

1 Herbal Medicine in Iran

by Hamid-Reza Adhami, PharmD; Bitu Mesgarpour, PharmD; and Hassan Farsam, PharmD, PhD



introduction

Iran (formerly called Persia) is located in southwest Asia, within the Middle East region. It covers a territory of 1,648,195 square kilometers and has a population of about 70 million people. Iran's borders extend 7,774 km, about one-third of which are seacoasts. Northern Iran borders the southern coastal areas of the Caspian Sea (663 km) while southern Iran borders the northern coastal areas of the Persian Gulf and the Sea of Oman (1,952 km).¹

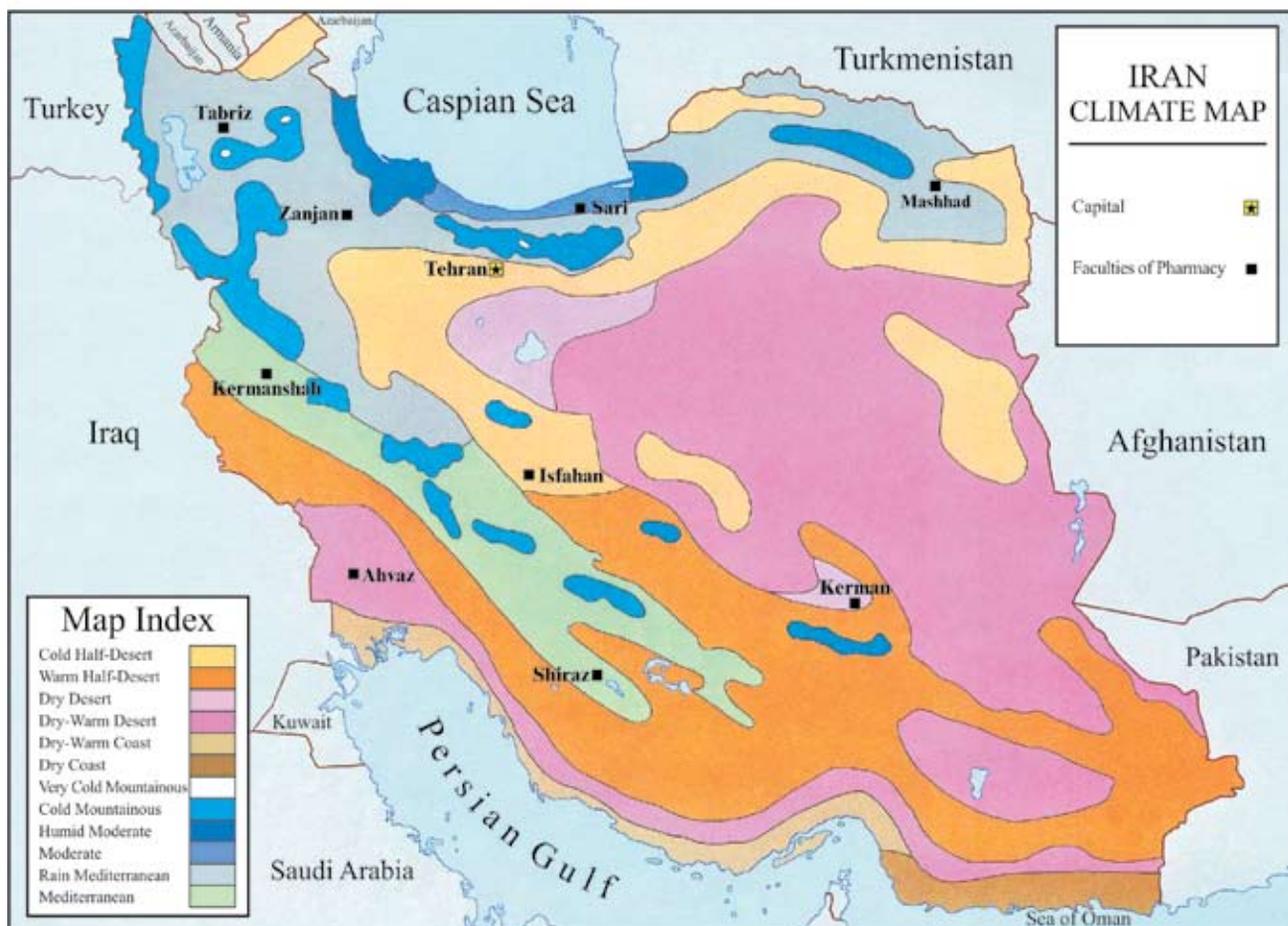
Iran's specific geographical position and variable climates make it unique in the world with its diverse climatic conditions. Among its 12 different geographic environments, Iran is divided into 5 major climates including Mediterranean, Desert and Half-desert, Warm-Humid, Warm-Dry, and Mountainous (see Figure 1).²

Due to this variety of climate, more than 7500 plant species grow in Iran, and about 1800 of those species are considered medicinal. Among these species, some are not found in any other part of the world.³ The rich floral biodiversity in Iran has its origin mostly from diverse climate conditions and partly from its great trade routes to India and China. During the Sassanid dynasty in the sixth

century CE, Burzūya (Perzoes in Latin), one of the famous physicians sent to India, brought many Indian medicinal plants into Persia. The trade of medicinal plants between Persia and India throughout history had an important influence on the Iranian medicinal plant heritage.⁴

