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Analysis of Traditional Medical Sciences in Asia and the Middle East in phytotherapeutic aspects

Abstract

Since ancient times, the utilisation of herbs has been common among Indigenous people in different parts of the world. The main important traditional medicine systems are Traditional Chinese medicine (TCM), Traditional Korean Medicine (TKM), Sasang Constitutional Medicine (SCM), Ayurveda, Unani medicine, Kampo (Traditional Japanese Medicine), Traditional Aboriginal Medicine, traditional medicine in Africa, Russian Traditional Medicine (RTM), Iranian Traditional Medicine (ITM), Taditional Arabic and Islamic Medicine (TAIM), Turkish Traditional Medicine (TTM). The aim of this literature review is to provide a brief summary of the various traditional medical sciences in the Middle East and Central Asia using phytotherapies. The information in this article comes from randomized controlled experiments, review articles, and analytical studies, as well as from observations collected from numerous bibliographic sources.

Keywords: medicinal plants, Traditional Arabic Medicine, Traditional Chinese Medicine, Traditional Iranian Medicine, Traditional Turkish Medicine
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Introduction

Natural products, especially herbs, are the basis for the treatment of many human diseases. New medicinal plants are constantly sought, and the demand for their raw materials is huge, even in the era of synthetic drugs (Shahrajabian et al., 2023a, b). They are considered safer than synthetic drugs, but it should also be borne in mind that they are not indifferent to health and can only be

used under the supervision of a specialist. Traditional herbal medicine includes polyherbal and mineral preparations, surgery, and regulations encompassing the whole lifestyle such as diet, physical activity, mental attitude, and even spiritual beliefs (Telles et al., 2014).

Traditional medicine was created based on a specific ethnic culture and philosophy of life. There are wide varieties of traditional medicine, including Ayurvedic, Arabic, Siddha, Kampo, Unani, Australian Bush Medicine, Traditional Chinese Medicine, Traditional African Medicine, Iranian, Korean, Traditional Thai Medicine, Traditional Tibetan, Uighur, Mongolian, native Indians, Maori medicine, etc (van Galen, 2014).

"Ayurveda" is a Sanskrit word that means the science of life span, and it is one of the ancient medicinal systems, that originated about 3,000 years ago in the Indian subcontinent. Traditional Chinese medicine is also one of the oldest medicinal systems, which has been practiced for more than 2500 years; it is according to the Yin-Yang theory and has five phases such as metal, wood, fire, water, and earth. Siddha is one of the oldest traditional medicinal systems of India, mostly practiced in the state of Tamil Nadu for the diagnosis and cure of different diseases. Unani medicine is the traditional system of medicine largely practiced in the Middle East and southern Asian countries including India. Greco-Arabic traditional system of medicine, based on the teachings of Greek physicians Hippocrates (460-375 BC) and Claudius Galenus (129-216 AD), has been developed by Arabian and Persian physicians. Kampo medicine is a Japanese traditional medicinal system that came from China and developed in Japan, and both Yin-Yang and five elemental Go-Gyo theories are at the base of the Kampo medicine treatment scenario (Kasote et al., 2017). Iranian traditional medicine has also a rich background of practice and a wealth of ancient medicine scholars (Setayesh et al., 2018; Ebrahimi Fana et al., 2021; Homaie Rad et al., 2021).

This manuscript aims to provide an introduction to the various traditional herbal-based medical sciences of the Middle East and Central Asia. The review presented here is prepared on scientific articles published in peer-reviewed journals from the last 10 years. The screening process was done in three stages, namely screening of title, abstract, and full text. Articles were identified using all databases associated with the *Web of Science* and *Scopus* search engines and the search was conducted between Jan and Feb of 2025. The Latin names of vascular plants are standardised according *World Flora Online* (2025), and of algae according Guiry and Guiry (2025).

Traditional Chinese Medicine (TCM)

Books that record the sources and applications of medicinal materials are commonly known as bencao (*Materia Medica*) in China. Bencao literature review is the very first step in the standard authentication procedure of Chinese medicinals (Zhao et al., 2018). The basic works related to traditional Chinese medicine include:

• *The Divine Husbandman's Classic of Materia Medica* (Shen Nong Ben Cao Jing), which is related to the late Eastern Han Dynasty,

• *Collection of Commentaries on the Classic of the Materia Medica* (Ben Cao Jing Ji Zhu) by Tao Hongjing from the Liang Dynasty,

• *Newly Revised Materia Medica* (Xin Xiu Ben Cao) from the Tang Dynasty in 659 AD,

• *Materia Medica Arranged According to Pattern* (Zheng Lei Ben Cao) by Tang Shenwei in 1082 AD,

• *Compendium of Materia Medica* (Ben Cao Gang Mu) by Li Shizhen in 1593 (Jaiswal et al., 2016).

