

A Pharmacological Approach to Medicinal Trees Described in the Classical Texts of Persian Traditional Medicine which do not Occur or No Longer Grow in Iran at Present

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Abstract: The aim of this study was historically and pharmacologically reviewing almost all the known medicinal trees mentioned in classical texts of Persian traditional herbal medicine, which are not present or do no longer grow in Iran today. 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. All plants, which were mentioned in classical texts of Iranian traditional herbal medicine, but do not occur or no longer grow in Iran at present. We compared 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 collected data were represented as twenty-three species of trees and shrubs which were mentioned in classical texts of Iranian traditional herbal medicine, but are not reported as spontaneous in Iran at present. It is interesting that almost all of these plants have been described in the classical texts of Iranian herbal medicine. These data show that Persian scholars knew these trees in the earlier times. We may suppose the following probabilities for this controversy. The Persian scholars may be aware of these plants from Arabic, Indic or Greek-Roman tradition without seeing them closely. But it is known that the usage of the plants was common among Iranian herbalists and scholars in the past centuries. We propose more researches about these plants and the exact cause of their earlier presence and accessibility to the Persians in the history and the lack of their presence today in Iran.

Key words: Classical texts, medicinal trees, persian traditional herbal medicine, pharmacology, phytomedicine, shrubs

INTRODUCTION

Medicinal plants have been long widely used by people all over the world in the history. They understood the gentle strength of natural remedies. The views and personal experiences of the early scholars have been collected in classical texts. Persian school of medicine and pharmacy has a rich treasure of classical texts. We have reviewed these texts and compared the herb-medicine and application of herbal medicine in the earlier times and the modern pharmacognosy. The results of these studies are several papers, which are already published. Meanwhile, we found out, there are several plants mentioned in classical texts of Persian herbal medicine, which do not occur or no longer grow today in Iran. According to our best knowledge, the trees, especially in the Iranian platform, have not comprehensively been

reviewed in the literature. This study reviews historically and pharmacologically almost all the known medicinal trees mentioned in classical texts of Persian traditional herbal medicine, which are not present or do no longer grow in Iran.

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. All plants, which were mentioned in classical texts of Persian traditional herbal medicine, but do not occur or no longer grow in Iran at present. We compared 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 collected data were represented as twenty-three species of trees and shrubs which were mentioned in classical texts of Iranian traditional herbal medicine, but are not reported as spontaneous in Iran at present. 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.

Betula spp. L.: The birch tree is called *ghān* or *tūs* in Persian. A single species is considered to grow spontaneously in a limited altitudes of Alborz mountains. Other species have been introduced and cultivated in Iran (Mozaffarian, 1998).

Description:

Medicinal Parts: The medicinal parts are the bark, leaves and buds.

Pharmacological effects of birch leaf: Birch leaves have a mild saluretic effect and are antipyretic. In animal tests, they have been shown to increase the amount of urine.

Pharmacological effects of birch tar: The aliphatic and aromatic hydrocarbons in birch tar are irritating to the skin and have an antiparasitic effect. Its use for diverse skin conditions and for parasitic infestation such as scabies seems plausible (Fleming, 2000).

Cassia fistula L.: The golden shower tree is called in Persian *folūs* or *senā*. It is said to be an introduced and cultivated species in Iran (Mozaffarian, 1998). But in the classical texts of Persian herbal medicine, a plant called *khyār-śambar* may be related to *Cassia fistula* L. (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts of the plant are the bark, fruit and seeds.

Pharmacological effects: The anthracene derivatives have a laxative effect. Preparations from the fruit have demonstrated antimicrobial and antiviral effects *in vitro* (Fleming, 2000).

Cedrus libani Barrel.: The cedar of Lebanon is called *sedr* in Persian, and it is said to be an introduced and

cultivated species in Iran (Mozaffarian, 1998). In the classical texts of Persian herbal medicine, a plant called *śerš* may be related to here (Ghahreman and Okhovvat, 2009). It is also said to be associated with *dīvīdār*, which is not convincing according to the descriptions of two plants in classical texts (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are the leaves, the wood and the oil.

Pharmacological effects: Cedar has an expectorant effect (Fleming, 2000).

Coffea arabica L.: The coffee is called *ghahveh* in Persian. Although either it has not been introduced and cultivated in Iran, or it is not spontaneous in Iran, but it has been long known to Iranians (Mozaffarian, 1998).

Description: The medicinal part of the plant is the seed in various forms and stages.

Pharmacological effects of coffee charcoal: Coffee charcoal contains purine alkaloids, with caffeine as the main constituent, and is absorbent and astringent.

