

## Ethnobotanical study of medicinal plants used in Ahar-Arasbaran (protected area in East Azerbaijan Province of Iran)

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**Abstract.** Iran is an ancient country in the usage of medicinal plants and Ahar is known as one of the richest regions of medicinal plants. The traditional knowledge about medicinal plants is the basic step in many drug productions and these kinds of information should be documented through botanical investigations. The present study is the first survey conducted in this region and its primary point is to distinguish such plants and to present their application in traditional medicine. In this study, the data was gathered by talking with indigenous individuals to identify medicinal plants with local importance developed during the 2015 and 2016 growing seasons. Scientific names and therapeutic uses are also mentioned. The results obtained from the present study indicated that there were 45 medicinal species of 23 families in Ahar and local people mainly used Lamiaceae and Asteraceae then Rosaceae, Brassicaceae and Fabaceae medicinal taxa. Medicinal plants were mostly used to treat intestinal-digestive disorders, for cold treatment and for soothing pain. According to results, significant ethnobotanical data on medicinal plants gives premise information to future pharmacological and phytochemical studies. Also, this document can be utilized as a part of protecting indigenous knowledge.

**Keywords.** Ahar; Ethnobotany; Medicinal plants; Traditional medicine.

### Estudio etnobotánico de las plantas medicinales utilizadas en Ahar-Arasbaran (área protegida en la provincia iraní de Azerbaiján del este)

**Resumen.** El uso de las plantas medicinales en Irán es conocido desde la antigüedad y Ahar está considerado una de las regiones más ricas en su uso. El conocimiento tradicional de las plantas medicinales es el paso básico en la producción de muchas drogas. Este tipo de información se debería recoger y anotar durante las investigaciones botánicas. El presente trabajo es la primera investigación de este tipo llevada al cabo en esta región. El objetivo principal de este estudio es reconocer las plantas y describir su uso en la medicina tradicional. Durante la época de floración en los años 2015 y 2016 se entrevistaron los habitantes indígenas de la región y se recogió la información relevante sobre la identificación de las plantas medicinales del interés local. Se adjudicaron los nombres científicos y el uso terapéutico de las plantas. Los resultados obtenidos en el presente trabajo indican la presencia de 45 especies de plantas medicinales pertenecientes a 23 familias en Ahar, en su mayoría Lamiaceae y Asteraceae, seguido por Rosaceae, Brassicaceae y Fabaceae. Las plantas medicinales se usan mayoritariamente para tratar las molestias del tracto digestivo, el resfriado y también para calmar el dolor. Los resultados demuestran que se han obtenido unos datos etnobotánicos significativos que permiten llevar al cabo futuros estudios farmacológicos y fitoquímicos de las plantas estudiadas. Además, el presente documento se puede usar para proteger el conocimiento indígena de la zona.

**Palabras clave.** Ahar; etnobotánica; plantas medicinales; medicina tradicional.

### Introduction

Ethnobotany is the study of how individuals of a specific culture and area utilize local plants. The history of using the medicinal plant to cure diseases goes back to ancient history. By far most of the information is still in the hands of customary healers and data of healers is either lost or go to age by the verbal. In this manner, the ethnobotanical examination tries to report the information of the healers with a specific end goal to save it for some time later (Seifu, 2004; Boucherit *et al.*, 2017; Medjati *et al.*, 2019). Botanical collection of the related ethno-organic information ought to be done before such rich legacies are lost because of different anthropogenic and other characteristic causes (Martin, 1995).

Iran with a background of thousand years of social and ethnic diversity, atmosphere and climate decent variety and richness of more than 8000 species is an appropriate instance of ethnobotanical contemplates. Iran has a long history of utilizing customary medicinal plants for fighting different diseases, which goes back to the season of Babylonian-Assyrian development. One of the most significant ancient heritages is a sophisticated experience of individuals who have attempted throughout the centuries to find helpful plants for wellbeing change and every age added their understanding to this convention (Naghibi *et al.*, 2005). Today, therapeutic plants are still generally utilized in all urban communities and towns of Iran, in particular, stores (named Attari), which customary healers (Attar

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give receipts and offer therapeutic plants. Individuals utilize therapeutic plants as curatives or palliatives of principle medical issues as per their social foundation.