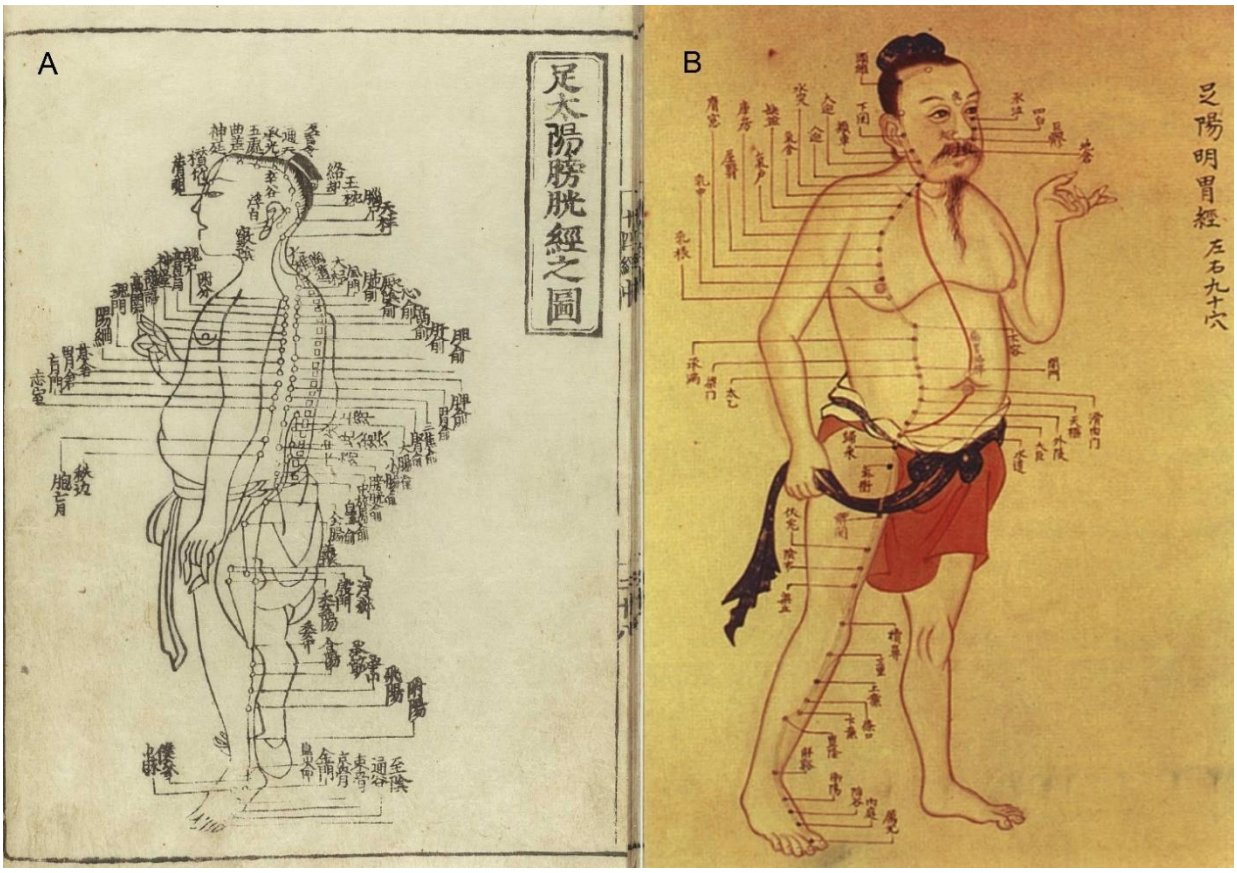

Fig. 1. Acupuncture sketch from around 1340, Yuan Dynasty – A; 90 acupuncture points on the median of the foot stomach, Yang ming – B (Source: Wikimedia commons – Public domain)

The *Divine Husbandman's Classic of Materia Medica* is one of three foundation books of Chinese medicine. The Nei Jing (Inner Classic) established the theoretical foundations of TCM, the Shen Nong Ben Cao Jing laid the foundation for the study of Chinese medicinals, and the Shang Han Lun/Jin Gui Yao Lue (*Treatise on Damage [Due to] Cold/Essentials of the Golden Cabinet*) is the locus classicus for Chinese formulas and prescriptions and treatment based on pattern discrimination.

TCM practitioners use a variety of techniques to promote health and treat disease. The most commonly used approaches include Chinese herbal medicine, acupuncture (Fig. 1), and tai chi. The *Chinese Materia Medica* (the pharmacological book used by TCM practitioners) describes thousands of medicinal substances – mostly plants, but also some minerals and animal products. Various plant parts are used, such as leaves, roots, stems, flowers, and seeds. In TCM, herbs are often combined into formulas and given as teas, capsules, liquid extracts, granules, or powders. Both single-herbal medicines, which are based on active substances found in one specific species or genus, and multi-herbal preparations, which are a mixture of raw materials from different medicinal species, are popular (Tab. 1).

