic, Antipyretic Anti-inflammatory (32)	Decoction Infusion
<i>Dracocephalum moldavica</i> L.	Badrashbi	A.p. Se. L.	Heart tonic (34);Reconstituent (29) (35); Sedative (34) (36) (37);Flatulence (29) (35);Vermifuge (31), Diaphoretic, Snakes bites and stings, Nausea (35)	Antifungal (14)	Distilled water Decoction
<i>Eremostachys glabra</i> Boiss		Rh.	Analgesic (local), Inflammation (38)	Antioxidative (39)	
<i>Hedeoma pulegioides</i>	Pudneh	A.p.	Headache, Flatulence, Stimulant, Emmenagogue Diaphoretic, Flavoring agent (28)		
<i>Hymnocrater elegans</i> Bunge.	Gol-e-serwaj	Fl.	Excessive menstruation (29)		Decoction
<i>Hyssopus officinalis</i> L. var. <i>angustifolia</i> (M. B.) Boiss.	Zofa Gol-e-puneh	A.p.	Cattarrh (28) (40), Fever, Rheumatism (28) Flatulence, Diaphoretic (28) (29) Stimulant (29), Spasm (40)	Muscle relaxing (41) Inhibitory on alpha-glucosidase, ostprandial Hyperglycemia (42)	Infusion Decoction
<i>Lallemantia royleana</i> (Benth. in Wall.) Benth. <i>L. iberica</i> (Stev.) Fisch & C.A. Mey	Balangu shirazi Balangu shahri	Se. R.	Fever (31); Common cold, Expectorant, Coughing (43) Reconstituent, Stimulant, Diuretic (14) Expectorant (14) (28) (29)		Soaked in water Sap as tea
<i>Lamium galeobdolon</i> L.	Gazaneh-e-zard	A.p.	Fever, Malaria, Warts, Constipation, Hair loss Rheumatism, Dandruff, Hemorrhage (9); Depreesion, Nerve tonic (92)		Decoction
<i>Lavandula dentate</i> L. <i>L. stoechas</i> L.	Ostokhodus Ossoghodus	Fl. L	Cattarrh (28) (29) (26),Malaria (28) (45); Diarrhea, Nervous disorders, Vomiting, Sedative, Antiseptic for wounds (28) (29) (26), Heart tonic, Nerves tonic, Dyspepsia, Anemia (46)	Anticonvulsant, Sedative Antispasmodic (47)	Infusion
<i>Lavandula angustifolia</i> Mill.	Ostokhodus	L.	Inflammation (16) Coughing, Flatulence, Diuretic, Spasm, Sedative (37)	Anti-inflammatory Analgesic (16) Cytotoxicity (48) Neuroprotective, Miticidal, Anaesthetic (28)	Extract

Table1. List of various plant species along with their species traditional uses. (Continued)

