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RESEARCH PAPER

Ethnopharmacological survey of medicinal plants in semi-arid rangeland in western Iran

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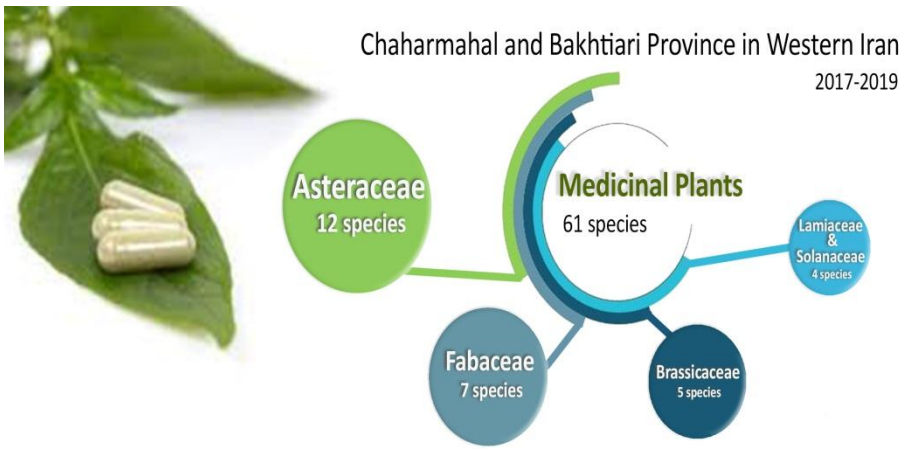
Highlights

- In this study, a number of 61 native plant species was identified by medicinal use.
- The most of the collected native species by medicinal use were belonged to Asteraceae family (12 species).
- Fruit/ seed, Leaves and flower were recognized the main parts of plants those used as the traditional medicine in Charmahal & Bakhtiari.

Graphical Abstract



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Abstract

Ethnopharmacology studies natural medicines derived from plants and other substances that have been traditionally used by groups of people to treat various human diseases. Various environmental conditions (from Tropical to Tempe ration condition) of Iran have made this country one of the major parts of plant diversity in the world. Plants have played an important role in Iranian people's life. The study is located in Chaharmahal and Bakhtiari province in western Iran (31°9' to 32°38' N and 49°30' to 51°26' E) with an area of 16,332 km^2 and a population of about 895,263. Endemic plants were collected during 2017-2019 from different locations in Chaharmahal and Bakhtiari province. Most of the studied regions were situated in orchards, highlands and neighboring farmlands. The plant raw materials were cleaned, dried and fixed at room temperature. In this study, a number of 61 native plant species with medicinal properties were collected during three years. Among the 70 people that were interviewed (mean age of 60 years old), 61 species of vascular plants were identified for treatment of various human ailments. Ethnopharmacology report is made consisting of species names, vernacular names, popular uses of the plants and their pharmacological properties. Identifying plant classification (taxa) was done in Chaharmahal and Bakhtiari Agricultural Research Center and the Iranian Research Institute of Plant Protection. The results showed that most of the collected species belonged to Asteraceae (12 species). Other families are included: Fabaceae (seven species), Brassicaceae (five species), Lamiaceae and Solanaceae (four species). This study shows the high herbal biodiversity of the medicinal plants in Iran as well as a fascinating potential for profitable studies on medicinal plant breeding, chemistry and pharmacology of the feature drugs.

