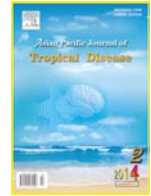




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Antiparasitic herbs used in west regions of Ilam province located in west of Iran

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ABSTRACT

Objective: To identify antiparasitic medicinal plants used by people in southern regions of Ilam province in Iran.

Methods: This study was carried out using questionnaire and interview method between February 2012 and April 2013 and also by means of public resources. Along with distributing questionnaires herbarium specimens of each plant were collected and then their genus and species were determined in the Natural Resources Research Center of Ilam province.

Results: A total of 19 medicinal plants used as antiparasitic plants belonged to 14 families were identified in southern regions of Ilam province. Majority of antiparasite herbs were related to Compositae (11%), Rosaceae (11%), Solanaceae (11%), Liliaceae (11%), and Asteraceae (11%) families. Aerial parts with 28% were the most plant organs used for the treatment of parasitic diseases. Results of this study showed that infusion with 83% is the most popular form of herbal medications in southern regions of Ilam province.

Conclusions: The report of medicinal plants belonged to northern regions of this province may provide necessary condition for researchers to identify effective substances and to study the clinical effects claimed for these plants and their effective substances on different parasitic diseases while traditional effects of these plants are documented.

1. Introduction

High prevalence of parasitic infections indicates inadequacy of health system performance^[1–3]. According to a report of World Health Organization, about 3500 million persons around the world are infected with parasites and 450 million persons get sick as a result of parasites infections per year^[4]. More than 200 thousand deaths are reported per

year due to parasitic infection^[5]. Infection with parasites and parasitic diseases are of the health problems in different communities and are considered as commercial–social barriers of development in most countries around the world, especially in developing countries. Wide spread of parasites diseases due to some causes such as illiteracy, malnutrition, lack of health facilities, increasing population growth and poverty imposes a significant burden to human societies. Intestinal parasitic infections are seen more or less in all places of the world and wide scientific development in last decades has decreased parasitic infections and mortality. But yet parasitic diseases are considered as one of the most important causes of mortality in developing countries. These diseases affect human

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health by creating malnutrition, anemia, diarrhea and low weight in human especially in children and elderly[6]. Parasitic infections are transferred directly or indirectly. The direct transfer usually happens in dense communities like kindergartens, military camps and dormitories. The indirect transfer happens through cyst and cyst is usually transferred through hand and dirty tools but direct transfer usually occurs through food and water[7].

Available drugs have weak effect or have lost their effects due to frequency of usage. Today, medicinal plants are considered as alternative drugs for many diseases like parasitic diseases and many researches have reported promising results. Using pharmaceutical products with plant origin has been more expended due to different reasons like less side effects, better acceptance of patients and lower price of medicinal plants and also more compatibility with normal physiological function of human body[8,9].

The present study aims to identify antiparasitic medicinal plants used by people in southern regions of Ilam province in Iran.

2. Materials and methods

This study was performed in southern regions of Ilam province located in the west of Iran. Ilam province has 425 km common border with Iraq. The average rainfall in southern regions is 200 mm and in northern regions is 500 mm[10].

This study was carried out using questionnaire and interview method between February 2012 and April 2013. The common effects of plants in treatment of parasitic diseases were studied by the means of direct observation and interview along with collecting herbarium specimens of indigenous medicinal plants. Questionnaires included personal information of traditional healers and a list

containing the used organ, method of the use and effect of traditional therapy. Herbarium specimens obtained from local traditional healers' information in the questionnaires were collected from the region and then were dried deposited in herbarium unit in the Natural Resources Research Center of Ilam Province. Then, specimens were identified and their species was determined by using the flora book of Ilam province[11].

Data obtained from questionnaires were entered into the excel program and were analyzed.

3. Results

After collecting questionnaires, totally 19 anti-parasite plants were identified in southern regions of Ilam province that were used in the treatment of parasitic diseases and are specified in the Table 1.

As determined, 19 plants of 14 plant families in southern regions of Ilam province had therapeutic application in treatment of parasitic diseases.