The Iranian people are largely descendants of the Medo-Persians, an Indo-European culture, thus making Iranians more closely related to Afghans, whose original language is Persian, than their Arab/Semitic neighbors. The traditional knowledge on medicine and pharmacy in Persia is an amalgamation of the prehistoric beliefs and practices of early inhabitants of the Mesopotamian plains, plus that of the later Babylonians, Assyrians, Elamites, and other ancient civilizations.^{5,6}

Figure 1. Iran Climate Map and Distribution of Faculties of Pharmacy



Note: There are 3 faculties of pharmacy in Tehran

One of the main sources of medical and herbal knowledge of the ancient inhabitants of Iran is the *Avesta* (the holy book of the Zoroastrians, aka Zarathustrans). In this book, *Thrita* (or *Serita*) was the first mythical physician to whom Ahura-Mazda (The Wise God of Light in the dualistic theology of Zoroastrianism) gave thousands of healing plants (*urvarō baešada* in the Avestan language). The term *urvarō baešazau* (*gyaah pezeshk* in the Persian language), or herbal physician, is one of the 5 categories of physicians named in this book and the term *bēšāzišnīh kartrīh* in the Pahlavi (Median Farsi) language means growing and caring for medicinal plants. It may be constructive to mention that the word *drug* was probably derived from the ancient Iranian word *dārāv*, meaning the stem of a plant, as the origin of medicinal herbs. This word later changed into *dārūk* in the Pahlavi language, and later became *droga* in Latin, *drogue* in French, *drug* in English, and *dāru* in the present Persian languages. Many herbs are introduced in this book for various ailments. Some herbal extracts, infusions, decoctions, abortifacients, and disinfectants are also well described in the *Vandidad* and *Yashts*, 2 sections of the 5 sections of the *Avesta*.^{4,7-13}

One of the most sacred herbs was *hōm* or *hāomā*, which has been identified by Flattery and Schwartz as *Peganum harmala*, Zygophyllaceae (*esfand* in Farsi).¹⁴ But according to other reputed documents, this plant is identified as *Ephedra vulgaris*, Ephedraceae.⁸ Many other herbs and herbal treatments are also mentioned in different sections of the *Avesta*.⁶ Determining the exact scientific name for these plants is a delicate and perhaps even impossible scientific task. However, some of these plants are given probable scientific names through logical reasoning. A selection of these plants is shown in Table 1 (on page 40), which lists their ancient names, common Persian names, equivalent English names, attributed botanical names, and ancient indications.^{8,12,15}

The Jundishapur academic center in ancient Persia, due to its cosmopolitan nature, could be defined as one of the earliest universities in the world. Sabur (or Shapur) Sahl, a well-known pharmacist of this institution, composed his *Agrabadin-e-Kabir* (great pharmacopeia) in 869 CE, which became the first pharmacopeia to receive widespread acceptance. His book was used in hospitals and pharmacies of the time.^{4,16} According to Edward Brown: "The most cogent evidence for ancient Iranian interest in pharmacy is the Iranian origin of many drug names in medieval medicine."¹⁷

With the establishment of an Islamic state in Iran and neighboring lands in the seventh century CE, the cultural knowledge of different nations, such as Egyptian, Babylonian, Persian, Greek, Roman, Indian, and even Chinese, came under the rule of Islam. A new era of medical, pharmaceutical, and other sciences came into being that was later disseminated into Europe, which greatly influenced the European Renaissance. Iranian scholars played an exceptional role in the advancement of sciences and arts in this period. The Arabic language became the dominant language of art and science. Unfortunately, an in-depth discussion of this era within the short space in this article would not be possible, especially when considering the thousands of relevant writings that existed in this period.¹⁸⁻²¹ For example, according to Levey, "during this era over 600,000 manuscripts were dispersed in depositories throughout the world." These manuscripts are mostly in Arabic and some in Persian languages.⁵ The first book on pharmacology in the Persian language was written about 975 CE by Abu-Mansur Muvaffaq Heravi and was titled *Kitab ul-Abniya an Haqa'iq-il*

Adviya (*Book of the Foundation of the True Properties of Remedies*). This book ushered a new trend in pharmacology in Persia.⁴ When reviewing the primary humanist and rationalist sages in the history of Persian medicine and pharmacy, some well-known scholars and writings must be mentioned.