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1. Introduction

Ethnopharmacology studies natural medicines derived from plants and other substances that have been traditionally used by groups of people to treat various human diseases. Ethnopharmacological studies of medicinal plants are useful in order to protect and find new uses of biological resources. Using medicinal plants to remedy human illness goes back to 2500 years ago which is transferred from elders to younger people orally, often from generation to generation. Recently, the subject of traditional medicine in Iran has received great attention in the literature, with regard to the use of medicinal plants (Rahman and Gulshana, 2014). The public tendency for the application of herbal and natural products for therapeutic purposes has enhanced in recent years. There are exciting possibilities for using plants as a source for the discovery of novel lead structures to be employed in drug industries, and also for the development of active plant extracts useful in treating a variety of ailments in humans and animals. The increasing global spread of drug's resistance to most of the available and affordable chemical drugs is a major apprehension that requires innovative strategies. Furthermore, it has been shown that more than 25% of chemical drugs are made of plants and 12% of them have microbial origins (Borris, 1996). Medicinal herbs have been introduced as the main source of the novel bio-molecule (Holland, 1994; Heinrich and Gibbons, 2001), which can theoretically be used in treating multiple lives-threatening illnesses such as malaria and cancer (Shoemaker et al., 2005; Cragg and Newman, 2005). Historical and cultural reasons are the other two factors responsible for the popularity of herbal medicines.

Various environmental conditions (from Tropical to Tempe ration condition) of Iran have made this country one of the major parts of plant diversity in the world. Plants have played an important role in Iranian people's life. Thousands of medicinal plants with potential pharmaceutical properties grow across the country. Moreover, germplasm and genetic resources are some of the more important natural wealth of any country. Documentation of the indigenous knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources Therefore, the establishment of the local names and indigenous uses of plants has significant potential societal benefits There has been an extensive global attempt to identify medicinal components of plant material, but so far less than 10% of the total of 250000 plant species have been identified and explored for more than one biological function. Understanding genetic variation among populations is required as an effective practice for the conservation of endangered plants. Chaharmahal and Bakhtiari province is known as one of the most important regions of the medicinal plant diversity in Iran. A wealth of these plants is employed by the local people for the "treatment" of several ailments. For example, Persian shallot (*Allium hirtifolium*) bulbs to treat rheumatism, pain; Flixweed (*Descurainia Sophia*) to the cough and diarrhea; Chevill (*Ferulago subvelutina*) to cholesterol, uric acid and rheumatic; Keluss (*Kelussia odoratissima*) to the "fat blood," triglycerides and many other teas for many other disorders. Considering appropriate policies based on realistic consideration concerning the current position of natural ecosystems in some suitable practices and technical methods in all dimensions, including cultivation, managing, harvest and industrial and commercial exploitation of them either in natural habitats or in mechanized farms, needs n reliable approach to achieve a comprehensive view on the role and productivity of medicinal plants in developing countries like Iran.

The present study is carried out to assess and document the folk medicinal knowledge of the populations with respect to the wild area taxons. They are liable to become lost due, not just to the advances of civilization, but also to the aging of the local people and finding our common/rare uses of medicinal species, which could lead to the expansion of new plant-based medicines. Specifically, we aimed to answer the following questions of (i) what is the diversity of medicinal plants in the study area? (ii) What parts of the plant are used as medicine and what are their medicinal properties? (iii) What are the most important ailments in the area study and what plant species are used for their treatment?

2. Materials and Methods

2.1. Study area

The study is located in Chaharmahal and Bakhtiari province in western Iran (31°09' to 32°38' N and 49°30' to 51°26' E) with an area of 16,332 km² (Fig. 1) and a population of about 895,263. The annual precipitation is varied from less than 250 mm to more than 1000 mm. December and August are the coldest and the hottest months, respectively. Numerous varieties of wild plant species, due to different ecological conditions can therefore be found. Along with increased latitude, more dense vegetation is observed. Furthermore, the existence of some places with more than 3000 m altitudes in Koohrang is accompanied by the presence of some unique medicinal species such as *Kelussia odoratissima*, *Ferulago subvelutina* and *Echinophora platyloba*. Regions with different elevation levels in the study area have suitable environments for the growth and extension of plant species in the rangeland area. These lands are the valuable resources of plant species and medicinal herbs. Moreover, there are some kinds of rare plant species with medicinal properties and multiple uses, which grow as wild populations across the rangeland and farm margins such as Liquorice (*Glycyrrhiza glabra*), Flixweed (*Sisymbrium Sophia*) and Common Thyme (*Thymus vulgaris*).