Tab. 1. Some of the most important Chinese single-herb and multi-herbal medicines by rheumatoid arthritis patients with lower risk of stroke (Lai et al., 2019)

Single-herb products	**Multi-herb products**
Hai-Piao-Xiao, Ye-Jiao-Teng, Yan-Hu-Suo, San-Qi, Zhe-Bei-Mu, Da-Huang, Dan-Shen, Tian-Hua-Feng, Mu-Li, Fu-Zi	Shu-Jing-Huo-Xue-Tang, Shao-Yao-Gan-Cao-Tang, Jia-Wei-Xiao-Yao-San, Dang-Gui-Nian-Tong-Tang, Du-Huo-Ji-Sheng-Tang, Gan-Lu-Yin, Ge-Gen-Tang, Gui-Zhi-Shao-Yao-Zhi-Mu-Tang, Xin-Yi-Qing-Fei-Tang, and Zhi-Gan-Cao-Tang

An example of treatment based on the properties of species from one genus can be given as *Siegesbeckiae Herba* (SH, also called Xi-Xian Cao in China). SH is a traditional part of Chinese herbal medicine (CHM). It was extensively applied for the treatment of different chronic inflammatory diseases and the first record of SH could be retrospective to the ancient Chinese medicinal book "*Newly Revised Material Medica*" published during the Tang Dynasty. It was based on the use of the following species: *Sigesbeckia orientalis*, *S. pubescens*, and *S. glabrescens*. The dried aerial parts of *Herba Siegesbeckiae* are also used as a herbal medicine in many countries such

as Japan, Korea, and Vietnam. They are used for treating rheumatism, limb paralysis, muscle weakness, hemiplegia, wet rubella, and others (Wang et al., 2010; Zhou et al., 2018; Zhang et al., 2019). Other selected examples of single-species raw materials used in TCM are presented below (Tab. 2).

Tab. 2. Selected species whose pure raw materials are often used in Traditional Chinese Medicine

Species/ raw material	Bioactive substances	Properties
Camellia sinensis leaves	Epigallocatechin Gallate (EGCG)	possess the antioxidant, anti-inflammatory, and anti-aging properties, and its synergistic impacts along with L-theanine, another bioactive compound, increase brain functions (Saeed et al., 2017)
Ginkgo biloba seeds	flavonoids, amentoflavone, luteolin, quercetin, isorhamnetin, apigenin, kaempferol, biflavones, isoginkgetin, bilobetin, ginkgetin, and sciadopitysin (Zhou et al., 2014)	asthma, cough, pyogenic skin infections, enuresis and intestinal tract worm infections (Wang, Zhang, 2019).
Momordica cochinchinensis fruits	carotenoids, fatty acids, polyphenol compounds, α-tocopherol, vitamin C, and flavonoids (Do et al., 2010)	generally strengthening, immunizing (Do et al., 2010)
Coriandrum sativum fruits	*Oleum Coriandri*, phytoncide linalool	antioxidant, anxiolytic, anticancer, neuroprotective, anticonvulsant, analgesic effects, hypoglycemic, migraine-relieving, hypolipidemic, hypotensive, anti-inflammatory, and antimicrobial activities (Prachayasittikul et al., 2018)

In TCM, the phenomenon of hormesis is often used. It consists in the fact that a factor occurring in nature, harmful to the body in larger doses, has a beneficial effect on it in small doses. In other words, active substances contained in some plant species in large doses can cause poisoning, and in small doses have a therapeutic effect. It is proposed that the stimulating (i.e. low dose) and inhibiting (i.e. high dose) components of the hormetic dose-response correspond to the "regulating" and "healing" aspects of TCM herbal treatments, respectivly. Extracts from many herbs, either individually or combined, can induce hormetic responses in various models including animal and human cells. Currently, the dosage of herbal medicines used clinically is prescribed according to "physicians' understanding of the pharmacopeia" (Song et al., 2013), which means that it is largely based on physicians' personal experience (Jaiswal et al., 2016; Wang et al., 2018).

In China, the concept of "Let food be thy medicine and medicine be thy food" has been

popular and accepted for thousands of years (Jin et al., 2016). Herbal teas are abundant in China because of its vast territory, different landforms and climate, and availability of various plant raw materials. Hundreds of herbal teas are sold in drugstores, supermarkets, and health food stores. Among Chinese products, the most famous teas are Teng Cha (rattan tea: *Ampelopsis grossedentata* (Hand.-Mazz.) W.T.Wang), Shi Ya Cha (cliff tea: growing in Wuyi Mountain China), and Guangxi Tian Cha (Guangxi sweet tea: growing in Guangxi province) (Jin et al., 2016). Many plant raw materials used in various medicinal teas can be purchased at local markets (Tab. 3 – Appendix 1).