Ali ibn Sahl Rabban al-Tabari (circa 818-870 CE). This Iranian scholar was born in Marv, Tabaristan, from a respectable Jewish family. His father Sahl was a well-known physician and a reputable philosopher called Rabbin (Great teacher). As a result of his association with his learned father, Tabari was educated in the fields of medicine, calligraphy, astrology, and mathematics. He was also proficient in Syriac and Greek languages. Later, he was obliged to leave Marv and fled to Ray, the birthplace of the famous physician Zakariya Razi (near present Tehran). Then he moved to Baghdad and converted to Islam. However, he introduced his previous religion as Christianity in one of his writings, *Deen-o-Doulat* (although it is not clear why he would have done so, having been raised Jewish). Some historians have described him as a tutor of Razi, which is not accepted by others (e.g., Myerhof, due to the differences on their birth and death dates). However, Razi, as a disciple, remembered him several times in his well-known book *Al-Hawi fi Tibb*. It is quite possible that Razi had taught many aspects of medicine and pharmacy from Tabari's writings. In Tabari's famous book about medicine and pharmacy, *Ferdous al-Hikamat* (*The Paradise of Wisdom*), 2 out of 7 sections are dedicated to drugs and poisons.^{4,22} Some writers consider this book the first medical encyclopedia. Tabari's reliance on information from Greek medicine and the traditional uses of Indian herbal drugs can be seen in this book.

Mohammad ibn Zakariya Razi (Rhazes in Latin) (865-925 CE). This chemist, pharmacist, musician, physicist, philosopher, and great clinical physician was a leading figure in the field of medieval medicine.²³ He wrote his famous encyclopedia (*Al-Hawi fi Tibb*) in about 26 books, which was translated from Arabic into Latin under the name of *The Continens of Rhazes* by Faraj ibn Salim (Farragut) in 1279 CE. The first Latin edition of this book was printed in Brescia, Italy, in 1486. This edition was published in Venice 4 times from 1505-1542. The book was among the 9 books employed by the Paris Faculty of Medicine in 1395.^{18,22} Razi's book, *al-Hawi fi Tibb*, based on his clinical approach, did not make as strong an impression on Western medical history as did Ibn Sina's works, which were more theoretical in approach and had been translated earlier, incorporating the Greco-Roman Galenic theories of the second century CE.

Two volumes of Razi's encyclopedia were dedicated to pharmacy and pharmacology and served as one of the main sources of pharmacology even a long time after the scientific Renaissance in Europe.²⁴ Razi's work on pharmacy is greatly appreciated. He introduced mercurial ointments and apothecary apparatuses such as pestles, flasks, beakers, and glass vessels into the Western world.²⁵ His independent mind is revealed in his famous book *Shukuk 'ala Jalinus* (*Doubts about Galen*), a critique of the writings and practice of the second century (CE) Greco-Roman physician Galen. His independent thinking is seen even in his clinical records.^{23,26,27}

Abu Ali al-Husain ibn Abdallah ibn Sina (Avicenna in Latin) (980-1037 CE). This philosopher, mathematician,



A view of Persepolis, Shiraz. Photo ©2005 William Grassie

writer, poet, politician, physician, and pharmacologist was known in Europe as “The Prince of Physicians.”²⁸ In 1491 CE his masterpiece *Al-Qanun fi-Tibb (The Canon of Medicine)* was translated into Latin by Gerardus Cremonensis in Naples, and it was translated into other languages and taught in many European universities for years. He dedicated 2 of the 5 volumes of this book to pharmacy and pharmacology. Ibn Sina also mentioned about 900 drugs, mostly herbal, in these 2 volumes.²⁹ He also was one of the first persons to introduce the concept of polypharmacy (using compound drugs) on humoral theory, and he discussed the changing effects of drugs from one person to another, which is considered an important factor in pharmacokinetics today.^{28,30}

In this era many herbal formularies and compendia were written by different scientists as separate fascicles or as a part of a collection. These classified and coded writings have had a strong influence on the advancement of medical, pharmaceutical, and pharmacological sciences.¹⁸ Ibn Sina occupies a prominent place among the European scholars and philosophers who indirectly translated his works into Latin, thereby significantly impacting Western medical literature and university curriculum and helping to awaken Europe to the Renaissance.²⁸

Other Important Texts

Two popular pharmacopeias in Farsi have been used as main sources of traditional remedies by later physicians, traditional healers, and even traditional herbalists: (1) *Tuhfat al-Mu'minin (The Gift of two Muminis)* written by Muhammad Zaman e-Tunekabuni in about 1669, and (2) *Makhzan al-adviyah (The Storage of Medicaments)* written by Muhammad husayn ibn al-Alavi al-Khurasani al-Shirazi in 1771 CE.^{21,31}

The Advent of Western Medicine in Iran

Modern Western conventional medicine was introduced into Iran with the establishment of Dar-ul-Fonun (Poly-

technic School) in Tehran in 1850. With the advent of Western medicine, the traditional knowledge of herbs and healers was gradually ignored and eventually excluded from the mainstream of the Iranian medico-pharmaceutical community. Nevertheless, traditional medicine has continued its survival through medical services rendered by unauthorized healers, sometimes even within urban areas that have well-equipped hospitals.³²

People choose Iranian traditional medicine and herbal therapies mostly because of their socio-cultural beliefs and, of course, partly because of the barriers presented by the complicated, time-consuming, and expensive system of modern health care. Currently, the following categories of traditional healers can be found in Iran.

1. Herbal Sellers (*Attaries*)

These are usually laymen who sell medicinal herbs, dispense herbal drugs, and even provide medical services. A number of them have traditional knowledge and experience in herbal medicine. Many Iranian people continue to consult these herbal sellers/practitioners.