As it is seen in the Figure 1, majority of anti-parasite herbs are related to Compositae (11%), Rosaceae (11%), Solanaceae (11%), Liliaceae (11%), and Asteraceae (11%) families. The prevalence of other plant families are shown in the Figure 1.

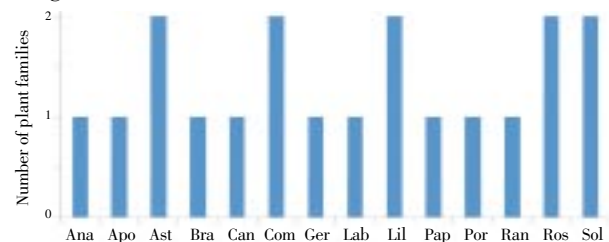


Figure 1. Number of plant families combination.

Ana: Anacardiaceae, Apo: Apocynaceae, Ast: Asteraceae, Bra: Brassicaceae, Can: Canabinaceae, Com: Compositae, Ger: Geraniaceae, Lab: Labiatae, Lil: Lillaceae, Pap: Papilionaceae, Por: Portulacaceae, Ran: Ranunculaceae, Ros: Rosaceae, Sol: Solanaceae.

Table 1

Complete botanical information, the usage method and remedial effects of plants studied.

Scientific name	Family	Persian name	Parts use	Type sue	Literature	Therapeutic effects
<i>Allium akaka</i>	Liliaceae	Valk	Leaf, Bulb	Decoction	–	Anti-parasite
<i>Artemisia sieberi</i>	Asteraceae	Dermanehe Zagrosi	Areal organs	Decoction	[12]	Anti-parasite
<i>Cannabis sativa</i>	Canabinaceae	Shahdoneh	Leaf	Decoction	[13]	Anti-parasite
<i>Consolida orientalis</i>	Ranunculaceae	Zaban pas Ghafa denae	Flower	Decoction	[13]	Anti-parasite
<i>Nasturtium officinale</i>	Brassicaceae	Alafe cheshmeh	Leaf, Flower, Root	Decoction	–	Anti-parasite
<i>Euphorbia graminifolius</i>	Compositae	Shir kosh	Areal organs	Decoction	–	Removing intestinal worms
<i>Salsola rigida</i>	Solanaceae	Alafe shoor	Areal organs	Decoction	[20]	Removing intestinal worms
<i>Bieberstehnia multifida</i>	Geraniaceae	Adamak	Areal organs	Decoction	[20]	Thick and louse
<i>Artemisia herba-alba</i>	Compositae	Dermaneh	Areal organs	Decoction	[21]	Removing intestinal worms
<i>Amygdalus arabica olivier</i>	Rosaceae	Badame Koohi	Fruit	Decoction,	[12–13]	Louse, thick and intestinal worms
<i>Astrangulus golicucanthus</i>	Papilionaceae	Gavan	Resin	Decoction, Smoke	[8]	Anti-fly larvae
<i>Nerium indicum</i>	Apocynaceae	Kharzahre	Flower and leaf	Decoction, Smoke	[8]	Anti-fly larvae
<i>Amygdalus lycioides</i>	Rosaceae	Tangras	Fruit	Decoction, Smoke	[8]	Anti-fly larvae
<i>Pistacia atlantica</i>	Anacardiaceae	Baneh	Fruit	Decoction, Smoke	[8]	Anti-fly larvae
<i>Saturiya khuzistanica</i>	Labiatae	Marzeh	Areal organs	Decoction	[8]	Anti-leech
<i>Prangos ferulacea</i>	Asteraceae	Jooshir	Flower	Decoction	[22]	Thick and louse
<i>Allium sativum</i>	Liliaceae	Sir	Root	Decoction	[23–25]	Anti-parasite

Results of analysis for the percent of using plant organs for antiparasitic consumptions showed that aerial organs with 28% were the main plant organs used in treatment of parasitic diseases. Leaf with 20% and flower with 16% were in next ranks most widely used organs of medicinal plants (Figure 2).