<i>Lavandula vera</i> D.C.	Ostokhodus (cultivated)	Fl. Se.	Depression, Migran (49)	(<i>Lavandula officinalis</i>) Diuretic (50) Antiallergic (51) Angioprotective(52)	
<i>Marrubium vulgare</i> L.	Gandna kouhi Ferasuon Yol-ghutli	Wh.P	Fever (31) (26), Nausea, Colitis, Bronchitis, Inflammation, Edema (30), Heart tonic (26); , Appetizer (30) (26) Diuretic (26), Cholagogue (30) (53) (26), Vermifuge, Expectorant (30), Dyspepsia (54), Ear pain (53); Abortifacient (36), Emmenagogue (53) (26)(36)	Hypoglycemic (119) Hypotensive,Vasorelaxant (45)(56), Antinociceptive (17), Anti-inflammatory (18)	Decoction
<i>Marrubium anisodon</i> K.Koch.	It-sieq, Narfiz Yol-ghutli	St. L	High blood pressure, Cardiac pains, Spasm, Flatulence, Dyspepsia, Women infertility (54)		Decoction Poultice
<i>Melissa officinalis</i> L.	Barangbo Badranjbuyeh	Fl. St. L. Se.	Gout, Palpitations, Tremor Blood depurative (30) Sedative (34) (37) (26) (57) (49), Diuretic (34) (46) Flatulence (37) (53) (57) (26), Flavoring agent (37) (53) Wound healing (37), Hair loss, Expectorant, Hiccup (53) Reconstituent, Dyspepsia, Emmenagogue, Joints pain Diaphoretic (57), Spasm, Headache (49), Impotence (46) Snake bites &stings (40)	Relaxant (58) Heart rate decreasing (59) Fungitoxic (60) Antimicrobial (61), Human CNS cholinergic receptor binding (62), Antioxidant (63), Anti- inflammatory (64), Cytotoxic (MTT) (65) Antiviral; HSV- 1(66) Neurotropic, peripheral analgesic– induce sleep (67), Anti-HIV-1 (68)	Decoction
<i>Mentha sylvestris</i> L.	Poneh Fudenj	L.	Rheumatism, Dysenthy, Dyspepsia (28) (29) Skin allergies, Stimulant (28), Chills (29)		Infusion
<i>Mentha piperata</i>	Naana felfeli khalvash	A.p.	Flatulence (30) (26), Inflammation, Dyspepsia, Jaundice, Throat infections Diaphoretic, Diuretic (30); Reconstituent, Stomach tonic (26)	Antimycobacterial (69) Antifungal (20,39) Antimicrobial (70) Antiallergic (71) Virucidal (72) Antioxidant (73) Radioprotective (74)	Decoction
<i>Mentha arvensis</i> L	Naana sahree		Flatulence, Constipation, Jaundice, Spasm, Diaphoretic Diuretic (30), Reconstituent, Stomach tonic (26)		Decoction
<i>Mentha longifolia</i> (L.) Hudson <i>M. longifolia</i> var. <i>chlorodictya</i> Rech. F. <i>M. spicata</i> L.	Poneh, Bideneh Yarpuz Naana vahshi	A.P. L	Bladder stone, Gall stone, Rheumatism, Jaundice, Diarrhoea (30); Toothache, Stomachache, Anti-infection (43) Dyspnea (30) (54), Flatulence , Gastrodynia (34) (29) Dyspepsia, Sedative (29), Stomach tonic, Reconstituent (26) Insect repellent (57)	(<i>M. longifolia</i>) Cyclooxygenase inhibitor (75) HIV 1 inhibitory (76) (<i>M. spicata</i>) Anti- inflammatory Haemostatic (77)	Decoction Distilled water Food additive Infusion
<i>Mentha aquatica</i> L.	Puneh, Bidanah	A.p.	Reconstituent, Stomach tonic (26)		
<i>Mentha sativa</i>	Naana sabz	L.	Jaundice, Dyspepsia, Diarrhoea, Cholagogue (30)		

Table1. List of various plant species along with their species traditional uses. (*Continued*)