In addition to herbal teas, decoctions are a very popular form of herbal medicine in TCM. For example, some of the most popular Chinese herbal medicines in the treatment of ischemic heart diseases are decoctions: Danshen-Gegen (*Salvia miltiorrhiza*, *Pueraria montana* var. *lobata*), Guanxin No. 2 (*S. miltiorrhiza*, *Oreocome striata* (Chuanxiong), *Paeonia lactiflora*, etc.), Guizhi Tang (*Neolitsea cassia* (*Cassia twig*), *Paeonia officinalis* subsp. *officinalis*, *Zingiber officinale*, etc.), Jupi Tang (*Rhizoma zingiberis*, *Pericarpium citri reticulatae*), Buxu Huayu Qutan (*Radix astragali*, *Rhizoma polygonati*, etc.), Huoxue Anxin Recipe (*Fructus trichosanthis*, *Longstamen onion bulb*, *Semen Ziziphi spinosae* etc.) and others (Wang et al., 2016). In addition to decoctions, other forms of herbal medicines can be used simultaneously. For example, both classical or modern TCM herbal formulae (including decoctions – Yinchenhao, Xiayuxue, Xiaochaihutang, Yiguanjian, Huangqi, Fuzheng Huayu Formula, and pills – Dahuang Zhechong, Fufang Biejia Ruangan Tablets, Anluo Huaxian Pills, and Compound 861) have anti-hepatic fibrosis effect, in both on patients with liver fibrosis and animal models (Li, 2020).

Pu et al. (2017) introduced the main Chinese herbal medicine in aquaculture and their effective ingredients (Tab. 4). The chemical constituents of Chinese herbal medicines are complex, diverse, and found in trace amounts, so it is very difficult to analyse and identify them.

Tab. 4. Some of the active ingredients contained in plant materials of different species used in Traditional Chinese Medicine (Pu et al., 2017)

Taxon	**Main effective ingredients**
Acalypha australis	Sitosterol
Allium sativum	Alliin
Angelica dahurica	Coumarin
Angelica sinensis	Ferulic acid
Artemisia carvifolia	Arteannuin
Azadirachta indica	Azadirachtin A
Capsicum frutescens	Capsaicin
Citrus ×aurantium	Hesperidin

Eucommia ulmoides	Chlorogenic acid
Euphorbia humifusa	Anthrauinone
Forsythia suspensa	Phillyrin
Gardenia jasminoides	Geniposide
Glycyrrhiza uralensis	Glycyrrhetic acid
Kaempferia sp.	Kaempferol
Melia azedarach	Methyl kulonate
Phellodendron chinense	Obacunone
Phragmites sp.	Coixol, Vanillic acid
Rheum officinale	Rhein, Emodin
Rhus chinensis	Gallic acid
Rosa chinensis	Quercetin, Kaempferol
Sophora flavescens	Matrine
Scutellaria baicalensis	Baicalin
Toona sinensis	Thiophene
Ziziphus jujuba var. *spinosa*	Jujuboside A, Jujuboside B

However, as a result of the development of analytical techniques, more and more traditional Chinese herbal medicines have an increasingly better-known chemical composition. An example is the plant polysaccharides with antidiabetic effects noticed in numerous medicinal species used in TCM. Studies have shown that polysaccharides have immunomodulatory, anticancer, antioxidant, and hypoglycemic effects (Wu et al., 2016). Therefore, Chinese *Materia Medica* polysaccharides, which are natural macromolecules, play an important role in drug research. The polysaccharides of Chinese medicine with antidiabetic properties include polysaccharides isolated from, among others, the following plant and algae species: *Angelica sinensis*, *Anoectochilus roxburghii*, *Astragalus* sp., *Dendrobium officinale*, *Dioscorea polystachya*, *Euryale ferox*, *Ficus pumila*, *Gracilaria lemaneiformis*, *Lilium lancifolium*, *Lonicera japonica*, *Lycium barbarum*, *Morus alba*, *Ophiopogon japonicus*, *Ribes nigrum*, *Sarcandra glabra*, *Sargassum pallidum*, *S. thunbergii*, *Talinum fruticosum*, *Vaccinium bracteatum*, *Vachellia tortilis*, and others (Zheng et al., 2019).