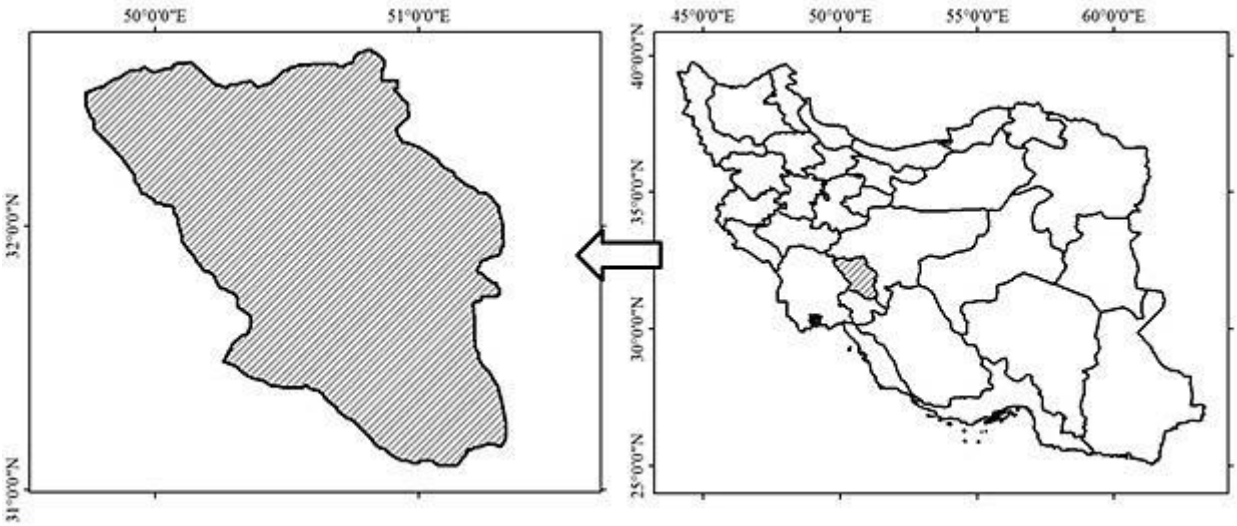

Figure 1. Location of the study area on the map of Iran.

2.2. Plant collection

Endemic plants were collected during 2017-2019 from different locations in Chaharmahal and Bakhtiari province. Most of the studied regions were situated in orchards, highlands and neighboring farmlands. The plant raw materials were cleaned, dried and fixed at room temperature. The collected plants were identified by the Research Center of Agriculture and National Resource (RCANR) and Plant Pathology Research Institute (PPR) in Tehran.

A study in the context of interviewing was performed to investigate the traditional application of plants and to identify the parts of plants used by local people. Participants of the study composed of 65 locals well-known people of both genders with an average age of 65 years from the study area. Local people were asked to collect the name of the plants, to indicate against which illnesses the plants were used and to determine the methods of plant applications. Furthermore, only those species that could be directly indicated and collected by the local persons were studied. The vernacular names were collected with the cooperation of local people. For each species, the following information was collected: botanical taxon, family name, part used, common secondary metabolites, and references (Table 1).

3. Results and Discussion

According to the study results, it was observed that eight species had the highest concentration of the Alkaloids among which are *Hyoscyamus niger*, *Datura stramonium*, *Artemisia annua* and *Artemisia persica*. These species are important for pharmaceutical value and also for providing raw material. It was observed that 18 species were significant considering essential oils. Chamomile has a high level of necessary oils and flavonoids that have multiple applications in traditional medicine are *Echinophora platyloba*, *Ferulago subvelutina, Ziziphora clinopodioides, Artemisia annua* and *Tanacetum parthenium*. A number of 10 species were important regarding flavonoid compounds among which *Kelussia odoratissima* (also of essential oils) and *Hypericum perforatum* are the most important ones (Chalibian et al., 2006).

Considering these findings and the importance of providing raw material for pharmaceutical industries, conducting extensive future studies for investigation of morphological traits, genetic variation and breeding programs, especially for those plants exposed to extinction such as Khosharize (*Echinophora platyloba*), Mokhalase (*Tanacetum parthenium*) and Keluss (*Kelussia odoratissima*)) which have not been investigated carefully seems to be necessary.