<i>Nepeta bracteata</i> Benth.	Zofa	A.P.	Asthma, Flatulence (34), Bronchitis, Tuberculosis, Pertussis, Dyspnea, Goiter (30), Common cold (30) (8)		Decoction
<i>Nepeta cataria</i> L.	Alaf-e-gorbehdashti		Spasm, Anxiety, Sedative, Obsession, Nerves tonic Blood depurative (30)	Antimicrobial activity(19) Repellent activity(80)	
<i>Nepeta racemosa</i> Lam.	Gol-e-moro	Fl.	Gastrodynia, Flatulence, Antiseptic (34)		
<i>Nepeta micranta</i> Bunge. <i>N. ispahnica</i> Boiss.	Zofa	A.P.	Flatulence (29), Common cold (8)		Infusion
<i>Nepeta crispa</i> Wild.		L.	Culinary & medicinal agent (8)		
<i>Nepeta binaloudensis</i> Jamzad		A.p.	Common cold (8)		
<i>Nepeta pungens</i> (Bunge) Benth.		A.p.	Common cold (8)		
<i>Nepeta pogonosperma</i> Jamzad & Assadi		L.	Bacterial & fungal disease (8)		
<i>Nepeta menthoides</i> Boiss. & Buhse.	Ostokhodus	A.p.	Gastrodynia, Sedative (34), High blood pressure, Bone pain Nervous disorders, Rheumatism, Blood depurative (30)		Decoction
<i>Nepeta glomerulosa</i> Lam.			Itch, Skin disorders (26)		
<i>Ocimum basilicum</i> L.	Reyhan	Se. L.	Urinary tract inflammation (34), Chest & lung complaints (29) (10), Diuretic, Reconstituent, Flatulence (26)Nerves tonic, Colic ulcer, Dyspepsia (30), Inflammation, Diarrhoea, Appetizer (37), Expectorant (34)(79), Galactagogue (79) Influenza (28) (29) (10)	Antimicrobial (81) Antioxidant (82), Anti-inflammatory (83)	Decoction Infusion
<i>Ocimum minimum</i>	Reyhan-e-siyah		Insect repellent, Dysuria (30)		Decoction
<i>Ocimum canum</i> Sims.	Reyhan-e-kouhi	Se.	Heart tonic, Expectorant (29)	(<i>Ocimum sanctum</i>) Hypotensive (84) Antioxidant, Neuroprotective (85) Anti-ulcerogenic, ulcer-healing (66) Antithyroidic (86) Anti-inflammatory, Analgesic, Antipyretic (87)	Ice drink
<i>Ocimum majorana</i> L.	Marzangush	A.p	Rheumatism, Eye pain, Headache (79)	(<i>Ocimum gratissimum</i>) Cardiovascular (88), Wound-healing (89), Relaxant (90) Anthelmintic (91) Antidiarrhoeal (92) Analgesic, Spasmolytic (93)	infusion

Table1. List of various plant species along with their species traditional uses. (Continued)

<i>Origanum vulgare</i> L.	Marzanjush Kaklic-oti Oshomek-e-Kerek	A.P.	Toothache (28) (53); Kidney stone (54); Flatulence (28) (34) (54) (49); Rheumatism (28); Headache (28) (37); Sedative, Anxiety (30); Diaphoretic (28) (34); Emmenagogue (28) (37) (26); Reconstituent (28) (34) (26); Flavoring agent (54), Diuretic (34) (37) (26); Antiseptic (34); Nerves tonic (30) (26) (46) Vermifuge (53); Asthma, Jaundice (26); Spasm, Diarrhoea (49); Heart tonic (46), Gastrodynia (79)	Inhibition of thrombin Anticancer (94) Radical scavenging (95) Anti-hyperglycemic (96) Anti-H. pylori (97), Antifungal (98)	Decoction Mix with yoghurt Bath
<i>Origanum dictamnus</i>	Poneh kouhi		Dyspnea, Bronchitis, Allergy, Depression, Itch, Dementia (30) Abortifacient (49)		Decoction
<i>Otostegia persica</i> (Burmm.) Boiss.	Goldar, Gudar, Kas-e Goli	Ap.	Analgesic, Rheumatism, Toothache (99)	Antioxidant (100,101)	
<i>Perovskia abrotanoides</i> Kar.	Barazmbel	R.	Leishmaniasis (31,102)	Leishmanicidal (102)	Sap, applied directly Poultice made of crushed root
<i>Perovskia artemisioides</i> Boiss.	Barazmbel	R.	Leishmaniasis (31)		Sap/ applied directly Poultice made of crushed root
<i>Phlomis tuberosa</i> L.		L.	Culinary use (26)		Grilled
<i>Rosmarinus officinalis</i> L.	Aklil-e-kouhi	L. Fl.	Appetizer, Migrane, Gastrodynia, Rheumatism, Nervous disorders, Antiseptic for wounds (30) Diuretic (30) (37) (26), Flatulence, Inflammation, Analgesic (37), Cholagogue (30) (26)	Preventing liver damage(103) Insecticid (104), Antioxidant (105), Antinociceptive (106) Trypanocidal (107) Diuretic (108) Antiulcerogenic (109) Hyperglycemic, insulin release inhibitory (110) Relaxant (111)	Decoction
<i>Salvia aethiopsis</i> L.		R. Wh.P.	Flatulence, Reconstituent (26)		
<i>Salvia aegyptica</i> L.	Maurlin	Se.	Eye disorders (29), Diarrhoea (26)		
<i>Salvia bracteata</i> Banks & Soland	Maryam goli-e- kouhi		Snake bites, Insect bites, Insect repellent, Flatulence Antiseptic for wounds (30)		Maceration in vinegar Decoction
<i>Salvia officinalis</i> L.	Maryam goli-e- kouhi	L. Fl.	Dyspepsia, Diuretic, Fever, Emmenagogue (26) Antiseptic for wounds (26) (37)	Antioxidant (112) lipid absorption inhibitor(113) treatment of patients with mild to moderate Alzheimer's disease(114)	
<i>Salvia hydrangea</i> D.C. ex Benth.	Gol-e-aruneh	Fl.	Fever, Flatulence, Rheumatism (34), Excessive menstruation (29), Common cold, Flavoring agent, Diuretic (37)	Antiplasmodial (115)	Decoction