When describing the basic drugs used for years in TCM, it is impossible to omit ginseng (*Panax ginseng* C.A. Meyer). It has been used in traditional medicine for centuries, although there is no clear evidence that it significantly improves health or reduces the risk of disease (Lee et al., 2021). Clinical studies indicate that it has no proven effects on improving memory, fatigue, menopausal symptoms, and insulin response in people with mild diabetes, but it does improve sexual performance (Choi et al., 2013; Li et al., 2017). Although the roots are used as a raw material in TCM, the leaves and stems contain higher amounts of phytochemicals than the roots (He et al., 2018). Its components include steroidal saponins known as ginsenosides, as well as polyacetylenes,

polysaccharides, peptidoglycans, and polyphenols (Lee et al., 2021). Ginsenosides from the leaves and stems are an approved over-the-counter drug in China. Due to its traditionally recognized health-promoting properties and the high demand for raw materials, this plant has been cultivated throughout the Far East for centuries (Fig. 2).

Fig. 2. *Panax ginseng* C.A. Meyer – pages from "Ninjin kōsaku-ki" (Record of ginseng cultivation); Author Tamura Ransui (Source: Wikimedia commons – Public domain)

The knowledge of herbal medicine and various therapies gathered over the centuries, contained in the books of Traditional Chinese Medicine, is still not sufficiently verified and authenticated. However, it is a very interesting source of research on new medicines and their conscious use.

The Traditional Arabic and Islamic Medicine (TAIM)

The most notable medicinal sciences that affected Traditional Arabic and Islamic Medicine (TAIM) are regional healing systems such as Traditional Persian Medicine, Chinese, Unani, Ayurvedic, and

Islamic religious influences and prophetic tradition. The medicinal plants most commonly mentioned in Islamic scriptures such as the *Holy Quran* and *Hadith* (Books of Muhammad's deeds and sayings) are: *Allium cepa*, *A. sativum*, *Ficus carica*, *Hordeum vulgare*, *Olea europaea*, *Phoenix dactylifera*, *Salvadora persica*, *Vitis vinifera*, and *Zingiber officinale*. Muhammad himself often mentioned such plants as mustard *Sinapis* sp., fenugreek *Trigonella* sp., garden cress *Lepidium sativum*, or aloe *Aloes* sp., attributing various medicinal properties to them. His opinions on health issues and habits regarding leading a healthy life were collected and edited as a separate corpus of writings under the title Ṭibb an-Nabī "*The Medicine of the Prophet*" (Al-Rawi et al., 2017).

The Islamic Golden Age was a step towards modern medicine with unique insights and multidisciplinary aspects. During this time, scientists sought out, systematised, and improved upon classical science with such diligence that Arab science became the most advanced of its day. The greatest successes were in ophthalmology, where Ibn al-Haytham's works retained authority in this field until the early modern period (El-Seedi et al., 2019).

The TAIM applied therapy includes:

a) primary methods such as leeching, venesection, manual therapy, cauterisation, cupping, auricular therapy, fomentation, physical movement, and hydrotherapy,

b) supportive methods, such as expectoration, purgation, emesis, diuresis, irritation, enema, diaphoresis, counter-irritation, and liniment (Al-Rawi, Fetters, 2019). Many of these treatments are still used in modern medicine.

Systematised Arabic medicine (AM), rooted in the Greek Hippocratic tradition, owes much to the contribution of the Persian physician and philosopher Avicenna (980-1037 CE), known as Ibn Sinna. After 1000 (of our common era), his followers worked in a huge cultural area stretching from Persia and the Middle East to the Iberic Peninsula (Andalusia and Spain), where medical schools flourished during the 11th and 12th centuries (Azaizeh et al., 2010). Medical textbooks from that time (the most famous are probably the *Canon of Medicine* (Fig. 3) and the *Poem of Medicine*, by Avicenna) were to constitute enduring references of medicine for centuries, bothin the East and the West (Graz, 2010).

Historical timelines for important events in Islamic medicine in the Middle Ages are presented in table (5).

