Medicinal Trees and Shrubs Introduced And Cultivated In Iran: A Pharmacological Approach

Peyman Mikaili, Massoumeh Sharifi and Shadi Sarahroodi

1Department of Pharmacology, School of Medicine, Urmia University of Medical Sciences, Urmia, Iran.
2Islamic Azad University, Urmia Branch, Urmia, Iran.
3Department of Physiology and Pharmacology, School of Medicine, Qom University of Medical Sciences, Qom, Iran.

ABSTRACT

The herbal medicines all over its history have been firmly considered herbs and weeds used as medicines. Although the trees and shrubs have been deep effects on phytomedicine, but according to our best knowledge, there have been no comprehensive studies about the influence of the trees and the shrubs and its extent in the traditional medicine. In this study we have studied these plants in the Iranian herbal medicine from an interesting view, at least for us, that some of these plants which have been described in the ancient documents, are considered as not spontaneous in Iran. The authors have reviewed all important historical and modern literature about 26 medicinal trees and shrubs introduced and cultivated in Iran and also used in Iranian traditional medicine. This means these plants are not spontaneous in Iranian platform. It is interesting that almost all of these plants have been described in the classical texts of Iranian herbal medicine. Some traditional herbalists described the common use of tree medicines as an infusion or a decoction. These data show that some of these trees were known to Iranian scholars from Arabic, Indic or Greek-Roman tradition without seeing them closely. But it is known that the usage of these so-called not spontaneous trees was common among Iranian herbalists and scholars in the past centuries.

Key words: Phytomedicine, medicinal trees, shrubs, non spontaneous in Iran, pharmacology.

Introduction

Medicinal plants are now becoming more widely used by people all over the world. People understand the gentle strength of natural remedies. Doctors and scientists are validating the wisdom of traditional use. Because of the varied history of medicinal plants, the multitude of names has grown confusing. On the other hand, the trees, especially in the Iranian platform, have not comprehensibly been reviewed in the literature. This study reviews historically and pharmacologically almost all the known medicinal trees in modern and historical views in the Iranian traditional herbal medicine.

Methodology:

We have reviewed all important historical and modern literature about the medicinal trees and shrub used in Iranian traditional medicine. Then we selected the major references and collected the data. We compare the modern and traditional documented herbal medicine of our country and edited them as follow. All data about the terminology (if necessary some etymological information have been provided), local and native names, comparison the modern and traditional terminology and postulations about the plants, description about the medicinal parts of the plant, and finally the proposed medicinal and pharmacological activities of the trees have been presented. The detailed references have been provided for each data.

Results:

The data were collected and represented as 26 species of trees and shrubs which have been introduced and cultivated in Iran and are not reported as spontaneous in Iran. It is interesting that almost all of these plants have been described in the classical texts of Iranian herbal medicine. Some traditional herbalists described the common use of tree medicines as an infusion or a decoction. The data represented as follow.
[1] Abies Spp. L:

Description:

The genus of ‘fir’ has been introduced and cultivated in Iran in Karaj, Lāhijān and Rāmsar [12]. It has two species Abies cephalonica Link and A. nordmanniana (Stev.) Spach, called Greek fir and Nordmann fir, respectively. This genus is called narrād in Persian [10]. The medicinal part of the trees is the timber of the fir [6]. In classical texts of Persian herbal medicine, a plant called nār-qeysar perhaps may be related to Abies alba Mill., but it is uncertain [7].

Pharmacological Effects:

The essential oil has secretolytic and mildly antiseptic effects on the bronchial mucous membrane area and hyperemic effects on the skin. The constituents’ camphene, limonene and alpha-pinene are responsible for the strong expectorator effect connected with its inhalation.


Description:

It is said that ‘catechu’ is not spontaneous in Iran [10], but in the classical texts of Persian herbal medicine kāt or kāhir perhaps is related to the description of this plant [7]. It is effective for gingivitis, gastrointestinal helminthes, urinary ulcers and jaundice [9]. Black catechu is extracted from the heartwood in a process of distillation and is used in a variety of preparations.

Pharmacological Effects:

Catechu is an astringent and antiseptic.