Table1. List of various plant species along with their species traditional uses. (Continued)

<i>Salvia sclarea</i> L.		L. Fl.	Reconstituent, Emmenagogue, Antiseptic (26)	Antifungal (116) Antimicrobial (117)	Decoction
<i>Salvia macrosiphon</i> Boiss.	Tokhm-e-marv	Se.	Heart disturbances during pregnancy, Phelegmasia after childbirth (28) (29) (10), Reconstituent (28) (29), Coughing (34) (30), Pertussis, Angina, Sinusitis, Eye disorders (30) Expectorant (34)		Syrup Decoction
<i>Salvia viridis</i> L.	Bash-ashagh	Se.	Eye pain, Eye cleanser (54), Stomach tonic (26)	Antibacterial (118)	Moisted seeds used directly for cleansing eyes
<i>Satureja hortensis</i> L.	Marzeh	Se. A.P.	Stomach & intestinal disorders (119), Muscle pain (34) (120) Rheumatism (34), Colic ulcer, Stomach tonic, Impotence, Depression, Nerves tonic (30), Bone pain (30) (120), Dyspnea (30) (57), Anti-parasitic (31) (57), Vermifuge (30) (26)	Antispasmodic and anti-diarrhoeal (120) Antimicrobial (121) Anti-inflammation (122)	Decoction Sap as bathing for antiparasitic effect
<i>Satureja mutica</i> Fisch & C.A.Mey	Kemer-oti	A.p	Flavoring agent, Flatulence (54)		Additive
<i>Satureja khuzistanica</i> Jamzad	Marzeh khuzestani	A.p.	Inflammation , Toothache, Common cold (123), Antiseptic Analgesic (123) (124)	Antihyperlipidemic(in rat) Antidiabetic, Antioxidant (124)	
<i>Stachys byzantina</i> K. Koch.	Bezalagh	L.	Infected wounds, Cutting, (43)		Decoction, Demulcent
<i>Stachys turcamanica</i> Trautv.	Sim-kesh	Wh.p.	Foot inflammation, Toothache, Bronchitis, Influenza (54)		Infusion Demulcent Vapor
<i>Stachys lavandulaefolia</i> Vahl.	Marzanjush Tuklijeh, Chai alafi	L.	Fever (31) (57), Spasm (29), Gastrodynia (28) (29) Dyspepsia (34) (44); Sedative, Flatulence (57)	Anxiolytic (110)	Infusion Decoction
<i>Stachys germanica</i>	Tuklijeh	Fl.	Gastrodynia (28) (29), Painful menstruation (28)		Infusion
<i>Stachys schtschegleevii</i> Sosn. <i>S. inflata</i> Benth.			Asthma, Rheumatism, Infectious disease, Influenza (126)	Anti-inflammatory (126)	
<i>Teucrium chamaedrys</i>	Komaderios	A.p.	Jaundice, Bladder stone, Dyspepsia (25); Abortifacient (36)	Acute hepatitis due to ingestion of <i>T. chamaedrys</i> infusions (127)	
<i>Teucrium polium</i> L. <i>T. scordioides</i> Schreb.	Maryam-nokhodi Kalporeh Bakhsh-yeushan	A.p.	Pregnancy pains (28) (29), Flatulence (34) (54) (29), Analgesic (34), Liver disorders (54), Jaundice (53), Coughing, Abortifacient (37)	Analgesic, Antiinflammatory (128) Hypoglycemic (129) Antispasmodic (130) Antipyretic antibacterial (131) Hypolipidemic (132)	Infusion
<i>Teucrium stocksianum</i> Boiss	Kalporeh	A.p.	Fever (29)		