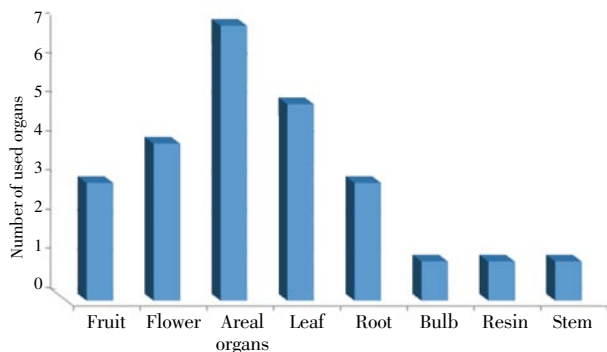


Figure 2. Used organs and their number.

Infusion with 83% was the most popular form of herbal medications between traditional healers of southern regions of Ilam province (Figure 3).

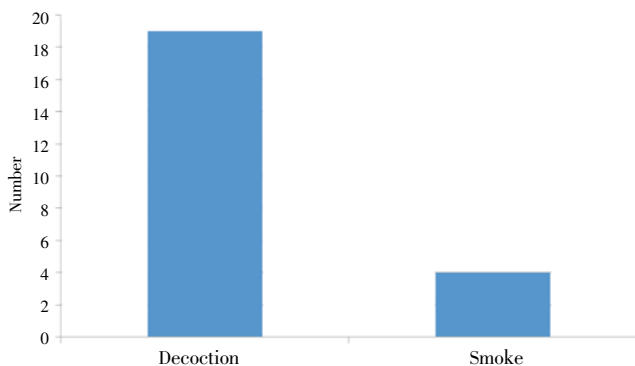


Figure 3. Number of therapeutic use method.

4. Discussion

Today, using medicinal plants in treatment of different types of diseases has become usual since these natural resources are cheap, accessible, effective, with less side effects compared to chemical drugs and are considered as a requirement in modern era[26–34]. In this study, a total of 19 medicinal plants belonged to 14 families, used in parasitic infections were identified that were reported as anti-parasite, anti-louse, anti-tick and anti-insect. With regard to importance of leech and report of infection to it, in our study the tobacco plant was reported effective on *Limnatis nilotica* (leech)[35–38]. Results of previous studies showed that plants of ginger, sagebrush, wormwood, grape etc. have positive effect on leech[39–44].

Botanical studies have been conducted on different regions of Iran. Results of botanical studies in Kerman province (east of Iran) showed that peanut is applied to treat allergy and hair loss. Sagebrush plant is used in the

treatment of fever, stomachache. *Cannabis* plant is used to treat urinary tract disorders and acts as sedative and hypnotic drug[45].

Results of ethnobotanical study performed in Kerman province showed that the *Artemisia persica* Boiss. is an intestinal anti-parasitic plant in sheep and goats and is applied to treat ringworm[46]. Results of ethnobotany study performed in Arasbaran region located in north-west of Iran showed that *Hypercom perforatum* L. plant has traditional therapeutic applications and is considered as a sedative, anti-depressant, anti-cancer, respiratory and uterine system booster and also can solve digestive problems. *Satureja hortensis* L. is used to treat acute flatulence to treat nausea, diarrhea, sexual reluctance, anorexia, and acts as an anti-cancer, anti-microbial, anti-gout drug. A species of *Portulaca* with the scientific name of *Portulaca oleracea* is used to purify blood, inflammation and acts as a diuretic drug[47]. A study performed in Shiraz, located in Fars province (south of Iran) and Mobarakeh in center of Iran showed that *Amygdalus lycioides* plant is used to heal burn. *Amygdalus lycioides* plant is also used as anti-parasite and appetizer. *Nasturtium officinale* L. is used for excretion of urinary stones. *Satureja hortensis* is used as astringent to treat muscle pain, cramps and flatulence. Also *Amygdalus* is used to treat diarrhea, nausea and indigestion and *Allium sativum* L. to treat corn, bronchitis and arthritis[48–51].