2. Unauthorized and Unofficial Healers

Usually these healers have some information of Iranian traditional medicine. They are usually recognized by the community rather than by the health authorities. At present the government has no plan to include folk healers in the scope of officially authorized medical services. These healers are frequently engaged in medical, pharmaceutical, and even non-medical activities. No statistical data are available for this category of healers.

3. Physicians and Pharmacists

The main sources of information for physicians are older Iranian herbal books written by Iranian scholars, newly-published manuscripts translated from other languages into Farsi, and other European or American books on herbal medicine in original languages.

A group of pharmacists provide as nonprescription drugs (NPD) various herb-based pharmaceuticals and

يَبْطَلُخُوَيْتِرُ نَبَاتٌ يُشْبِهُ الْفَرَّاسِيَّونَ لَكِنَّهُ أَطْوَلُ مِنْهُ زَرَّاصِفٌ وَأَصْلَبُ
 وَأَطْيَبُ رَائِحَةً وَأَسْفَنٌ وَلَهُ قَضَبَانِ كَثِيرٌ وَمَرَّضِلٌ وَأَجْدَانِيْنٌ مِنَ الْفَرَّاسِيَّوْنِ
 وَنَبْتُهَا الْمَوَاضِعُ الْجَبَلِيَّةُ الْغَنَاءُ لَهُ قُوَّةٌ مُتَخَنَّةٌ حَرِيْفَةٌ مَا أَطْيَبُ مِنْ شَرْبَةٍ
 يَدْرُ الْبَوْلَ وَالطَّلْحَ وَفَيْحِدُ الْمَشِيْمَةَ

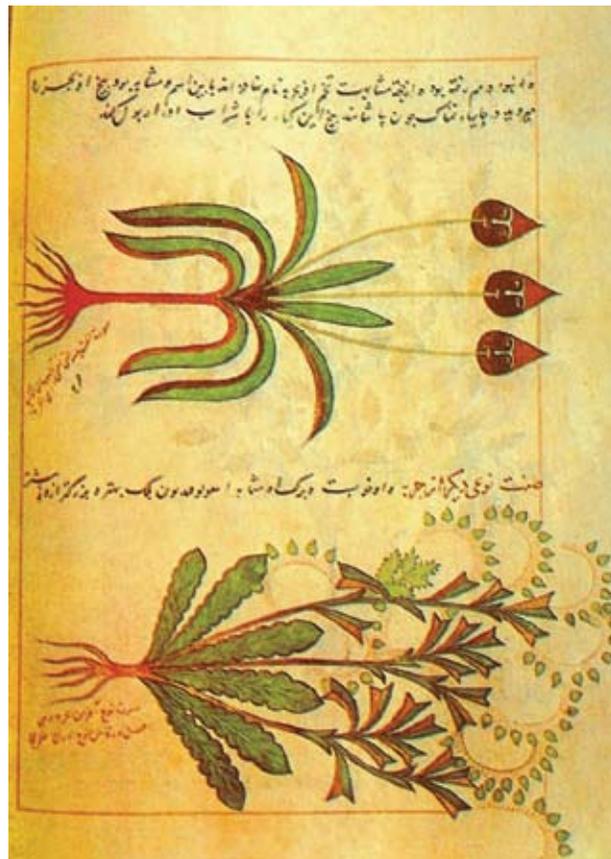


فَوَلِيْطِيْسٌ حَشِيْشَةٌ تُشْبِهُ الْكَمَّازَ وَأَطْوَلُ وَأَخْشَنُ وَرَاقَاتُهَا هِيَ مَرْتَفَعَةٌ
 مِمَّا نَزَلَتْ فِيهَا وَخَارِجُهُمْ كَالدُّوْدِ اللَّطِيْبِ وَهِيَ سَدْرٌ وَسَبْعَةٌ وَنَبْتُهَا فِي مَوَاضِعَ
 كَثِيْرٍ الْاَفْيَاوِيَّةِ وَالْحَبَاوِيَّةِ وَهِيَ فِي طَعْمِهَا قَابِضَةٌ وَلَيْسَ لَهَا زَمْرٌ وَلَا قَضَبَانِ وَلَا مَشْرَبٌ

At left: An illustration of a variety of Sorrel, *Rumex* spp. Photo ©Roland Michaud (Nasr SH. *Islamic Science: An illustrated study*, London: Kazi Publication; 1976)

The tapping of a Balsam Tree, *Commiphora opobalsamum*. Photo ©Roland Michaud (Nasr SH. *Islamic Science: An illustrated study*, London: Kazi Publication; 1976)

An illustration of anthropomorphic flower from a Persian botanical treatise. Photo ©Roland Michaud (Nasr SH. *Islamic Science: An illustrated study*, London: Kazi Publication; 1976)



herbal preparations by themselves. They also dispense them according to the order or suggestion (prescription) of conventional physicians or traditional and complementary and alternative medicine (CAM) practitioners.