[3] Aesculus Hippocastanum L:

The genus of ‘Horse chestnut’ or šāh-balāt hendī (in Persian) has been introduced and cultivated in Iran (Sabeti, 2006:93).

Description:

The medicinal parts are the dried Horse Chestnut leaves, the oil extracted from the peeled fruit capsules (seeds) and dried chestnut seeds.

Pharmacological Effects Of Horse Chestnut Leaf:

The main active principles of the anti-exudative effect and improvement of venous tone are hydroxycoumarins (aesculin and fraxin), triterpene saponins in the petioles and leaf veins, flavonoids and a rich supply of tannins. Although the drug is said to have an anti-exudative effect and improve venous tone, there is a lack of clinical data to support the efficacy.

Pharmacological Effects Of Horse Chestnut Seeds:

As found in different animal tests and preclinical investigations, the principal ingredient of Horse Chestnut seed extract, triterpene glycoside mixture (aescin), has an anti-exudative, vascular tightening effect, and reduction of vascular permeability which result in an antiedemic effect. The vein-toning properties of the Horse Chestnut extract also demonstrated improvement of venous return flow. A significant reduction of transcapillary filtration was seen in a placebo-controlled human pharmacological trial [1]. Significant improvement in the symptoms of chronic venous insufficiency was demonstrated in diverse, randomized, double-blind and cross-over studies [2,13]. There are indications that Horse Chestnut seed extract reduces the activity of lysosomal enzymes, which increases in chronic pathological conditions of the veins. The enzymes will break down glycoacalyx (mucopolysaccharides) in the region of the capillary walls, allowing proteins to leak into the interstitium. The activity of the enzymes is reduced by the aescin and so the breakdown of glycoacalyx is also inhibited. The transcapillary filtration of low-molecular proteins, electrolytes and water into the interstitium is inhibited through a reduction of vascular permeability by the aescin [6].

[4] Ailanthus Altissima (Mill.) Schwingle:

The tree of Heaven has been introduced and cultivated in Iran and called ‘ar’ar everywhere in this country [12].

Description:

The medicinal parts are the dried trunk and root bark.

Pharmacological Effects:

An antimalarial action is being tested in an in-vitro trial. The active agents also have astringent, antipyretic, and antispasmodic properties [6].

[5] Anacardium Occidentale L:

The Cashew has not been mentioned in the list of Iranian native trees [10]. But in classical texts of Persian herbal medicine, a plant called balúdor perhaps may be related to Anacardium spp. [7].

Description:

The medicinal parts are the finely chopped bark, the cashew nut, the fresh leaves and extracted cashew oil.
Pharmacological Effects:

It has been demonstrated in vitro that the dried extract prepared with ethanol is effective against the gram-positive bacteria Bacillus subtilis and Staphylococcus aureus. It also acts as an astringent and cauterizing agent due to the phenolic skin stimulant (anacardic acid) found mostly in the skin of the fruit, but also in the fruit itself [6].

[6] Boswellia carterii Bird W:

The Frankincense has not been mentioned as spontaneous trees of Iran [10]. But in classical texts of Persian herbal medicine, a plant called kondūr perhaps may be related to *Boswellia carterii* Bird W., although the whole morphological descriptions are not matched [7].

Description:

The medicinal part of the tree is the resin gum exuded when incisions are made in the bark of the trunk.

Pharmacological Effects:

Externally, Frankincense can cause mild irritation of the skin. Internally, it is a mild carminative [6].

[7] Croton spp. L:

The croton species as ornamental plants have been introduced and cultivated in Iran [10]. But in the classical texts of Persian herbal medicine, a plant called armal or armalak perhaps may be related to *Croton oblongifolius* Roxb. [7]. Although, it is not convincing.

Description:

The medicinal part is the dried bark.

Pharmacological Effects:

Cascarilla is a stimulant and a tonic [6].

[8] Croton tiglium L:

The croton seeds have been introduced and cultivated in Iran [10]. But in the classical texts of Persian herbal medicine, a plant called habb-ul-molāk perhaps may be related to *Croton tiglium* L. [7].

Description:

The seeds are the medicinal parts. The oil is extracted from the seeds and is toxic; 1 ml can be fatal.