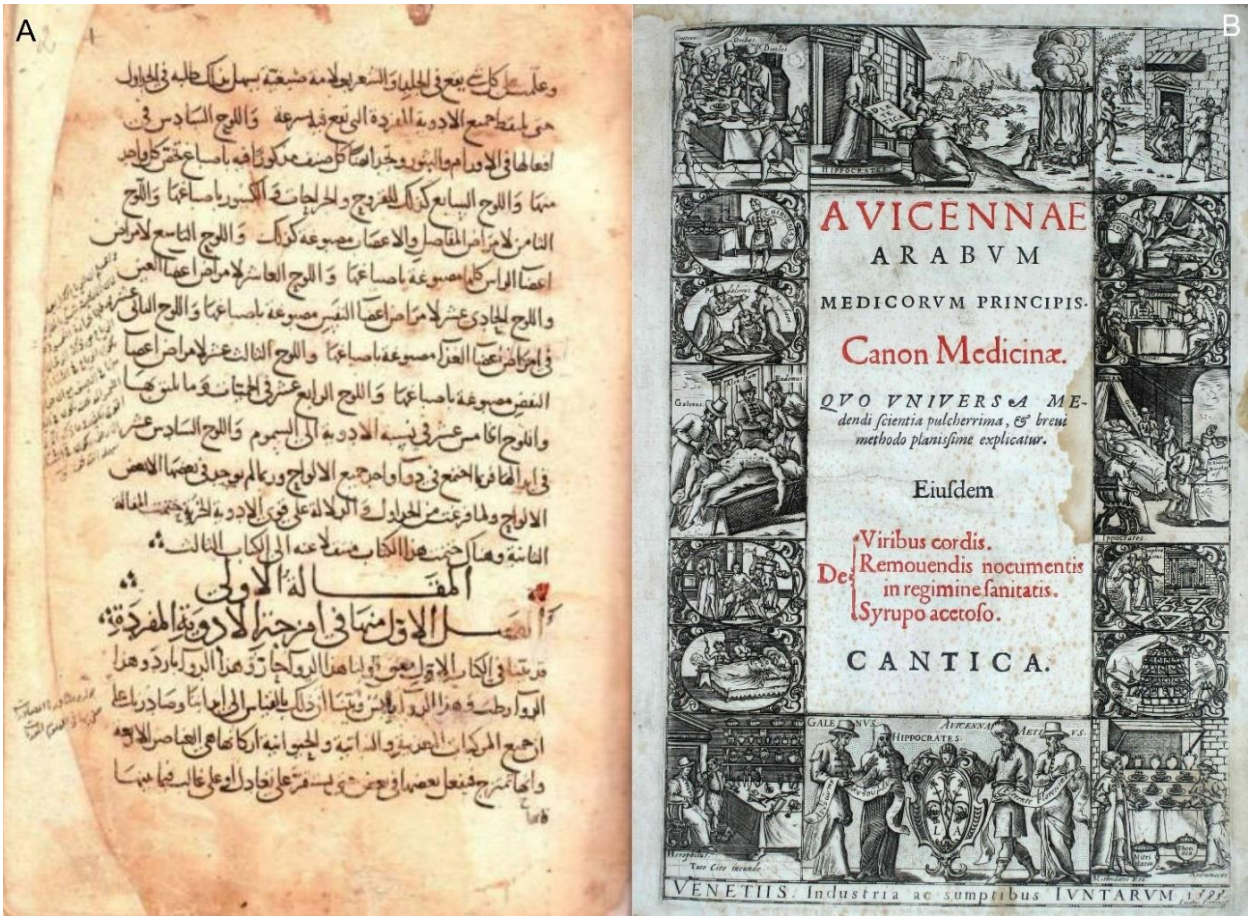

Fig. 3. The *Canon of Medicine* (1030 AD) by the Persian physician Avicenna (970-1037 AD), containing main principles of medicine: one of the oldest copies of the second volume, in original language –A (Institute of Manuscripts of Azerbaijan National Academy of Sciences (IMANAS), Baku); title page of a copy translated and published in Venice – B (Source: wikipedia.org – Public domain)

Tab. 5. Historical timeline for important events in Islamic Medicine in the Middle Ages (Edriss et al., 2017)

Creative personality	Years of life	Field of activity
Hippocrates	460-370 BCE	Greek physician; Father of Modern Medicine
Aristotle	384-322 BCD	Greek philosopher, scientist
Galen	129-ca 200/216 CE	Greek physician, medical researcher
Al-Razi	865-925 CE; 251-312 H	Persian physician, philosopher, scientist
Abu-al-Qasim	936-1013 CE; 329-404 H	Arabic physician, most important surgeon in his era
Ibn Sina (Avicenna)	980-1037 CE; 369-428 H	Persian polymath, physician
Ibn Zuhr	ca 1094-1162 CE; 370-428 H	Arabic physician, experimental

		surgeon
Ibn al-Baitar	1197-1248 CE; 593-646 H	Arabic physician, pharmacist, scientist
Ibn al-Nafis	1213-1288 CE; 609-678 H	Arabic physician, physiologist
Mansur Ibn Ilyas	1380-1422 CE; 782-824 H	Persian physician, illustrated atlas of anatomy

BCE, before the Common Era; CE, Common Era, H, Hijri year.

Certainly, the works of ancient Greek and Roman physicians and philosophers – Hippocrates, Galen, and Aristotele, had a lasting influence on the development of Middle Eastern medicine, including TAIM (Edriss et al., 2017). TCM inspirations can also be seen in TAIM. For example, Chinese herbal drugs have been described by medieval Middle Eastern scholars such as al-Tabari (870 CE), Rhazes (925 CE), Haly Abbas (982 CE), Avicenna (1037 CE) and Jurjani (1137 CE), and the term *al-sin* (the Arabic word for China) is used 46 times in Avicenna's *Canon of Medicine* about herbal drugs imported from China (Heydari et al., 2015). Therefore, in TAIM not only herbs that grew in the immediate vicinity were used, but also those whose raw materials were brought from distant countries.