4. Bonesetters (*Shekasteh-band* in Persian)

Bonesetters are traditional orthopedists who have not undergone formal institutional training. They acquired their skill from other experienced persons, often close family members. They usually have a considerable reputa-

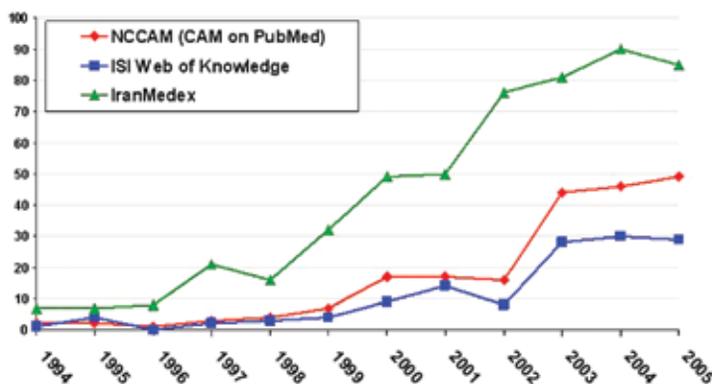
tion and some people believe strongly in them. They use herbal or animal materials for management of sprains and broken bones.

5. Traditional Birth Attendants (*Ghabeleh* or *Mama* in Persian)

A number of babies in rural areas are still delivered by local midwives or birth attendants who are not trained in official conventional medicine. They usually acquire their skills by working with other experienced persons.

These traditional birth attendants also use herbal preparations before or after delivery.

Figure 2. Indexed Articles on Herbal Medicine by Iranian Researchers in PubMed, ISI, and IranMedex



Recent Changes in Herbal Medicine

During the last 2 decades there have been appreciable changes in the attitudes of the general public as well as medical and pharmaceutical authorities towards medicinal plants and herbal products. Serious attempts have been made to promote traditional medicine (TM) and to avoid possible misuse of other TM and CAM systems. Reform has been carried out within the framework of a national drug policy (NDP) toward the promotion of TM/CAM implementations of

technical guidelines for ensuring quality, safety, and efficacy of herbal medicines and other approved TM/CAM products. These reform measures establish an effective system for regulation, quality assurance, and the rational use of herbal drugs according to World Health Organization (WHO) recommendations.³³ The expert committee on medicinal herbs has formulated a separate regulation for herbal products under the supervision of the Ministry of Health and Medical Education.³² This panel of experts is also charged with evaluating the safety and efficacy of herbal products.³⁴

The Iranian Academy of Medical Sciences has taken steps to revive and promote traditional and herbal medicines and to integrate Iranian traditional medicine into the scientific conventional medical system.³³ The primary health care system in Iran is internationally acknowledged as one of the best in the world as reported by UNICEF. There are plans to gradually substitute traditional birth attendants with trained midwives so that each village would have one trained birth attendant.³²

Iranians are still interested in using herbal remedies. A recent cross-sectional study of 4123 people (more than 15 years old) in Tehran showed the following:

- 75.6% of the studied population were familiar with herbal therapy,
- 50.8% of the population familiar with herbal therapy had used it at least once, and
- 38.4% of the total population had used it at least once.³⁵

On the other hand, many conventional physicians use herbal drugs, alone or in combination with synthetic drugs, to treat their patients. Another study that surveyed knowledge, attitude, and practice of CAM among general practitioners in Tehran showed that 85% of them believed complementary medicine had become more popular. In their opinion, the most commonly used modality in Iran is herbal medicine.³⁶ An investigation on the knowledge of Iranian pharmacists about herbal medicine revealed that those pharmacists who had some courses about herbal medicine had a fair knowledge on this subject.³⁷

In addition to its traditional popularity, phytotherapy is accepted as a recognized CAM by the state authority. According to new regulations of this modality, only physicians (usually general practitioners) who pass specific courses on phytotherapy are allowed to treat patients.

Fortunately, the knowledge of traditional Iranian medicine is largely based on written documents. However, complex challenges and problems surrounding the use of this knowledge need urgent scientific review, documentation, and validation.

Institutional and Research Activities

Educational Activities

The most important educational activities in herbal medicine are related to faculties (colleges) of pharmacy. There are 11 Faculties of Pharmacy in different provinces of Iran. All