Concoction drugs are utilized widely these days while medicinal plants have been utilized progressively and its generation can make a significant value. Utilization of drawn-out compound substances may have side effects, now and again as serious as the illness itself, while utilizing restorative plants part does not include such symptoms. Thalidomide in Europe is the best example of this terrible impact (Daryaie, 2006). Despite the considerable information on restorative plants performed in Iran, a couple of studies have been completed to archive ethnobotanical learning. Some researchers have examined the traditional pharmacopoeia and medicinal plants in different areas of the country (Hooper & Field, 1937; Zargari, 1989–1992; Amin, 1991; Miraldi *et al.*, 2001; Ghorbani, 2005; Amiri *et al.*, 2012, Emami *et al.*, 2012; Mosaddegh *et al.*, 2012; Rajaei *et al.*, 2012; Safa *et al.*, 2013).

Inquiring into ethnobotanical plants and archiving the gotten data can increase indigenous knowledge through medicinal plants. Consequently, prominent documents of therapeutic plants have shown fundamental significance to mitigate the erosion of indigenous knowledge of traditional medicine. The present research was initiated to assess the medicinal plant species, parts used, route of application and diseases treated in Ahar. Besides, this paper provides baseline data for future pharmacological and phytochemical studies.

## Materials and Methods

### Study area

East Azerbaijan is one of the most famous regions for possessing the oldest civilizations in Iran. Also, it is one of the richest regions in the field of medicinal herbs. It is a cold and mountainous region and it has always been influenced by the northern and Siberian cold winds. Also, the wetness of the Black Sea, the Mediterranean, the Atlantic Ocean, and heavy snowfall are common during winter.

Arasbaran is a protected area and located in East Azerbaijan. It is a large mountainous area stretching from the Qūshā Dāgh massif, south of Ahar, to the Aras River in East Azerbaijan Province of Iran. Ahar is the largest and oldest city of Arasbaran. Its approximate geographic location is 38°28'39" north latitude and 47°04'12" east longitude with the altitude of 1,360 meters above sea level. It is surrounded by the mountains Shaver in North East, Buzkashi in the south and Qashqadagh in the South East. The vast majority of people in Ahar, over 97% of the population, are Azeri. In this area, agriculture plays the main economic role. Ahar is one of the ancient cities of Azerbaijan (Figure 1). Based on the floristic regions division, Ahar belongs to the Irano-Turanian region (Armeno-Iranian province, Atropatanean sub-province; Takhtajan, 1986).

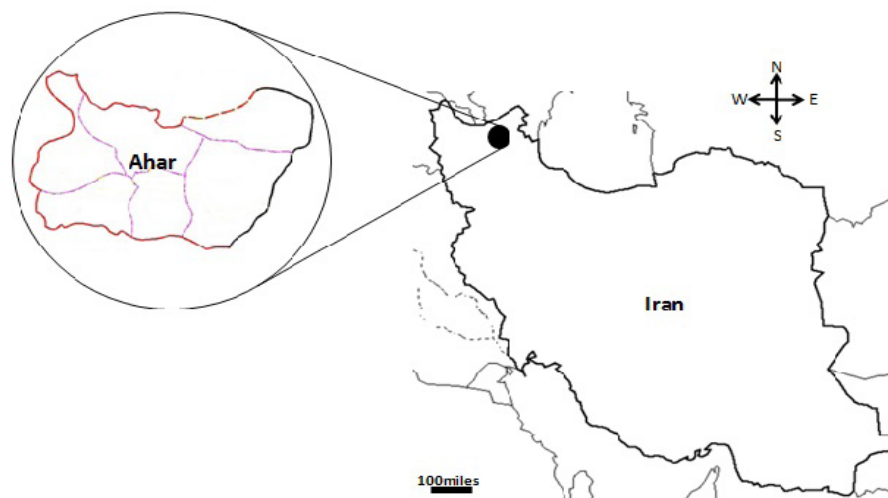


Figure 1. Map of Iran, East Azerbaijan province, Ahar.