Pharmacological effects of coffee beans: Most of the indicated effects of coffee are due to the presence of caffeine. The primary effects of caffeine can be summarized as follows: Caffeine has a positive inotropic effect. In higher concentrations, it has a positive chronotropic effect on the heart and CNS. It causes a relaxation of the smooth muscles of blood vessels (except for cerebral blood vessels) and the bronchial tubes. Moreover, caffeine works as a short-lived diuretic and produces an increase of gastric secretions and the release of catecholamines. Caffeine works competitively to block adenosine receptors that lie on cell surfaces in the brain, fat tissue, liver, kidneys, heart and erythrocytes. Heart, circulation, vessels: People who normally do not drink coffee react 1 h after an intake of 250 g, with an increase of 10 mm Hg in their systolic blood pressure.

Habitual coffee drinkers are tolerant in this regard. Blood: After 9 weeks of an average daily intake of 5.6 cups of coffee (steeped for 10 min.), the overall and LDL cholesterol increases significantly. The use of coffee filters can reduce this by up to 80%. Digestive tract: Oral intake of 200 mg of chlorogenic acid doubles gastric secretion, as does caffeine alone.

Miscellaneous: In animal studies, a diet consisting of 20% green coffee impedes the growth of DMBA-induced tumors in hamsters by 90%. Outcome of the stimulating effects of caffeine commence a few minutes subsequent to taking the drug. The maximum plasma concentration of caffeine is reached between 15 and 45 min later. The plasma half-life amounts to 4 to 6 h.

Coffee extracts made from roasted and unroasted seeds are used analogously with other drugs containing caffeine for physical and mental fatigue. The drink can

also be used therapeutically in cases of hypotonia, as an analeptic agent, in the treatment of influenza (flu) and migraine and as an additive to analgesia (Fleming, 2000).

Cola acuminata (P. Beauv.) Schott & Endl.: The cola has not been described as a spontaneous or cultivated plant in Iran. But in the classical texts of Persian herbal medicine, a plant called *jowz-ul-zanj* perhaps may be related to *Cola acuminata* (P. Beauv.) Schott & Endl. (Gahreman and Okhovvat, 2009).

Description: The seeds are the medicinal parts of the plant.

Pharmacological effects: *Cola's purine* (caffeine) content makes it a strong CNS stimulant. In humans it acts as a respiratory analeptic, lipolytic, mildly positively chronotropic and mild diuretic. In addition, it stimulates gastric acid and increases motility of the gastrointestinal tract. In animal tests. Cola is also analeptic, lipolytic, stimulates production of gastric acid and increases gastric motility (Fleming, 2000).

Commiphora molmol Enge: The myrrh also has not been described as a spontaneous or cultivated plant in Iran. But in the classical texts of Persian herbal medicine, a plant called *muql* perhaps may be related to *Commiphora molmol* Enge. (Gahreman and Okhovvat, 2009).

Description: The resin, which has exuded from the bark and dried in the air, is the medicinal part. Myrrh is the pale yellow granular secretion that is discharged into cavities in the bark when it is wounded. The exudate hardens to a reddish brown mass about the size of a walnut.

Pharmacological effects: Myrrh has a local astringent, disinfectant and granulation promoting effect because of its essential oil (consisting mainly of sesquiterpenes) and amaroids (Fleming, 2000).

Daemonorops draco (Willd.) Blume: The dragon's blood (Xue-Jie) has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *dam-ul-akhawayn* perhaps may be related to *Daemonorops draco* (Willd.) Blume (Gahreman and Okhovvat, 2009).

Description: The medicinal part is the red resin from the fruit, which is extracted from both *Daemonorops draco* and *Daemonorops propinquus*.

Pharmacological effects: Dragon's Blood has an astringent effect (Fleming, 2000).

Haematoxylon campechianum L.: The logwood is not considered a spontaneous plant in Iran. But in the classical texts of Persian herbal medicine, a plant called

baqm-e-hendī perhaps may be related to *Haematoxylon campechianum* L. (Gahreman and Okhovvat, 2009).

Description: The medicinal part of the tree is the unfermented heartwood.

Pharmacological effects: Logwood has astringent properties, due to the isoflavone, hematoxylin. An antiphlogistic effect has been proven in animal experiments and an antimicrobial effect in vitro. Hemateine and hematoxylin are said to inhibit the production of melanin in skin when used topically (Fleming, 2000).

Illicium spp.: The star anise has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *rāziyāneh-barri* perhaps may be related to *Illicium* spp. (Gahreman and Okhovvat, 2009).

Description: The medicinal parts are the oil extracted from the ripe fruit, the whole dried fruit and the seeds.