One of the bioactive substances of *Cannabis* plant is tetrahydrocannabinol compound that has antioxidant and appetizer properties[52]. Over the past decades, this plant has been used in the traditional health care systems to treat some diseases like inflammation, nausea, headache and diarrhea[53,54]. Today, compounds derived from *Cannabis* and its synthetic agonists and antagonists are used in some cases such as treatment of multiple sclerosis, cataract, diarrhea and nausea resulted from chemotherapy, also for digestion and absorption syndrome due to HIV and cancer and to treat obesity[55,56].

Arachidonyl ethanolamine, one of the main components of *Cannabis* can activate cannabinoid receptors[57,58]. Possibly antiparasitic effect that we previously reported is attributed to this substance of *Cannabis* plant.

Main ingredient of tobacco plant is nicotine. Antiparasitic effects of nicotine have been proved[14–17]. *Portulaca oleracea* L. as an antiseptic, antispasmodic, diuretic, anti-fever, antioxidant, muscle relaxant, blood filtering has medical application and also has capability to enhance the immune system and relieve thirst[19,59–61]. Studies showed that aqueous and alcohol extract of this plant have different effects on the nervous system that include motor activity decrease. Anticonvulsant effects, inhibition of neuromuscular contraction following electrical stimulation and also muscle relaxant effect of *Portulaca oleracea* L.

extract was observed in conscious mice that even relaxant effect of this plant extract was more effective than drugs such as chlordiazepoxide, diazepam and dantrolene sodium^[61–63]. It seems that reported antiparasitic effect in this study is attributed to *Cannabis* effect on the parasite immune system and parasite paresis. Plant is a rich source of fatty acids like omega-3, alpha-tocopherol, ascorbic acid, β-carotene, glutathione and alpha linolenic acid, saccharide, carbohydrate (pectin, mucilage, noradernalin, dopamine, minerals including calcium, potassium, iron, phosphorus, manganese, copper and organic acids like cinnamic acid, caffeic acid, malic acid, oxalic acid, citric acid and also including coumarins, anthraquinone and cardiac glycosides, flavonoids, alkaloids, and quercetin^[19,58–65]. *Artemisia abrotanum* L. and artemisinin have antiparasitic effect. The antiparasitic effect of *Artemisia abrotanum* has also been attributed to artemisinin^[66].

Prangos plant also has been used in traditional medicine as carminative, laxative, tonic stomach, antiparasite, antiviral, antifungal and antibacterial, anti-inflammation and also has been used to treat gastrointestinal diseases, to enhance libido, to strengthen nervous system, to relieve muscular spasm and the obstruction of the ducts, to break kidney and bladder stones and to treat swollen spleens^[67–71].

In the present condition that consumption of medicinal plants has been increased significantly and the fact that a significant percent of drugs presented in different countries have the plant origin, production of medicinal plants can play an important role in economic development of the society while the society health is supported^[72]. Iran country has long history in the field of traditional medicine and using medicinal plants in treatment of different diseases. Rich plant flora of Iran and high knowledge of Iranian in using medicinal plants, presence of valid scientific centers in cities of Isfahan, Shiraz, Ray and valid scientific resources such as the Canon of Medicine book written by Ibn Sīnā and also famous scientists such as Ibn Sīnā that propagated medicine with medicinal plants among Iranian people and also combined interest of Iranian in medicinal plants, double necessity to pay attention to this science^[73]. Different regions of Iran has tribes with different customs and culture in using medicinal plants, so conducting ethnobotanical studies in order to identify these effects provides a field to further understanding of therapeutic effects and to create modern ideas to produce new drugs. As comparison of ethnobotanical studies performed in different regions of Iran (east, south, northwest, southeast and center) showed similar plants in different cultures of Iran have completely different with various effects. Some of plants that we reported have new effects that are presented for the first time.

Conflict of interest statement

We declare that we have no conflict of interest.

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