Pharmacological Effects:

Croton Seed oil is a laxative, skin-irritant, co-carcinogenic, nephrotoxic. It is a drastic irritant. TPA is a carcinogen, affecting prostaglandin metabolism [6].

[9] Cytisus spp. L:

The milk trefoil, called in Persian as yonjeh-derakhtī, has been introduced and cultivated in Iran [10]. In the classical texts of Persian herbal medicine, a plant called lāhyat-ul-tīs perhaps may be related to *Cytisus hypocistis* L. [7].

Description:

The seeds are the medicinal parts.

Pharmacological Effects:

No information is available [6].

[10] Eucalyptus spp. L:

Different species of eucalyptus, about 17 species, has been introduced and cultivated in Iran [10]. In the classical texts of Persian herbal medicine, although at least a species of a plant called kāfūr (camphor) perhaps may be related to this plant [7], but it is not convincing.

Description:

The medicinal parts are the oil extracted from the fresh leaves and branch tips as well as the dried leaves.

Pharmacological Effects Of Eucalyptus Oil:

Some of the subsequent properties mentioned refer to isolated cineole. As the standardized commodity, the drug contains 80 to 90% cineole. In vitro, eucalyptus oil has an antibacterial and fungicidal effect. The drug inhibits prostaglandin biosynthesis and has a mild hyperemic, expectorant and secretolytic motor effect when used topically. In animal experiments eucalyptus was demonstrably cough relieving and displayed a surfactant effect. In vitro, the oil was enzyme inducing and improved pulmonary compliance. It is secretolytic, expectorant, mildly antispasmodic, and a mild local hyperemic.

Pharmacological Effects Of Eucalyptus Leaf:

The drug has been shown to be secretolytic, expectorant, weakly antispasmodic, deodorizing, cooling and diuretic. In animal experiments the blood-sugar level of uninfluenced plasma insulin was reduced. The euglobulin is said to have an anti-
inflammatory and antiproliferative effect in animal experiments and inhibits in vitro TPA-induced EBV-EA activity [6].


Eugenia has been introduced and cultivated in Iran and it is called in Persian as ījen or jam [10].

Description:

The medicinal parts are the dried leaves.

Pharmacological Effects:

The ethanol extract inhibits xanthinoxidasis. The essential oil has a similar effect on germinating salad seeds such as auxin. An antibacterial and antymycotic effect has also been demonstrated. In the agar diffusion test, the leaf oil was effective against Pseudomonas acruginosa, Trichophyton mentagrophytes and Aspergillus niger. It also affects fat metabolism, the oil is used against hyperlipoproteinemia. It is used as a tonic, a diuretic and an expectorant [6].

[12] Fraxinus Ornus L:

This species of ash tree is called in Persian as zabān-gonjēšk gol. It has been introduced and cultivated in Iran [6].

Description:

The medicinal part is the juice extracted from the bark starting from the 8th to the 10th year. This tree yields from its bark a sugary sap known in pharmacy as Manna.

Pharmacological Effects:

Manna acts as a laxative [6].

[13] Hamamelis Virginiana L:

The Witch Hazel has been introduced and cultivated as an ornamental plant in Iran in restricted regions. It has not described in the classical texts of Persian herbal medicine, or in the modern Flora Iranica.

Description:

The medicinal parts are the plant's hamamelis water, which is distilled from various plant parts; the bark; the fresh and dried leaves; the fresh bark of the roots and branches; and the dried bark of the trunk and branches.

Pharmacological Effects Of Witch Hazel Bark:

Witch Hazel bark is astringent, anti-inflammatory and locally hemostatic.

Pharmacological Effects Of Witch Hazel Leaf:

The tannins and tannin elements have an astringent, anti-inflammatory and locally hemostatic effect [6].

[14] Larix Spp. Mill:

The larch has been introduced and cultivated in Iran [10]. It has not been mentioned in the classical texts of Persian herbal medicine.

Description:

The medicinal part is the outer bark separated from its outermost layer.

Pharmacological Effects:

When used externally the drug has a hyperemic and antiseptic effect due the essential oil content. Its use for catarrhal infections of the upper respiratory tract also seems plausible [6].