Another analogy of TAIM to Chinese medicine is the use of food plants for medicinal purposes. For example, some of the vegetarian foods recommended in the traditional Islamic teaching to increase the fertility of men are pomegranate, common quince, onion, carrot, melon, lentil, thymus, pumpkin, fig, and chicory (Bidgoli, 2019). Shafiee and Nojavan (2018) concluded that Lentil Savigh (roasted lentil flour) produced black bile and concentrated the blood, and it could be applied for diseases such as menorrhagia, thirst, bleeding during pregnancy, blood excitation, and postpartum hemorrhage. The next example is date palm (*Phoenix dactylifera*), a notable functional fruit in the arid and semi-arid regions of the Middle East. Both date fruits and their by-products, such as seeds, possess nutritional and medicinal values. Moreover, the most important bioactive compounds recognised in various varieties of dates are: carotenoids, flavonoids, phenolic acids, phytosterols, tocotrienol and tocopherol. The most important nutraceutical properties of date fruits and seeds are antimicrobial, anticancer, antioxidant, antidiabetic, anti-nephrotoxic activity, and anti-inflammatory effects (Maqsood et al., 2020). Both in the past and now, their health-promoting properties are appreciated. Below, there is a list of other useful plants that TAIM includes in the group of medicinal plants (Tab. 7). The plants mentioned here also include spices whose health benefits have been known for a long time.

Tab. 7. Popular vegetables and spices used for medicinal purposes for various ailments in the West Bank/Palestine (Al-Ramahi et al., 2014)

Plants	Medicinal use
Nigella	cancer
Cichorium, Tumeric, Arugula, Fenugreek, Coriander, Ginger, Nigella	infertility
Chamomile, Anise, Sage, Cumin and Peppermint	colic
Potato, Sage, Tea, Rice, Banana, Coffee, Garlic, Pomegranate, Sumac, Apple, and Lemon	diarrhea
Sage, Anise, Thyme, Aloe, and Chamomile	skin infections
Fenugreek, Cinnamon, Rosemary, Olive, Lupine, and Bitter apple	diabetes mellitus
Garlic, Hawthorn, Anise, and Olive	hypertension
Thyme, Chamomile, Licorice, Peppermint, Ginger, Sage, Anise, and Guava	cough
Garlic, Olive, Saffron, Chamomile	allergy
Fenugreek, Lemon, and Parsley	kidney stones
Garlic, Hawthorn, Cocoa, Tea, and Peppermint	heart diseases
Lemon, Tea, Ginger, Peppermint, Coffee, Sage, Tomato, Anise, and Chamomile	headache
Pepper, Mustard, and Bitter apple	rheumatoid arthritis

By the Medieval period the culinary function of spices grew significantly, both in Europe and the Middle East, while retaining their importance in medicinal applications (van der Veen, Morales, 2015).

In TAIM, as in other traditional sciences of medicines, a knowledge of plant and chemical poisons and the used detoxifying substances played a very important role. Origins of the discussion of poisons and antidotes date back to the Indians and Greeks, as well as to the empiric knowledge of the Indigenous population in the Arabic/Islamic world. One of the most significant scholarly contributions is *The Book on Poisons and the Repelling of their Harmful Effects* (Kitāb al-Sumūm wa-dafʿ maḍārrihā, Kr. no. 2145) by the famous Arab alchemist, Abū Mūsā Jābir ibn Ḥayyān (720-813 AD), known as a Geber. Another example of an independent manual on toxicology is *The Book on Poisons* (Kitāb al-Sumūm), written in five volumes by Shanaq al-Hindi, the Indian, and translated into Arabic by al-Abbas Said al-Jawhari in the ninth century (Saad et al., 2006). The main antidotes and poisons utilised in traditional Arabic medicines are listed in table (8).

Tab. 8. Poisons and antidotes used in the traditional Arab medicine (Saad et al., 2006).

Poison	Antidotes
Lead	Nauseant and then treatment with water extracts from seeds of *Ficus carica* (Wild fig tree), *Apium graveolens* (Wild celery), *Anethum graveolens* (dill), and then water extracts from *Smilax officinalis* (Sarsaparilla), *Triticum aestivum* (Common wheat), *Hyssopus officinalis* (Common hyssop).

Mercury	Nauseant and then treatment with water extracts of *Smilax officinalis* (Sarsaparilla) mixed with honey.
Iron	*Rosa canina* (Dog rose) and *Viola odorata* (Sweet violet), *Salix alba* (White willow) mixed with small amounts of vinegar.
Convolvulus scammonia (Scammony)	Extracts from *Cydonia oblonga* (Quince tree), *Rheum ribes* (Current-fruited rhubarb), and *Rhus coriaria* (Sumac).
Nerium oleander (Oleander)	*Vitis vinifera* (Common grape), *Phoenix dactylifera* (dates), and *Ficus carica* (Wild fig tree).