### Ethnobotanical data collection

In order to gather information on medicinal species found in the Ahar-Arasbaran protected area, an investigation was performed during two growing seasons of 2015–2016 from April to September and all plant species encountered during field observations were recorded. Also, questionnaires were given administered to the local people, through face to face interviews. More than 100 informants (Attar) within the age of 37 to 82 including males and females were interviewed.

Ethnobotanical information, including the various data such as name and age of informants, local names, and purpose of usage, preparation procedure, and duration of the treatment were obtained through interviews and discussions. Subsequently, specimens of the reported medicinal plants were identified by a specialist with the help of available Floras (Rechinger, 1963–2009; Assadi *et al.*, 1988–2008) and consulting with different herbal literature (Zargari, 1989–1992; Hooper & Field, 1937) at the Azarbaijan Shahid Madani University Herbarium (ASMUH). In this paper, scientific and author names of

plant species were checked for accuracy according to the plant list ([www.theplantlist.org](http://www.theplantlist.org)).

**Results**

The present ethnobotanical survey gathered information on 45 plant species reported by the informants for their medicinal use (see Appendix 1). The species belong to 42 genera and 23 families. Different parts of medicinal plants

(roots, leaves, fruits and seeds, latex, etc.) were used by the local inhabitants as medicines (23). Leaf (52%) and flower (22%) followed by seed (9%), shoot (9%), fruit (4%), latex (2%) and root (2%) were among the most widely used medicinal parts (Figure 2). As shown in Figure 3, Lamiaceae (9 species) and Asteraceae (5 species) were the most frequently used families in the area, followed by Rosaceae, Brassicaceae and Fabaceae families each with three species.

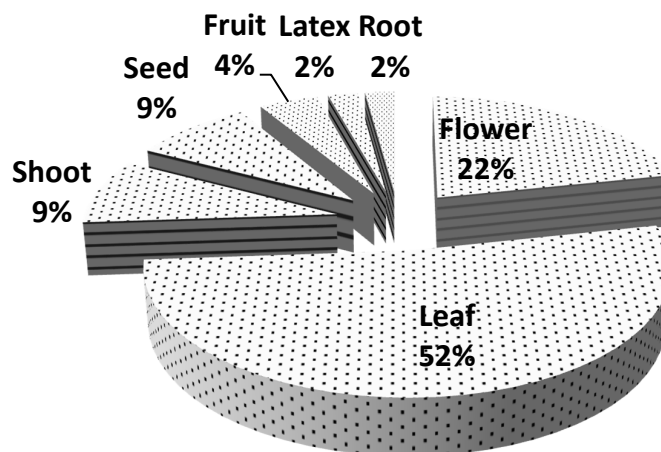


Figure 2. Distribution of plant parts used in taxa

Our research showed that the species of Lamiaceae (*Mentha longifolia*, *Nepeta menthoides*, *Stachys lavandulifolia*, *Stachys schtschegleevii*, and *Thymus kotschyanus*) are mostly used for the treatment of common cold. Moreover, the use of following plants is very common as a treatment for different disease among people: *Achillea millefolium* (stomach pain), *Althaea officinalis* (fever), *Cydonia oblonga* (cough), *Eremostachys laciniata* (rheumatism and cramps), *Malva neglecta* (pneumonia), *Peganum harmala* (infections), *Plantago major* (diarrhoea), and *Viola ignobilis* (pneumonia).