Table1. List of various plant species along with their species traditional uses. (Continued)

<i>Thymus serpyllum</i> L.	Kushan-e shirazi	L.	Flatulence (28) (29), Expectorant (49)	Antibacterial (21)	Infusion Additive
<i>Thymus pubescens</i> Boiss. & Kotschy ex Celak <i>T. carmanicus</i> Jalas.		L.	Rheumatism, Skin disorders (133)	Antibacterial (21)	Bath
<i>Thymus daenensis</i> (Subsp. <i>daenensis</i> Celak)	Avishan	Wh.p.	Fever (31), Diuretic, Vermifuge, Flatulence, Appetizer, Toothache (37)	(<i>Thymus vulgaris</i>) Anti-inflammatory (134) Antifungal (135) Human platelet aggregation inhibitors (136) Spasmolytic (137) inhibitory on H. pylori (138)	Decoction
<i>Thymus kotschyanus</i> Boiss.& Hohen	Avishan	A.p.	Gastrodynia, Joints pain (34), Common cold (34) (35), Flatulence (34) (57) (26) (133), Bone pain, Redness eyes, Blood depurative, Stomach tonic, Antiseptic (30), Coughing, Appetizer (30) (57), Kidney stones (43) (57), Reconstituen, Diuretic, Analgesic, High Blood pressure Uterine pains, Headache, Vomiting, Heartburn, Asthma, Catarrh, Inflammation & irritation of urinary organs (43), Expectorant, Emmenagogue, Spasm, Vermifuge, Sedative, Diaphoretic (133)	Antibacterial (139) Hypotensive, cardiotonic (22)	Decoction Infusion Vapor Powder (additive)
<i>Zataria multiflora</i> Boiss.	Avishan Ab-i-sham Avishan-e-shirazi Oshomek-e-peen	A.p.	Fever (31); Flatulence (29) (37); Pregnancy pains (29) (10) Rupture (29); Bone pain, Gastrodynia (34); Common cold (34) (37); Headache, Migran (30); Antiseptic (30) (140); Antiseptic, Haemostatic, Diarrhoea, Vomiting (79); Spasm, Anaesthetic (140); Joints pain, Diarrhoea, Vermifuge (37); Local antifungal (49)	Antinociceptive Anti-inflammatory(140) Antimicrobial (141)	Infusion Decoction Vapor
<i>Zhumeria majdae</i> Rech.& Wen.		D.S.L	Gastrodynia, Antiseptic, Painful menstruation (142)(143)(26)	Antinociceptive, Anti-inflammatory (143)	Preparation like tea
<i>Ziziphora tenuior</i> L.	Kakuti Pinah koei	A.p.	Fever, Dysentery (28) (29), Flatulence (144) (37) (26) Coughing (144) (37), Painful menstruation, Emmenagogue Bladder stone (144), Stomach tonic (28) (29) (10) Expectorant (37) (26), Diarrhea (37); Abortifacient (36)		Infusion Mix with doogh
<i>Ziziphora persica</i> Bunge.	Kaklic-oti	L.	Flatulence, Dyspepsia(54)		Infusion, Decoction
<i>Ziziphora clinopodioides</i> Lam.	Annakh Avishan-e-barik Moshk-e-toramashir	L. Fl.	Common cold, Inflammation, Antiseptic (34), Dyspepsia, Sedative (54), Expectorant (53), Migran, Depression (57) Stomach tonic, Gastrodynia, Fever, Heart disorders (26)		Infusion, Vapor Decoction Maceration