The parts used for treating ailments were included fruits/seeds (20.9%), leaves/petioles (17.7%), flowers (16.5%), stem/barks/wood (15.8%), underground parts (bulbs/rhizomes/tubers/roots) (13.9%), shoots (every parts above ground) (7.6%), and resins (3.8%). Leaves and barks were recognized as the main parts of plants used as the traditional maternal healthcare in Nigeria (Kankara et al., 2015). Leaves were recognized as the main part of plant species for preparing remedies (Kpodar et al., 2015). Furthermore, the whole plant was used in order to treat many ailments (3.8%). The most frequently used plant part was fruits/seeds (20.9%) followed by leaves/petioles (17.7%) (Fig. 2). Fruits/seeds and leaves/petioles are the most-used parts, possibly because they contain the higher amount of bioactive compounds than other parts (Rokaya et al., 2010). The harvest of the whole plant, fruits, seeds or roots affects negatively plant population growth, perhaps causing a strong decries of many medicinal plants in the natural ecosystems (Ghimire et al., 2008; Rokaya et al., 2010). In addition, the aerial parts such as leaves of the plants are maintained relatively more than other parts of the plants (Giday et al., 2003; Rokaya et al., 2010).

The results indicated that between 62 plant species with medicinal, the most frequently represented family were Asteraceae (19.36%) with 12 taxa, Fabaceae (11.29%), Brassicaceae (8.6%), Lamiaceae and Solanaceae (6.45%) (Fig. 2). Other representative families (11%) and Rosaceae (7%) are followed, respectively. Plant distribution across the province, exploited part of the plants, secondary metabolite, ethnopharmacology properties, the plant endemic and their scientific names are presented in Table 1. In this regard, investigation and comprehensive identification of the medicinal part of plants of the province needs more conceptual and financial investment from the scientific center (Table 1).

Based on the data reported by the Agricultural Research Center of Chaharmahal and Bakhtiari in 2010, the collection of plants obtained in the province is composed of 87 families, 468 genera and 1045 species, among which the most frequent genera belong to Asteraceae, Brassicaceae, and Poaceae with 69, 45 and 43 genera respectively. Among 1045 species identified in the province, 270 species possess pharmaceutical properties. The highest number of species is seen in Lamiaceae (35 species, 3.34%), Asteraceae (30 species, 2.87%), Apiaceae (20 species, 1.91%) and Fabaceae (19 species, 1.81%). Considering Raikaner's vegetative form, 46 Throphyt, 10 Cryptophyte, 119 Hemi-cryptophyt, 45 Phanerophyth , 45 Geophyt and 2 Parasite were identified. Regarding life form, 20 tree species 24 shrubs, 172 polyneal herbaceous, 7 biennial herbaceous and 3 annual occasionally biennial species have been detected.

The statistical population in this investigation covers 5.9% of the total flora of this province. As mentioned above, 270 (25.83%) species' pharmaceutical properties confirm the richness of the area in terms of medicinal plants. It was observed that fruit and seeds, leaves and petioles, flowers, stem, bark, wood and underground parts, with 20.9, 17.7, 16.5, 15.8, and 13.9% are the most utilized parts respectively (Fig. 2). Knowing the fact that utilizing underground parts such as root and tubers results in the eradication of the plants and that 22% of the

plants in this study are used for underground parts, extinction risk in these species is more serious and needs urgent attempt toward preventing their extinction.