The results obtained from the present study indicate that medicinal plants of the Ahar-Arasbaran protected area are used in the treatment of different diseases, particularly for intestinal-digestive disorders (22%), soothing pain (22%), cold (20%), infections (13%), skin and hair disorders (6%), heart-blood circulatory system disorders (7%), respiratory disorders (4%), kidney and urogenital diseases (2%), menstruation and fertility disorders (2%) and muscle cramps (2%; Figure 4).

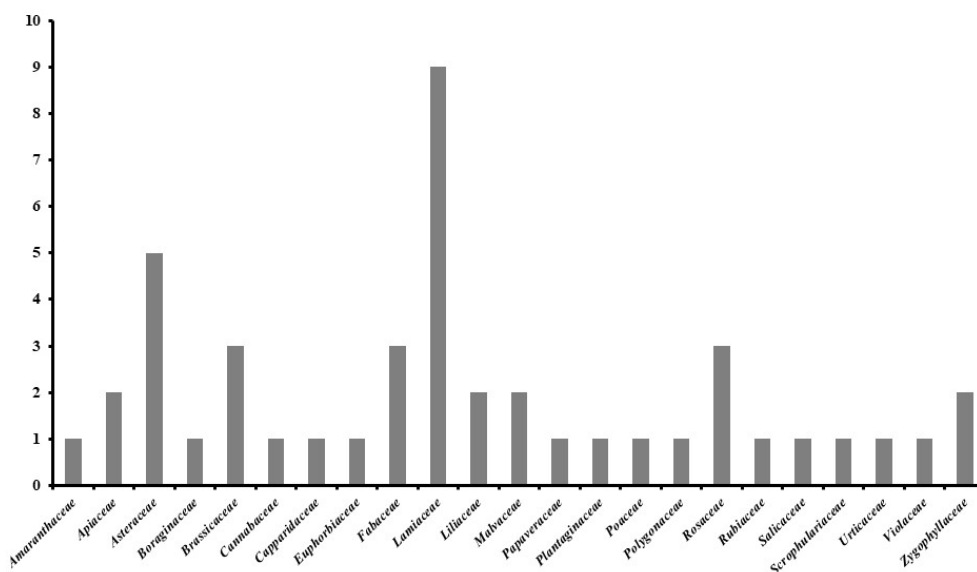


Figure 3. Number of species per family with medicinal importance found in the study area.

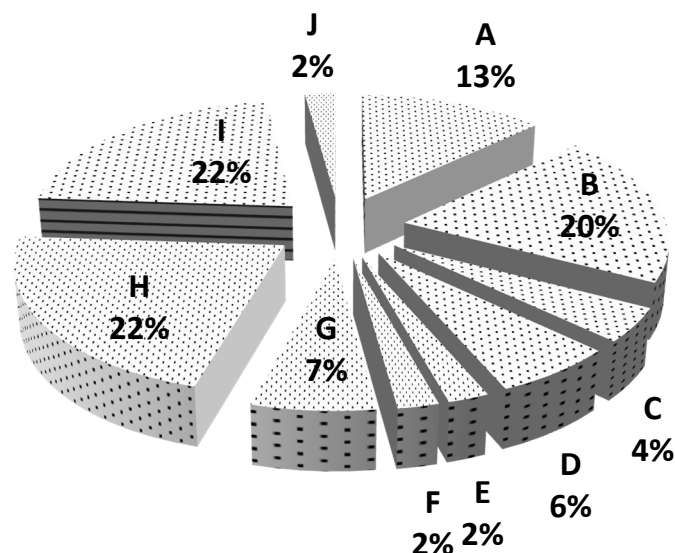


Figure 4. Medicinal plants application in different human disease treatments (in percentage).

A: anti-infection, B: cold treatment, C: respiratory disorders, D: skin and hair disorders, E: kidney and urogenital diseases, F: menstruation and fertility disorders, G: heart-blood circulatory system disorders, H: intestinal-digestive disorders, I: soothing pain, J: anti cramps.