Table 1. Selected Medicinal Plants Mentioned in the Avesta

Ancient Name		Common Name		Attributed Latin Name	Ancient Indication
Avestan	Pahlavic	Persian	English		
Vahugaonā	Hugun	Kondor	Frankincense, Olibanum	<i>Boswellia carterii</i>	Disinfectant, Aromatic
Banghā	Mang, Šāhdānk	Shāhdāneh	Hemp	<i>Cannabis sativa</i>	Anesthetic, Abortifacient
Vanpašak	Vanafšak	Gol-e Banafsheh	Violet flower	<i>Viola odorata</i>	Aromatic, Emulient
Vātrang	Vātrangböy	Bādranjbuyeh	Lemon balm	<i>Melissa officinalis</i>	Sedative
Gāokerenā	Kukren	Kuknār, Khashkhāsh	Opium poppy	<i>Papaver somniferum</i>	Hypnotic, Analgesic
Urvasnā	Čandal	Sandal	White sandalwood	<i>Santalum album</i>	Aromatic, Antiseptic
Hāḍāneāptā	Anār	Anār	Pomegranate	<i>Punica granatum</i>	Disinfectant
Āvišan	Āvišan	Āvišan	Thyme	<i>Thymus vulgaris</i>	Stomachic
Mitrogyā	Mahrkyā, Mahrgyā	Mahrgyāh	Mandrake	<i>Mandragora officinalis</i>	Sedative
Hirbazān	-	Shirinbayān	Licorice	<i>Glycyrrhiza glabra</i>	Stomachic
Hāomā, Hōm	Hōm	Rishboz, Ormak	Ephedra	<i>Ephedra vulgaris</i>	Religious mythical plant, Stimulant
Spand	Spand	Esfand	Harmel	<i>Peganum harmala</i>	Antiseptic, Protection of devil eye as fumigation
Murta	Murt	Murd, Murt	Myrtle	<i>Myrtus communis</i>	Antiseptic
Mabāk	Čambak	Zanbag	Orris	<i>Iris spp</i>	Aromatic oil
Spitjambak	Sōsan	Susan	Lily	<i>Lilium spp</i>	Analgesic oil
Sparyam	Šahsparham	Shāhesparm, Reyhān	Basil	<i>Ocimum basilicum</i>	Aromatic, Diaphoretic
Aerakeonā	Hamak vahār	Hamisheh bahār	Marigold flower	<i>Calendula officinalis</i>	Dermatic

Iran's diverse climate produces more than 7500 plant species—about 1800 of which are considered medicinal.

of these colleges have a Department of Pharmacognosy (the study of drugs of natural origin, usually with an emphasis on plant-derived drugs), and they present various courses on medicinal herbs. The geographic distribution of these faculties/colleges is shown in Figure 1 on page 35.

Pharmacognosy is among the 7 major postgraduate (PhD) programs, which have been taught only in 4 colleges of pharmacy (Tehran, Shahid Beheshti, Isfahan, and Tabriz) in Iran since 1989. Some specific courses of CAM are in practice in some colleges. However, these courses are limited to a few permitted CAM subjects such as homeopathy, acupuncture, Iranian traditional medicine, herbal medicine, and a few others.

Research Activities

1. *Faculties (Colleges) of Pharmacy*

The main body of research on herbal medicine is concentrated in the faculties of pharmacy. Research on medicinal plants, which is carried out in different departments of these faculties, play an important role in education and promotion of herbal knowledge. Over the past two decades, in accordance with the new wave of medicinal plant usage and initiation principles of doctorates in pharmacognosy and other branches, research activities have shown significant progress. Ethnobotanical information forms the starting point for many of these research activities. The results of these investigations have been published in reputable international periodicals as well as domestic journals.

The indexed articles in *Medline*, *ISI Web of Knowledge*, and *IranMedex* about herbal medicine by Iranian researchers are presented in Figure 2 on page 39.

2. *Research Centers*

There are 6 research centers on herbal medicine in Iran. The broad range of investigation carried out in these centers includes phytochemical, pharmacological, and clinical studies on medicinal plants. Parts of these investigations are based on the plants described in the classic books and treatises written by famous Iranian scholars as well as those supported by ethnological customs. Furthermore, there are some medical institutes such as the Iranian Cancer Institute, the Research Institute on Gastroenterology, and others that are concerned in part with research on medicinal plants.

3. *Herbal Medicine Research Network*

The Herbal Medicine Research Network has been established since 2003 in the office of the Deputy of Research and Technology at the Ministry of Health and Medical Education. The major goals of this network are summarized as follows:

- a. Development of a medicinal plant industry.
- b. Organization and management of network communications with other research centers.
- c. Development of education and research on medicinal plants.
- d. Development of local and international market activities.

Industrial Activities

1. *Pharmaceutical*

There are 30 pharmaceutical companies producing herbal products either as unprocessed medicinal herbs in bulk or as finished products.³⁴ The government's good manufac-

Cultivated *Echinacea* *Echinacea purpurea*, Golestan. Photo ©2003 Mohammad-Hadi Soleimani



turing practice (GMP) requirements for finished herbal drug products are the same as those required for conventional drugs. Safety assessment requirements are used to document potentially harmful effects.³⁸ Currently, 223 herbal drugs are registered and 130 approved herbal drugs have been produced and marketed.³⁹ These drugs are usually available as Nonprescription Drugs (NPD) and have popular use among the Iranian people.¹⁵ Many of them are also prescribed by physicians. Aromatic waters containing medicinal herbs are also produced for both local markets as well as for export to other countries.

2. Agricultural

To protect wild and native species of medicinal plants as a national heritage, some of these species, as well as those medicinal plants brought from abroad, are cultivated by private or state agricultural corporations. The products of these agricultural corporations are usually used by local factories or are exported to other countries.