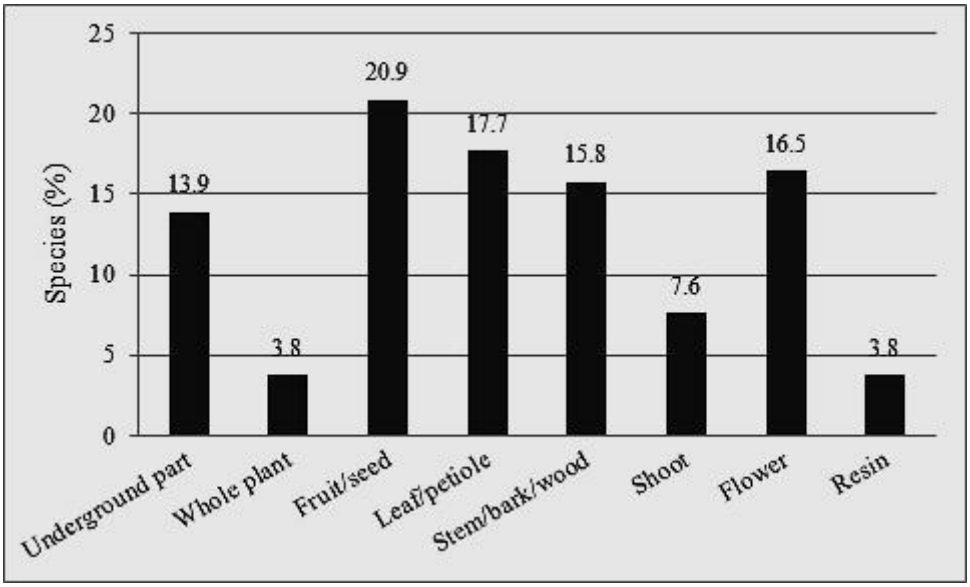

Figure 2. Number of plant parts used for the treating ailment.

Table 1. Medicinal species traditionally used in Chaharmahal and Bakhtiari province in western Iran.

Scientific name (Family)	Commune secondary metabolite	Therapeutic properties	Parts used	Reference
Acantholimon bioss (Caryophyllaceae)	Tannin, Amidon, Gallic acid	Carminative, Anti-hemintic, Astrigent, Healing	WP	Omidbaigi, 2009
Achillea aleppica (Asteraceae)	Azulene, Btonicine, Stachydrin, Mataicarin, Betaime, Luteolinn, Free Apigenin	Anti-inflammatory, regulates blood pressure, menstrual disorders, antipyretic, stimulating blood circulation	Fl, l	Omidbaigi, 2009; Zargari, 2003; Arihan et al., 2015
Alcea angulate (Malvaceae)	Mucilage, pectin, Amidon, acid valerenic	anti-cough, respiratory tract emollient, antibacterial, Producing sputum	Fl, F	Omidbaigi, 2009; Zargari, 2003
Alhagi persarum (Fabaceae)	Fructose, Sucrose	Laxative, Expectorant, Febrifuge, Diuretic, Anti-Scabies	WP, Re	Shafizadeh, 2002
Allium hirtifolium (Alliaceae)	Sulfur compounds such as: allyl propyl sulfide	Diuretic, Diaphoretic, Expectorant, Anti- Parasit, Sedative, Aromatic, Flavor, Anti-rheumatism, Anti-core	B, L	Abbas et al., 2003 ; Bahmani et al., 2015; Taran et al., 2006; Jafarian et al., 2010
Anagallis arvensis (Primulaceae)	Saponin, Glicrilazide, Cyclamin	Icterus, Expectoran, Diuretic, Pruritis, Toothache, Anti-Pustules	WP	Shafizadeh, 2002
Anthemis altisimma (Asteraceae)	Mucilage, chamazulene, luteolin-glycoside, apigenin, alfa bisabolol	Sedative, anti-inflammatory, analgesic menstruation, Memory Booster, booster digestive system	F	Acquaviva et al., 2012
Arctium lappa (Asteraceae)	Fatty acid, Oleic acid, Arctiol, Inulin, polyphenolic acid, Flavonoids	Diuretic, Diuphoretic, Stomachic, Cathartic, Febrifuge, Hypoglycemic	WP	Neves et al., 2007; Ziaie et al., 2006
Artemisia annua (Asteraceae)	Essential oils, Tannins, Inulins, Alkaloid, Mucilage	Stomachic, Diuretic, Diuphoretic, Astrigent, Vermifuge, Parasiticide	WP	Omidbaigi, 2009; Haynes and Krishna, 2004
Artemisia persica (Asteraceae)	Resin, Santonin, Artemisin, Terpens, Phllandrene, Thujone	Febrifuge, Stomachic, Disinfectant, Bechic, Vermifuge, Sadative	F	Omidbaigi, 2009

Table 1. Continued.