## Discussion

The Ahar-Arasbaran protected area comprises great biodiversity of plant species, a variation of climatic and also different ecological habitats such as mountains, hills, plains, valleys, and rivers. It appears that there are many medicinal uses for the treatment of different diseases in the studied area which were rarely revealed before this. According to the current study, Lamiaceae and Asteraceae were the dominant locally used families (Figure 3) and in the previous studies on the medicinal plants in Iran, these families were in the first or second rank (Akbarinia *et al.*, 2006; Mirdavodi & Babakhanlo, 2007). This is not unexpected due to the wide diversity and dispersal of these families in the flora of Iran (Assadi *et al.*, 1988–2008).

Medicinal plants in Ahar-Arasbaran are used mainly to soothe pain and to treat intestinal-digestive disorders and common cold. All of them are very common ailments in this cold and mountainous region.

However, there are some important medicinal species in the studied region such as *Echinophora platyloba*, *Ferula gummosa*, *Foeniculum vulgare* (Apiaceae), *Achillea wilhelmsii*, *Centaurea depressa*, *Cichorium intybus*, *Echinops ritrodes* (Asteraceae), *Alyssum linifolium* (Brassicaceae), *Ziziphora tenuior* (Lamiaceae) which are not used for the medicinal purposes by local people in Ahar. Moreover, some toxic plants were recorded, e.g. *Hyoscyamus reticulatus*, *Datura stramonium*, the people avoid them because of their high toxicity.

The results of our survey show that some of the plant species play an important role in the primary healthcare system of this tribal community. This investigation shows that although people in the studied area have access to modern medical facilities, a lot of them continue to use medicinal plants for the treatment of healthcare problems. Also, this study demonstrates significant ethnobotanical information on medical plants which can be used as pattern information for future pharmacological and phytochemical surveys.

It is trusted that the rational utilization of local medicinal plants along with effective synthetic drugs may have a benefit and can improve the quality of life and living standards of the native inhabitants (Namsa *et al.*, 2011; Oliveira *et al.*, 2011). Regardless of the significance of these plants for health improvement, it appears that probably the most encouraging restorative plants have not yet been completely recognized. For this reason, documentation of the indigenous knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources (Muthu *et al.*, 2006).

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## Appendix 1. List of medicinal plant species of the study area and their uses.