Summary

Iran's diverse climate produces more than 7500 plant species—about 1800 of which are considered medicinal. Iran also has an impressive heritage of medico-pharmaceutical knowledge. One of the main sources of this medical knowledge comes from the ancient inhabitants of Persia who wrote *Avesta* (the holy book of Zoroastrians). This book mentions numerous medicinal plants with their indications and five categories of physicians including herbal physician.

With the establishment of the Islamic state in Iran and neighboring lands in the seventh century, a new era of arts and medicine came into being that was later disseminated into Europe, which influenced the European Renaissance. Iranian scholars such as Rhazes (Razi) and Avicenna (Ibn-Sina) played a major role in this advancement. The introduction of Western medicine in 1850 CE eventually supplanted much of Iran's traditional medicine. However, even today various categories of traditional medicine are still practiced by unauthorized healers who are supported by the general population. With the advancement of herbal medicine throughout many parts of the world, Iranian medical authorities have adopted a new strategy. Iran's Ministry of Health is strongly committed to promoting the use of herbal drugs and traditional medicines as well as several types of CAM systems of medicine in the public health sector. HG

Hamid-Reza Adhami (PharmD) graduated from the Faculty of Pharmacy, Tehran University of Medical Sciences. He is interested in Complementary and Alternative Medicine (CAM). He studies and works in some methods of CAM, e.g., homeopathy, energy medicine, and herbal medicine. He was the secretary of the Department of Complementary and Alternative Medicine in the National Research Center for Medical Sciences of Iran (NRCMSI). Currently he works in the Pharmaceutical Incubator of Tehran University of Medical Sciences, and he is also the secretary of the Pharmaceutical Research Network in the Ministry of Health. E-mail: hradhami@gmail.com.

Bitia Mesgarpour (PharmD) graduated from the Faculty of Pharmacy, Tehran University of Medical Sciences. Her research interests and activities include evidence-based medicine and medicinal plants, Iranian traditional medicine, and other complementary medicine fields. She works as a researcher at NRCMSI. E-mail: bmesgarpour@gmail.com.

Hassan Farsam (PharmD, PhD) is professor of Medicinal Chemistry in the Faculty of Pharmacy, Tehran University of Medical Sciences. His research activity is focused on the chemical and biochemical analysis of drugs, medicinal plants, and herbal products. He was also a lecturer in history of pharmacy and Iranian traditional medicine. He has worked as a temporary adviser on medicinal plants with the WHO Eastern Mediterranean Regional Organization (EMRO) and as an expert in reviewing the WHO Monographs on Selected Medicinal Plants. E-mail: farsam@sina.tums.ac.ir (corresponding author).

References

1. Iran. The World Factbook [Web site]. Washington, DC: Central Intelligence Agency; 2007. Available at: <https://www.cia.gov/cia/publications/factbook/geos/ir.html#Intro>. Accessed March 13, 2007.
2. Geographical and Cartographical Institute. *A Cosmological Atlas of Iran's Provinces*, Farsi edition. Tehran, Iran: Geographical and Cartographical Institute; 2004.
3. Iranian Agriculture News Agency Web site [Persian]. September 7, 2004. Available at: <http://www.iana.ir>. Accessed March 13, 2007.
4. Najmabadi M. *History of Medicine of Iran*. Farsi edition. Vol 1. Tehran, Iran: Honarbakhsh Publication; 1962.
5. Elgood C. *A Medical History of Persia and the Eastern Caliphate from the Earliest Times to the Year A.D. 1932*. Cambridge: Cambridge University Press; 1951.
6. Levey M. *Early Arabic Pharmacology: An Introduction Based on Ancient and Medieval Sources*. Leiden: EJ Brill; 1973.
7. Doustkhah J. *Avesta*. Farsi edition. Vols 1 and 2. Tehran, Iran: Golshan Publication; 1991.
8. Behramgore T, Anklesaria MA. *Pahlavi Vandidad*. Transliteration and Translation in English. Bombay; 1949.
9. Bahrani E, Joneydi F. *Dictionary of Avesta*. Vols 1-4. Tehran, Iran: Nakhost Publication; 2000.
10. Noori A. The Medical Sciences in the *Avesta*. Available at: <http://tenets.zoroastrianism.com/noor33.html>. Accessed February 14, 2007.
11. Abulghassemi M. *Ethimology*, Farsi edition. Tehran: Ghogh-nus publication; 2000.
12. Faravashi B. *Persian-Pahlavi Dictionary*. Tehran: Tehran University Publication; 2002.
13. Khodabakhshi S. *La Medicine en Iran Ancient*. Tehran: L'Institute de publication de Farvabar; 1998.
14. Flattery DS, Schwartz M. *Haoma and Harmaline, the Botanical Identity of the Indo/Iranian Sacred Hallosinoger "Soma" and its Legacy in Religion, Language and Middle Eastern Folklore*. Berkeley: University of California Press; 1989.
15. Amin GH. *Popular Medicinal Plants of Iran*. Farsi edition. Tehran, Iran: Tehran University of Medical Sciences Publication; 2005.
16. Ebn-e-Nadim. *Ketab ul-Fibrest*. Tajaddud MR, trans-ed. Tehran, Iran: Amir-Kabir Publishing Corporation; 1987.
17. Browne EG. *Arabian Medicine*. Cambridge: Cambridge University; 1921.
18. Nakhosteen M. *History of Islamic Origins of Western Education*. Boulder: University of Colorado; 1964.
19. Nasr SH. *Sciences and Civilization in Islam*. Cambridge: Harvard University Press; 1968.