[15] Laurus Nobilis L:

The laurel has two arboreal species in Iran. It is called in Persian as barg-e-bū [10]. In the classical texts of Persian herbal medicine, a plant called dahmāsā or rārām perhaps may be related to Laurus nobilis L. [7].

Description:

The medicinal parts are the leaves, the fruit and the oil.

Pharmacological Effects:

Laurel leaves are externally rubefacient and allergenic because of die essential oil they contain. An antimicrobial, molluscidal and insect repellent effect has been demonstrated [6].

[16] Larix Spp. Mill:

The tulip tree is called in Persian as derakht-e-lāleh, which has been introduced and cultivated in Iran [10]. It has not been mentioned in the classical texts of Persian herbal medicine.

Description:

The bark is said to have medicinal properties.
Pharmacological Effects:

The alkaloids contained in the drug are antimicrobial in effect, and a positively inotropic effect has been described. Its usefulness as a tonic and a stimulant appears to be plausible, based upon its qualities as a bitter substance [6].

[17] Magnolia Grandiflora L:

The southern magnolia has been introduced and cultivated in Iran. It is called in Persian as māgnolīyā-e-sefīd [10]. It has not been mentioned in the classical texts of Persian herbal medicine.

Description:

The bark is the medicinal part.

Pharmacological Effects:

Magnolia has diaphoretic, anti-inflammatory and stimulant effects. It is also a tonic [6].

[18] Persea Americana Mill:

The avocado has been introduced and cultivated in Iran [10]. Some plants have been considered to be related to genus Persea in the classical texts of Persian herbal medicine, however they are not concluded.

Description:

The medicinal parts are the dried leaves, die fresh leaves, the whole fruit including the seed and the oil extracted from the leaves.

The Compounds Include:

Fatty oil: chief fatty acids oleic acid, palmitic acid, linoleic acid, palmitoleic acid (tocopherols, vitamin E)

Pharmacological Effects:

Avocado oil is an emollient, which improves rough ichthyotic skin [6].

Pharmacological Effects Of Spruce Needle Oil:

The plants are secretolytic, antibacterial and hyperemic.

Pharmacological Effects Of Spruce Shoots (Fresh):

The essential oil has a secretory, mild antiseptic and hyperemic effect [6].

[20] Pinus Spp. L:

The genus pine is called in Persian as kaj. They have been introduced and cultivated in Iran [6]. However, in the classical texts of Persian herbal medicine, a plant called sanībar perhaps may be related to here [7].

Description:

The medicinal parts are the tar extracted from the trunks, branches and roots. The oil extracted from the fresh needles, branch tips or fresh twigs is also used medicinally, as are the pine tips from fresh and dried shoots. The purified oil from the resin balsam, the tar extracted from the wood, the young shoots and the flowering branches of male and female flowers with pollen are also used.

Pharmacological Effects Of Pine Shoots:

Pine shoots have secretolytic and mildly antiseptic effects and stimulate the peripheral circulation.

Pharmacological Effects Of Pine Needle Oil:

The essential oil is secretolytic, hyperemic and weakly antiseptic.

Pharmacological effects of turpentine oil (Purified)

The essential oil is hyperaemic, antiseptic and increases bronchial secretion in animal tests [6].

[21] Pistacia Lentiscus L:

The mastic tree is called in Persian as pesteh or boneh. It has been introduced and cultivated in Iran [10]. In the classical texts of Persian herbal medicine, a plant called mastakī or zarow perhaps may be related to Pistacia lentiscus L. [7].

Description:

The medicinal part is the resin.

Pharmacological Effects:

In animal experiments Mastic is ulcer protective. The amaroids and essential oil are astringent and aromatic [6].
[22] Ptelea Trifoliata L:

The wafer ash has been introduced and cultivated in Iran [10]. It is called in Persian as naterak, and it grows in the tropical regions of Iran, e.g. in Abadan [12].

Description:

The medicinal parts are the leaves, the young bark and the root bark. The plant is also used in homeopathic medicine.

Pharmacological Effects:

Wafer Ash is antimicrobial. The alkaloid content acts against microbes; pteleatinium chloride acts against mycobacterium tuberculosis and yeast fungus [6].