Pharmacological effects: Star Anise is a bronchial expectorant and antispasmodic for the gastrointestinal tract. The essential oils (star anise oil) and flavonoids act on the smooth muscle of the gastrointestinal tract and the mucous membrane of the respiratory tract (Fleming, 2000).

Liquidambar orientalis Mill.: The storax has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *mey'ah-sā'ilah* perhaps may be related to *Liquidambar orientalis* Mill. (Gahreman and Okhovvat, 2009).

Description: The medicinal part is the balsam from the trunk and the inner bark.

Pharmacological effects: Storax has anti-inflammatory, diaphoretic and stimulant effects (Fleming, 2000).

Myrica spp.: The bayberry has not been mentioned in recent and modern Iranian flora literature. However, in the classical texts of Persian herbal medicine, a plant called *dār-u-śīšā'ān* perhaps may be related to *Myrica* spp. (Gahreman and Okhovvat, 2009).

Description: The medicinal parts are the dried root bark and die wax extracted from die berries.

Pharmacological effects: The active compounds have diaphoretic, stimulant and astringent effects (Fleming, 2000).

Myristica fragrans Houff.: The nutmeg has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *jowz-buwā* perhaps may be related to *Myristica fragrans* Houff. (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are die nutmeg seeds, which through various processes yield several therapeutic components. They include the essential oil of the seed; the compressed, dried aril; the mixture of fat, oil and color pigment from the pressed seeds; the dried seed kernels freed from the aril and shell of the nut; calcified seed kernels; and the dried seed kernels.

Pharmacological effects: In animal experiments, the eugenol in the essential oil inhibits, dose-dependently, medicinally induced diarrhea and slows down the transport of active carbon in the gastrointestinal tract. An effect on prostaglandin synthesis and an antimicrobial effect have also been demonstrated. The use of the drug for dysentery and rheumatic complaints seems plausible (Fleming, 2000).

Myroxylon balsamum (L.) Harms.: The balsam has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *balasān* perhaps may be related to *Myroxylon balsamum* (L.) Harms. (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are the balsam from the sweltered trunks, the hardened resin balsam that has been extracted from damaged trunks, softened and purified through a process of melting and sweltering.

Pharmacological effects of peruvian balsam: The drug has an antibacterial/antiseptic effect, promotes the granulation process and is antiparasitic (especially for scabies). The main active constituent is an ester mixture that mainly contains benzyl benzoate.

Pharmacological effects of tolu balsam: The undiluted oil showed antibacterial and fungicidal effects in the diffusion test. The drug also acts as an expectorant. The effect on the respiratory tract appears to work in the field of aromatherapy (Fleming, 2000).

Pterocarpus santalinus L.: The red sandalwood is called in Persian as *sandal-e-sorkh*. It has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *sandal* perhaps may be related to *Pterocarpus santalinus* L. (Ghahreman and Okhovvat, 2009).

Description: The medicinal part is the wood.

Pharmacological effects: In animal experiments, extracts of the wood are hypoglycemic. Insecticidal and antidiabetic effects are attributed to the pterostilbene constituent. In addition CNS-suppressive, spasmolytic and anti-exudative affects have been described, although detailed information is unavailable (Fleming, 2000).

Sassafras albidum (Nutt) Nees.: The sassafras has not been mentioned in recent and modern Iranian flora literature. However, in the classical texts of Persian herbal medicine, a plant called *sāsafrās* perhaps may be related to *Sassafras albidum* (Nutt) Nees. (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are the essential oil of the root wood, the peeled and dried root bark, and the root wood.

Pharmacological effects: The drug is said to have a mild diuretic effect, which is undocumented. The toxic characteristics are determined by the essential oil, which contains safrole (sassafras aetheroleum that is renal toxic and carcinogenic) (Fleming, 2000).

Strychnos nux vomica L.: The nux vomica has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *jawz-ul-qayy* perhaps may be related to *Strychnos nux vomica* L. (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are the ripe, dried seeds and the dried bark.

Pharmacological effects: Nux Vomica increases reflex excitability. Endogenic and exogenic stimuli reach the targeted organ without hindrance and, as a result, possess a strengthened effect that can be attributed to the alkaloid strychnine. The toxic principle strychnine deadens the inhibitory synapse of the CNS and results in overextended musculature reactions. The strychnine and brucine components act as competitive antagonists of the neurotransmitter glycine. The drug is psychotropic due to an increase in reflex action, i.e., endogenic and exogenic stimuli reach-the targeted organ without hindrance and as a result have a strengthened effect. In addition, strychnine is cholinolytic in animal experiments. In lower doses, the drug causes a reflexive increase of glandular secretion in the gastrointestinal tract through the amaroids (Fleming, 2000).