Astraglus gossypinus (Fabaceae)	Minerals, Saccharids, Gum	Laxative, Sedative, Hoarseness of voic, Use in preparation of drugs in emulsions and suspensions, Ophthalmia	Sy	Omidbaigi, 2009; Azadbakht, 2003
Cannabis sativa (Cannabaceae)	Cannabinol, Tetrahydrocannabinol, Cannin, Cannabinoid	Cathartic, Dysmenorrhea, Vomittiny, Alopecia, Tonic,	F, L, Sh	Omidbaigi, 2009
Capsella bursa pastoris (Brassicaceae)	Tannin, Asetilkolin, Terpenoid, Resin, Myrosinase, Tyramine	Astrigent, Diuretic, Hemostatic, Oligomenorrihea, Dysuria	WP	Shafiazadeh, 2002
Carthamus oxyacantha (Asteraceae)	Carthamin, Tartaric acid, Carthamul, Lignin, oil, Polysaccharids	Anti- Arteriosclerosis, Cathartic, Hypertensin, Abortive	F, Sd	Omidbaigi, 2009; Dini and Babakhanlou, 2002
Centaurea luristanica (Asteraceae)	Tannin, Cyanine, Pelargonien, glycosides	Febrifuge, Diuretic, Cathartic, Bechie, Expectorant, Eupepitic, Bronshit, Alopecia	F, L	Centaurea luristanica (Asteraceae)
Cardaria draba (Brassicaceae)	Essential oils, Ascorbic acid	Anti- scorbut, Breast Vulnerary, Hemorrhoid, Anti-core, Anti-dote	St, Br, L	Shafizadeh, 2002
Capparis spinosa (Capparaceae)	Flavonoids, glycosides, glucocaparin	Stomachic, Expectorant, Diuretic, Emmenagogue, Toothache, Healing, Anti-dote, Parasiticide	F, R, Br, Fb	Karanayil et al., 2011; Shemshadi et al., 2015; Zeidali and Khorshidvand, 2015
Cichorium intybus (Asteraceae)	Tannin, Mucilage, Pectin, Inulin, Laktotropes, Sesquied, Potassium nitrate	Diuretic, Laxative, Diuphoretic, Anti-pruritis, Febrifuge, Pustules, Stomachic, Disinfectant, Choleretic, Mouth Wash	R, Fb, Sh, L	Haghi and Safaie, A, 2003; Zargari, 2003
Citrullus colocynthis (Cucurbitaceae)	Citrullol, Elaterin, Albuminoid, Coloynthetin, Alkaloid, Pectin	Backache, Headache, Cathartict, Emmenagogue, Epilepsy, Amnesia Toothache, Anti-rheumatism	F, Sd, R	Omidbaigi, 2009
Convolvulus koeieanus (Convolvulaceae)	Amidone, hydrocarbons	Choleretic, Hemostatic, Vulnerary, Healing	R, L, F, Sd	Shafiazadeh, 2002; Azadbakht, 2003
Cynodon dactylon (Poaceae)	Triticin, Inosit, Potassium	Diuretic, Diuphoretic, Anti-rheumatism, Anti- Pustules, Hypoglycemic	Rh	Singh et al., 2008
Marrubium vulgare (Lamiaceae)	Tannin, Mucilage, Lipids	Stomachic, Expectorant, Astrigent, Febrifuge Emmenagogue, Anuria, Disinfectant, Choleretic	L, F, Sh	Zargari, 2003
Melilotus officinalis (Fabaceae)	Lysine, Cysteine, Phenylalanine, high level of vitamin(A, C, E, K)	Child Atony, stress, Stimulant, Anti-Migrena , Diuresis Menopause Hypotensor, Diuretic, Stomachic, Slimming	Sh, F, L, Sh	Melilotus officinalis (Fabaceae)
Onopordum acanthium (Asteraceae)	Oil, Inulin	Febrifuge, Diuretic, Astrigent, Stomachic, Hemostatic, Anitifungi, Healing	Sd, R, Sh, F	Taleie et al., 2006
Orobanche ramosa (Orobanchaceae)	Sesquiterpene	Choleretic, Cornicid, Carminative, Anti-scorbutic, Laxative, Stomachic	St	Omidbaigi, 2009
Ononis spinosa (Fabaceae)	Glycosides, Ononin, Tannin, Citric acid	Diuretic, Anti-Scabies, Disinfectant	R, F, L	Zareazadeh et al., 2010
Papaver rhoeas (Papaveraceae)	Roemerine, Alkaloid, Papaveraldine, Codeine,Cryptopine, Tannin, Resin, Anthocyanin, Papaveric acid	Blepharritis, Sedative, Expectorant, Astrigent, Hypnotic, Diuphoretic, Bechic, Hoarseness	F, Sd	Omidbaigi, 2009; Azadbakht, 2003