20. Najmabadi M. *History of Medicine of Iran*. Farsi edition. Vol 2. Tehran, Iran: Tehran University Publication; 1987.
21. Farsam H. History of early pharmacy in Iran, presented at the International conference in the city of Bukara, September 2002, *Avicenna Scientific and Practical International Journal*. 2002;1,2:99-100.
22. Mohaghegh M. Filsūf-i-Rayy: Mohammad Ibn-I-Zakariyâ-i-Râzî. McGill University, Montreal, Canada, Institute of Islamic Studies, Tehran Branch. In Collaboration with Tehran University. Printed at the Offset Press, Inc. Tehran; 1974.
23. Braswell MF. Chaucer and Rhazes: What the Physician Knew [Web site]. Available at: <http://www-personal.umich.edu/~tgarbaty/braswell.htm>. Accessed March 13, 2007.
24. Campbell D. *Arabian Medicine and its influence in the middle Ages*. London; 1926.
25. Flannery MA. Rhazes and Pharmacy. Reynolds Historical Library; 1999. Available at: www.uab.edu/reynolds/rhazes_pharm.htm. Accessed February 14, 2007.
26. Encyclopedia of Islam: Al-Razi (Rhazes). Available at: www.muslimphilosophy.com/ei/razi.htm. Accessed February 14, 2007.
27. Azkâei. *Rhazes the Sage, Natural wisdom and phylasophysical system of Muhammad Zakariya, Sayrafi (Razi)*. Farsi edition with English introduction. Tehran, Iran: Tarh-e Now Publication; 2003.
28. Darmani NA. Avicenna: The Prince of Physician and a Giant in Pharmacology. *The Journal of Islamic Medical Association of North America*. 1995;26:78-81.
29. Ibn Sina. *Al-Qanun Fi'l Tibb*. English Translation of the Critical Arabic Text. New Delhi: Jamia Hamdard Printing Press; 1998.
30. Siraisi NG. *Avicenna in Renaissance Italy: the Canon and Medical Teaching in Italian Universities after 1500*. Princeton: Princeton University Press; 1987.
31. Zakie MR. Pharmacy in Safavid period [dissertation 3825]. Published under the supervision of Dr. Hassan Farsam, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran; 1997.
32. Farsam H. Traditional Healers in the Health Care System of Iran. In: *Regional consultation on better utilization of healers and traditional birth attendants in national health services*. WHO-EM/TRM/606/E/L. Alexandria: World Health Organization; 1997.
33. Bodeker G, Ong CK, Grundy C, Burford G, Shein K. *WHO Global Atlas of Traditional, Complementary and Alternative Medicine*. Kobe: World Health Organization Center for Health Development; 2005.
34. World Health Organization. *Legal Status of Traditional Medicine and Complementary/Alternative Medicine: A Worldwide Review*. Geneva: World Health Organization; 2001.
35. Sadighi J, Maftoon F, Ziai SA. Herbal Medicine: Knowledge, Attitude and Practice in Tehran. *Journal of Medicinal Plants* [in Farsi]. 2005;4(13):60-67.
36. Azin SA, Nouraii SM, Moshkani ZS. Complementary/alternative medicine: knowledge, attitude and practice among general practitioners in Tehran, Iran. *Payesh* [in Farsi]. 2003;3(2):165-173.
37. Mojab F, Nikavar B. Evaluation of the knowledge of the Iranian Pharmacists on herbal medicines. *Pazhohandeh* [in Farsi]. 2003;5:343-345.
38. World Health Organization. *National Policy on Traditional Medicine and Regulation of Herbal Medicine*. Geneva: World Health Organization; 2005.
39. Food and Drug Administration, Medicinal Plants Section, Iran. Available at: www.fdo.ir. Accessed February 14, 2007.

Fully Verified Quality...Exceptional Pricing

The ProfileProven™ Extract Line:

Ginkgo Biloba 24/6 and 24/6<1

Tested to assure no added Rutin. Fully conforms to recent AHPA Trade Recommendation.

Grape Seed

85% Polyphenols and Procyanidolic Value >95.0

Green Tea

50% EGCG and 50% Polyphenol

Soy-40™ Soy Isoflavone Extract

40% Soy Isoflavone from non-GMO Soy Beans

Plus: Rhodiola Rosea, Milk Thistle, Echinacea and more.

All products verified for active compounds

Prop 65 compliant for lead content

Screened for known adulterants, microbial, heavy metals & pesticides

For information and other raw materials:

Telephone: 866-459-4454 or Email: info@EthicalNaturals.com



Ethical Naturals, Inc.

NATURE VERIFIED BY SCIENCE

www.EthicalNaturals.com



Ethical Naturals is dedicated to bringing a new level of knowledge and integrity to the supply of key natural raw materials for the health supplement industry.