Scientific name	Family	Local name	Habit	Part used	Ailment treated
<i>Achillea millefolium</i>	Asteraceae	Boymadaran	Herb	Flowers	Stomach pain, parasitic infections
<i>Alhagi maurorum</i>	Fabaceae	Dava gharni	Herb	Leaves	Infections, kidney stones
<i>Althaea officinalis</i>	Malvaceae	Khatmi goli	Herb	Flowers	Fever, hiccup
<i>Anchusa strigosa</i>	Boraginaceae	Pishi firteghi	Herb	Flowers	Cough, intestine pain
<i>Cannabis sativa</i>	Cannabaceae	Chatana	Herb	Seed	Analgesic, aphrodisiac
<i>Capsella bursa-pastoris</i>	Brassicaceae	Pishi dirnaghi	Herb	Leaves	Fever, hemorrhage
<i>Capparis spinosa</i>	Capparidaceae	Ilan gharpizi	Herb	Fruit	Migraine
<i>Chenopodium album</i>	Amaranthaceae	Yaghlja	Herb	Leaves	Strengthen the digestive system
<i>Cirsium arvense</i>	Asteraceae	Gangal	Herb	Shoots	Appetizer
<i>Cydonia oblonga</i>	Rosaceae	Heyva	Tree	Seed	Cough, cardiotionic
<i>Cynodon dactylon</i>	Poaceae	Chayir	Herb	Leaves	Fever
<i>Descurainia sophia</i>	Brassicaceae	Shovaran	Herb	Seed	Thirst, laxative
<i>Euphorbia helioscopia</i>	Euphorbiaceae	Soddian	Herb	Latex	Parasitic infections
<i>Eremostachys laciniata</i>	Lamiaceae	Chelleh daghi	Herb	Roots	Rheuma, cramps, heel spurs disease
<i>Falcaria vulgaris</i>	Apiaceae	Ghaz ayaghi	Herb	Leaves	Skin wounds
<i>Fumaria asepsala</i>	Papaveraceae	Shah tarasi	Herb	Leaves	Fever
<i>Galium aparine</i>	Rubiaceae	Bitirakh	Herb	Shoots	Wounds, skin diseases
<i>Glycyrrhiza glabra</i>	Fabaceae	Shirinbayan	Herb	Leaves	Stomachic
<i>Heracleum persicum</i>	Apiaceae	Baldirghan	Herb	Fruit	Sedative, to increase breast milk supply
<i>Ixiolirion tataricum</i>	Liliaceae	Khiyarak	Herb	Shoots	Joint pain, skin booster
<i>Lamium album</i>	Lamiaceae	Gigi tikan	Herb	Flowers	Sedative, analgesic
<i>Malva neglecta</i>	Malvaceae	Aman komangi	Herb	Leaves	Pneumonia
<i>Mentha longifolia</i>	Lamiaceae	Yarpiz	Herb	Leaves	Common cold
<i>Muscari neglectum</i>	Liliaceae	Garga soghani	Herb	Flowers	Digestive problems
<i>Nasturtium officinale</i>	Brassicaceae	Bolagh oti	Herb	Leaves	Analgesic
<i>Nepeta menthoides</i>	Lamiaceae	Osti ghodus	Herb	Flowers	Common cold
<i>Ocimum basilicum</i>	Lamiaceae	Reyhan	Herb	Leaves	Common cold
<i>Peganum harmala</i>	Zygophyllaceae	Ozarrik	Herb	Seed	Infections, stomach pain
<i>Plantago major</i>	Plantaginaceae	Bizosha	Herb	Seed	Diarrhoea
<i>Rosa damascena</i>	Rosaceae	Ghzel goli	Shrub	Flowers	Sedative, analgesic
<i>Rosa canina</i>	Rosaceae	It borni	Shrub	Flowers	Cough, headache
<i>Rumex chalepensis</i>	Polygonaceae	Avalih	Herb	Leaves	Laxative
<i>Salix aegyptiaca</i>	Salicaceae	Pish pishi	Tree	Flowers	Laxative, sedative, cough, bloating
<i>Salvia nemorosa</i>	Lamiaceae	Maryam goli	Herb	Leaves	Digestive, menstrual cramps, headache
<i>Sophora pachycarpa</i>	Fabaceae	Ajibayan	Herb	Flowers	Analgesic, parasitic infections
<i>Stachys lavandulifolia</i>	Lamiaceae	Tohloja	Herb	Leaves	Common cold
<i>Stachys schtschegleevii</i>	Lamiaceae	Sataljam alaghi	Herb	Leaves	Common cold
<i>Tanacetum balsamita</i>	Asteraceae	Shahsparam	Herb	Leaves	Bloating, stomach pain
<i>Taraxacum syriacum</i>	Asteraceae	Khabarak	Herb	Flowers	Bloating
<i>Thymus kotschyanus</i>	Lamiaceae	Kahlik oti	Herb	Leaves	Common cold
<i>Tragopogon graminifolius</i>	Asteraceae	Yem lik	Herb	Leaves	Laxative
<i>Tribulus terrestris</i>	Zygophyllaceae	Damirtikani	Herb	Flowers	Infections
<i>Urtica dioica</i>	Urticaceae	Dalama	Herb	Leaves	Analgesic
<i>Verbascum cheiranthifolium</i>	Scrophulariaceae	Sirguyrugh	Herb	Leaves	Analgesic, hemorrhoids
<i>Viola ignobilis</i>	Violaceae	Banoshah	Herb	Leaves	Pneumonia