Table 1. Continued.

Plantago psyllium (Plantaginaceae)	Tannin, Tannic acid, Terpenes, Gallic acid, Octopine, Xylene, Mucilage, Fatty acid	Laxative, Expectorant, Febrifuge	Br, L, Sd	Singh and Chauhan, 2009
Plantago lanceolata (Plantaginaceae)	Mucilage, Tannin, Flavonoids, Saponozid, Ascorbic acid, Apigenin, Aucubin, Aucubin, Apigenin, AllAnti-on	Astrigent, Anti-Anti-diarrhea, Hoarseness of voice, Anti-Pustules, Diuretic,Toothache	L, R, Sd	Zarian et al., 2004
Peganum harmala (Zygophyllaceae)	Alkaloids such as: Harmine, Harmaline, Harmalol	Hypnotic, Febrifuge, Diuphoretic, Parasiticide Emmenagogue, Anti-fungal Galactogogue, Toothache, Disinfectant	Sd, R, L	Zareazadeh et al., 2010; Diba et al., 2011; Omidbaigi, 2009
Physalis divericata (Solanaceae)	Ascorbic acid, Citric acid, Cryptoxantine, Physalin	Anti-helmintic, Diuretic , Emmenagogue, Sedative, Laxative, Anti-rheumatism, Carminative, Leterus	F	Dini and Babakhanlou, 2002
Raphanus raphanistrum (Brassicaceae)	Essential oils, Ascorbic acid, High levels of amino acid	Diuretic, Expectorant, Anti-influenza, Anti-Scurvy, Anti-rheumatism	Sy, L, R	Shafizadeh, 2002
Reseda lutea (Resedaceae)	Essential oil, Flavonoids, Glycosides	Diuretic, Diaphoretic, Cathartic, Stomachic	R, Sd, Sh, F	Diuretic, Diaphoretic, Cathartic, Stomachic
Rheum ribes (Rubiaceae)	Anthraquinone compounds, Reide, Malic acid, Funic acid, Sulfuric acid, Resin, Oxalic acid, Tannin, Antosianin	Stomachic, Emmenagogue, Astrigent, Anti-lithiasis	Pt, R, Re	Zargari, 2003
Sanguisorba minor (Rosaceae)	Tannin, High levels of Minerals	Stomachic, Diuretic, Astrigent, Anti-cold, Hemorrhoid, Oligomenorrhea analgesic, astringent, anti-wrinkle, anti-viral,	Sanguisorba minor (Rosaceae)	Tannin, High levels of Minerals
Solanum nigrum (Solanaceae)	Solanine ,Saponin, Solasoidine Diosgenin, Tannin	Febrifuge, Hemostatic, Purgative, Toothache, Hemorrhoid	F, L	Azadbakht, 2003
Silybum marianum (Asteraceae)	Essential oils, high level of hydrocarbons	Anti-cirrosis	F, Br	Khalilian et al., 2003
Salvia sclarea (Lamiaceae)	Tannin, Phenic acid, Terpens, Acetone, Linalool, Salvion, Borneol	Anti- Hysteria, Febrifuge, Emmenagogue, Sedative, Blood suger, Toothache, Disinfectant, Analeptic, Hypotensor, Anti-core	L, Sh, F	Peana and Moretti, 2002
Tanacetum persicum (Asteraceae)	Essential oil, α-pinene, Terpenoid, Tannin, Flavonoid, Camphor	Anti-Hysteria, Emmenagogue, Astrigent, Disinfectant, Febrifuge, Insecticide, Parasiticide , Migren	L, Sh, F	Mehrnia and Biranvand, 2007; Esmaeili et al., 2010
Tragopogon caricifolius (Asteraceae)	Inulin, protein, carbohydrate, minerals	Hypotensor, Hypoglycmic, Cholertic, Astrigent, Hemostatic	F, L	Omidbaigi, 2009
Tribulus terrestris (Zygophylaceae)	Cinnamic acid, Sterol, steroid, Amino acids, Alkaloid	Diuretic, Stomachic, Febrifuge, Astrigent, Anti-scubies, Anti-lithiasis, hypotensor	L, Sh, F, R	Shafizadeh, 2002
Astragalus hamosus (Fabaceae)	Tannin, Coumarin, Flavin, Hexadecanoic acid	Expectorant, Carminative Astrigent, Sedative, Headache, Vertigo, Amnesia	F, Sd, Sh	Azadbakht, 2003; Tawaha et al., 2007