[23] Rhododendron Ponticum L:

The Pontian rhododendron or other species have been introduced and cultivated in Iran [10]. It has not been mentioned in the classical texts of Persian herbal medicine.

Description:

The medicinal part of the plant is its leafy branches.

Pharmacological Effects:

The drug has the effect of reducing blood pressure in animal experiments, due to the diterpenes it contains of the andromedan type (grayanotoxins). Historically, effects also have been described as stimulating, narcotic, diaphoretic and diuretic [6].

[24] Santalum Album L:

The sandalwood is interchangeable with Pterocarpus santalinus L. (red sandalwood). It is called in Persian sandal. In the classical texts of Persian herbal medicine, a plant called sandal perhaps may be related to Pterocarpus santalinus L. [7].

Description:

The medicinal parts are the oil extracted from the trunk wood, the heartwood freed from the sapwood and the bark, and the dried wood.

Pharmacological Effects:

The essential oil of Sandalwood has disinfecting effect on the urinary tract. However, if used in high doses and for long periods, it can be toxic to the kidneys [6].

[25] Terminalia Chebula Ret:

The tropical almond is called in Persian as ārjūn. It has been introduced and cultivated in Iran [10]. In the classical texts of Persian herbal medicine, a plant called hallleye-Kābōli perhaps may be related to Terminalia chebula Ret. [7].

Description:

The medicinal part of the tree is the fruit. The compounds include: Tannins: gallotannins, ellagitannins; Steroids: sterols, including betasitosterol; Triterpenes: arjunic acid and its glucosides, oleanolic acid; Flavonoids: including arjunolon, baicalein.

Pharmacological Effects:

Clinical experiments with the bark powder have demonstrated efficacy against congestive cardiac insufficiency and hypertonia. Various extracts caused lowered blood pressure, bradycardia and positively inotropic effects in animal experiments. Spasmolytic and hemostyptic qualities have also been described. The substance is said to be sedative and potentiates the activity of barbiturates. Its high tannin content explains the use of the drug as an astringent. A variety of experiments have demonstrated antibacterial, cardiotonic and antarteriosclerotic (lowering of cholesterol levels) effects for the drug [6].

[26] Theobroma Cacao L:

The cocoa has been introduced and cultivated in Iran. It is called in Persian as kākāũū [10]. It has not been mentioned in the classical texts of Persian herbal medicine.

Description:

The medicinal parts are the seed skins that remain after making cocoa and cocoa butter: the seeds which have been partly freed from their skins and lightly roasted: and the raw, dried, unroasted seeds.

Pharmacological Effects Of Cocoa Seed:

Cocoa seeds can cause constipation because of the tannin content. The drug contains methylxanthines, mainly theobromin, which have a diuretic, broncholytic, and vasodilatory effect. They also stimulate cardiac muscle performance and act as a muscle relaxant.
Pharmacological Effects Of Cocoa Seed Coat:

Cocoa can cause constipation. Cocoa contains methylxanthines, which have a diuretic, broncholytic, and vasodilatory effect. They also improve cardiac muscle performance and act as a muscle relaxant.

Pharmacological Effects Of Cocoa Butter:

The main constituents are triglycerides. High doses of cocoa butter, in contrast to similar saturated fatty acids, do not cause an increase of serum cholesterol and the LDL fraction [6].

Discussion and Conclusion:

The herbal medicine all over its history, have been firmly considered herbs and weeds used as medicines. Although the trees and shrubs have been deep effects on phytomedicine, but according to our best knowledge, there have been no comprehensive studies about the influence of the trees and the shrubs and its extent in the traditional medicine. In this study we have studied these plants in the Iranian herbal medicine from an interesting view, at least for us, that some of these plants which have been described in the ancient documents, are considered as not spontaneous in Iran. These data show that some of these trees were known to Iranian scholars from Arabic, Indic or Greek-Roman tradition without seeing them closely. But it is known that the usage of these so-called not spontaneous trees was common among Iranian herbalists and scholars in the past centuries. We propose more researches about these plants and the authentic effects of the medicinal plants of Iranian herbal medicine.

References