Styrax officinalis L.: The benzoin tree has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *labanī* perhaps may be related to *Styrax officinalis* L. (Ghahreman and Okhovvat, 2009).

Description: The medicinal part of the plant is the resin obtained from the trunk.

Pharmacological effects: The expectorant effect with which the drug is credited could not be proven experimentally (it possibly originated in connection with an "aroma therapy," due to its vanilla content) (Fleming, 2000).

Syzygium aromaticum (L.) Merr & Perry: The clove has not been mentioned in recent and modern Iranian flora literature. In the classical texts of Persian herbal medicine, a plant called *qaranful* perhaps may be related to *Syzygium aromaticum* (L.) Merr & Perry (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are the oil extracted from the whole or macerated flower buds, the pedicles and leaves, the dried flower buds and the not quite ripe fruit.

Pharmacological effects: Clove is antiseptic, antibacterial, antifungal, antiviral, spasmolytic and a local anaesthetic (Fleming, 2000).

Tetraclinis articulata (Vahl.) Mast.: The sandarac is not mentioned in the recent Iranian flora. However, in the classical texts of Persian herbal medicine, a plant called *sandiyān* perhaps may be related to *Tetraclinis articulata* (Vahl.) Mast. (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts of the plant are the naturally flowing resin and the bark.

Pharmacological effects: The resin is said to be antibacterial and bacteriostatic in effect. Experimental data supporting these effects is not available (Fleming, 2000).

Thuja orientalis (L.) Franco: The Oriental Arborvitae is not mentioned in the recent Iranian flora. However, in the classical texts of Persian herbal medicine, a plant called *'alas* perhaps may be related to *Thuja orientalis* (L.) Franco (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are the dried leaves and leafy branches.

Pharmacological effects: The terpene-containing drug is severely toxic. The hemostyptic and hair growth-promoting effects with which it is credited have not yet been documented in experimental data (Fleming, 2000).

Usnea barbata (L.) F. H. Wigg: The usnea is not mentioned in the recent Iranian flora. In the classical texts

of Persian herbal medicine, a plant called *šībeh* or *ašyab* or *reyhān-ul-abyaz* perhaps may be related to *Usnea barbata* (L.) F. H. Wigg (Ghahreman and Okhovvat, 2009).

Description: Research into this species is not yet complete, making it difficult to establish which lichens are used for the extraction of which drug, and which lichens have been described by earlier botanists.

Pharmacological effects: The drug is antimicrobial (Fleming, 2000).

Vitex agnus-castus L.: The Chaste Tree is called in Persian as *panj-angošt* (Mozaffarian, 1998). In the classical texts of Persian herbal medicine, many plant names, usually called *banjankušt* or synonymous to it, are related to *Vitex agnus-castus* L. (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are the ripe dried fruit and the dried leaves.

Pharmacological effects: The drug is dopaminergic and FSH-suppressive; it also inhibits lactation (main active principles aucubin and agnoside). In addition, the drug represses the release of prolactin and improves the symptoms of PMS.

In older animal experiments, the drug was tested on the ovaries and resulted in a reduction of cystic and bleeding follicles. In other animal experiments, an inhibition of lactation and a normalization of stress-induced hyperprolactin anemia were observed. In clinical studies, the positive effect on symptoms resulting from hyperprolactin anemia was proven. A dopaminergic effect via bonding on D2-receptors was also shown (Fleming, 2000).

Zanthoxylum avicennae DC.: The Prickly Ash has not been mentioned in the recent botanical texts of Iranian flora. But in the classical texts of Persian herbal medicine, a plant called *fāgherah* perhaps may be related to *Zanthoxylum avicennae* DC. (Ghahreman and Okhovvat, 2009).

Description: The medicinal parts are the root bark and the berries.

Pharmacological effects: No information is available (Fleming, 2000).

DISCUSSION AND CONCLUSION

Although the trees and shrubs have been used as medicines and have had deep effects on phytomedicine all

over herbal medicine history, according to our best knowledge, there have been no comprehensive studies about the influence of the trees and the shrubs in the traditional medicine. In this study we have studied the plants mentioned in the Iranian herbal medicine from an interesting view, at least for us, that these plants which have been described in the ancient documents, are do not occur or no longer grow in Iran at present. These data show that Persian scholars knew these trees in the earlier times. We may suppose the following probabilities for this controversy. The Persian scholars may were aware of these plants from Arabic, Indic or Greek-Roman tradition without seeing them closely. Nevertheless, it is known that the usage of the plants was common among Iranian

herbalists and scholars in the past centuries. We propose more researches about these plants and the exact cause of their earlier presence and accessibility to the Persians in the history and the lack of their presence today in Iran.

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