Table 1. Continued.

Datura stramonium (Solanaceae)	Hyoscyamine, Atropin, Ascopolamin, Coumarin, Vitanol, Tannin	Headache, Febrifuge, Sedative, Aphasia, Simulative,	L, Sd, F	Yousaf et al., 2008; Aslani et al., 2007
Urtica dioica (Urticaceae)	Mucilage, Tannin, Asetilkolin, Secretin, Phytosterol, Gallic acid, Histamin, Glycerol, Ka+, Fe, Si	Diuretic, Diuphoretic, Astrigent, Pustules, Alopecia, Anti-goutal, Sedative, Hypoglycemic	L, Sd, R, Sy	Daher et al., 2006
Vaccaria pyramidata (Caryphyllaceae)	High level of protein, Saponin, Oil	Diuretic, Sedative, Anti-Parasit, Febrifuge, Anti-Scabies, Hemostatic, Dysmenorrhea	F, Sd, L	Omidbaigi, 2009; Zargari, 2003
Verbascum lanceolatum (Scophullariaceae)	Saponin, Mucilage, Resin, Galactose, Arabinose	Diuretic, Diaphoretic , Anti-Hysteria, Expectorant, Emollient, Anti-asthma	F, L, R, Re	Omidbaigi, 2009; Zargari, 2003
Veronica anagallis-aquatica (Scrophulariaceae)	Tannin, Resin, Acobin, Wax	Stomachic, Tonic, Astrigent, Cicatrizing	F, L, St, Sh	Dini and Babakhanlou, 2002
Viscum album (Loranthaceae)	Viscotoxins Phoratoxin, Tannin, Terpenoid, Mucilage, Choline	Anti-oxidant, Diuretic, Hypotensor, Headache, Sedative	L, St, F	ÖnayUçar et al., 2006; Omidbaigi, 2009
Ziziphora clinopodioides (Lamiaceae)	Flavonoids, Carvacrol, Essential oil (Thymol), Tannin	Carminative, Hysteria, Ponic, Disinfectant, Diuphoretic, Expectorant, Melancholia, Migrene	L, Sh, St, F	Omidbaigi, 2009; Zargari, 2003

WP: Whole Plant, L: Leaves, St: Steam, Br: Bark, Re: Resin, F: Flower, R: Root, Sh: Shoot, Sy: Syrup

4. Conclusion

Promotional measures and strategies to prevent the increase of seed banks and vegetative organs in garden weed management for farmers should be explained. In general, research results show that weed density is high in Darreh Shahr gardens, so weed management methods should be improved to control weeds. Also, according to the results of this research, the structure of weeds in city gardens is different, and this can be useful in management planning for weed control.

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