A.p. = Aerial parts, S= Seed, L= Leaf, Fl= Flower, R= Root, Rh. = Rhizome, Wh.p. = Whole plant, St. = Stem

C- Comments on some species:

Many species of the family, especially endemics, are used locally by indigenous people in different parts of Iran and there is little information or documented references about their uses. For example Maur (*Salvia aegyptica* L.) seeds are used locally in Baluchestan for eye diseases. The genus *Salvia* is well known for production of mucilage, when seeds are wetted. The mucilaginous layer around the seeds contains complex polysaccharides, which form a soft layer around the seeds. This layer may well have a cleansing effect, and polysaccharides are known to be useful in the treatment of inflammatory conditions and bacterial or viral infections (23). The same use for seeds of *Salvia viridis* L. is reported in the Turkmen Sahra area. *Nepeta pogonosperma* Jamzad & Assadi is used as an anti-fungal and anti-bacterial agent by Bedouins of Alborz Mountains (8) and *Leonorus cardiaca* L. and species of *Lamium* are used locally in Mazandaran (24).

Some species mentioned in table 1 do not occur naturally in Iran and could have been cultivated or imported from other countries such as India. For example, there are only two species of *Lavandula* growing naturally in Iran, *L. stricta* Del. and *L. sublepidata* Rech. K. These species are not mentioned as medicinal plants in references; however *L. soechas* L., *L. vera* DC., *L. angustifolia* Mill. and *L. dantata* L. have been referred to in table-1. From the genus *Ocimum*, only the *O. basilicum* L. occurs naturally in Iran. Other species may be cultivated or imported from other countries. Based on Flora Iranica, *Calamintha graveolens* and *C. acinos* do not occur in Iran and only *C. officinalis* Moench, *C. debilis* (Bunge.) Benth. and *C. grandiflora* (L.) Moench grow in Iran. Species of *Mentha* are also used as vegetables and as culinary herbs. *M. aquatica* and *M. longifolia* are used as vegetables in most parts of Iran, especially in the northern regions. *M. arvensis* L. and *M. sativa* do not exist naturally in Iran, based on Flora Iranica. *Origanum vulgare* L. is an extremely variable species. In Flora Iranica, it is represented by three subspecies which are not always clearly distinct. *Origanum dictamnus* L. does not occur in Iran.

Some genera have a great number of species and a wide range of distribution in Iran, but there are either no or few records of the use of the species of these genera. For example, *Hymnocrater* has 9 species in Iran, with a wide range of distribution, but we found no record on the use of this genus. These shrubby Labiate plants have a strong odor and it seems that they contain compounds with anti-feeding activity, because in areas with a high grazing pressure, these plants remain intact. Another example is the genus *Phlomis*, again with a relatively high number of species, but with only one record of use. This demonstrates the necessity of ethnobotanical studies in different parts of Iran to record all the knowledge of folk medicine practiced among indigenous people.

Citation of species which do not occur in Iran may also be a result of misidentification of these plants. The importance of a correct scientific identification of the plant can hardly be exaggerated, since it is the only key connecting the ethnobotanical information gained with already existing biological and chemical knowledge recorded in the literature. However, vernacular synonyms in a literature search pose a major problem. In some of the traditional texts, it is not possible to match these names with scientific names. Another problem is the uncertainty regarding scientific naming of plants, because of the different vernacular names or a local name which is given to two or more species. For example, the name Zuffa is matched with two species of *Nepeta bracteata* Benth. and *Hyssopus officinalis* L. in different references or Badi-ranj Buyeh has been variously referred to the species of *Nepeta*, *Calamintha* and *Melissa* or the name Avishan is a common name given to different species of *Thymus* in different parts of Iran. Local names are not a reliable source for identification of plants, because they differ significantly from one region to another.

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