Analysing the above examples, it is easy to see that plant materials were used both as a source of poisons and as an antidote to these poisons.

The study of the properties of various poisons has contributed to the discovery of many important medicines of plant origin, which are widely used in various types of main or supportive therapies. For example, knowledge of the chemical composition of traditional drugs has made it possible to use them in modern supportive anti-cancer therapies. Ahmad et al. (2016, 2017) listed as many as 35 of the most important ethnopharmacological Islamic and Arabic plant and fungal species used in the treatment of cancer (*Acorus calamus*, *Allium ascalonicum*, *A. cepa*, *A. sativum*, *Aloe vera*, *Anethum graveolens*, *Apium graveolens*, *Artemisia absinthium*, *Arum palaestinum*, *Asplenium ceterach* subsp. *ceterach*, *Astoma seselifolia*, *Boswellia sacra*, *Brassica nigra*, *B. oleracea*, *Bryonia syriaca*, *Capparis spinosa*, *Senna alexandrina*, *Glebionis coronaria*, *Cichorium intybus*, *Cinnamomum camphora*, *Crataegus azarolus*, *Crocus sativus*, *Cucumis melo*, *Matricaria aurea*, *Narcissus tazetta*, *Nigella sativa*, *Peganum harmala*, *Pistacia lentiscus*, *Punica granatum*, *Thymus vulgaris*, *Urtica pilulifera*, *Vachellia seyal*, *Viscum cruciatum*, *Vitis vinifera* and *Zingiber officinale*).

Many plant species are used to treat various ailments locally. In different regions of Africa and the Middle East, plant materials having similar properties, but coming from completely different species are used (Tab. 9 – Appendix 1). Thanks to centuries of practice, their effects have been known in terapies, which constitutes an interesting research reservoir for new drugs. Overall, Islamic medicine is a combination of practices and medicines from Greece, Persia, Syria, India, and Byzantium. The literary and scientific lingua franca was adapted, changed, and, most importantly, “Islamized.” Its influence spread not only to Islamic countries but also to Europe, Asia, China, and the Far East (Nagamia, 2003).

Persian Traditional and Iranian Medicine

The history of Persian Traditional Medicine (PTM) also known as Iranian Traditional Medicine (ITM) dates back to before the Sassanid dynasty and it has a link to Zoroastrianism. Zoroastrianism (also Mazdaism) was the religion of Iranian-speaking peoples who arrived from Central Asia around 1000 BCE and settled on the Iranian Plateau. These people brought with them their traditions of medicine and herbalism (Zargaran, 2014).

Fig. 4. Manuscript of Haly Abbas "*Kamil al-Sana'ah al-Tibbiyyah*" (Complete Book of Medicinal Art), copy created in Iran, dated January–February 1194 (Source: https://en.wikipedia.org – Public domain)

Rhazes – Abū Bakr Muḥammad ibn Zakariyyāʾ al-Rāzī (865-925 AD), Avicenna – Abu Ali Husain ebn Abdallah Ebn-e Sina (980-1037 AD), and Haly Abbas – 'Ali ibn al-'Abbas al-Majusi (died between 982-994 AD) – Fig. 4 are famous Persian scholars and physicians, who did develop medicinal science in Persian Empire (Heydari et al., 2016a, b). According to a definition given in one of the first Iranian medical textbooks called *Hidayat al-Muta'allemin Fi al-Tibb* (*A Guide to*

Medical Learners'), written in the 10th century by Al-Akhawyni Bokhari – Abu Bakr Rabee Ibn Ahmad Al-Akhawayni Bokhari (died 983 AD), medicine is a technique of scientifically maintaining human health and restoring it when it deteriorates.

ITM has a strong focus on prioritising health maintenance and disease prevention over treatment (Namdar et al., 2015). It is grounded in the concept of four humors: phlegm (Balgham), blood (Dam), yellow bile (Ṣafrā'), and black bile (Saudā'). The four humors concept is based on the teachings of Rhazes and Avicenna developed into an elaborate medical system. The ITM lifestyle principles focus on six basic principles, known as Setah Zaroriah in Persian: nutrition, environment, physical activity, sleep patterns, emotions, and waste elimination (Borhani et al., 2014). Traditional herbal medicines are an addition to a healthy lifestyle and help with various diseases. Herbs, spices and herbal extracts for ITM are often sold in a specialised shop called *Attari*. The activity of such a pharmacy is regulated by the government.

Herbal medicine is an important element of the Iranian economy in the agricultural areas. Most of the medicinal plants belong to the Iranian-Turanian phytogeographic region. There are clear regional differences in terms of the richness of medicinal species in this country. For example, in the Saravan region (Baluchistan), 64 medicinal species belonging to 30 families have been recorded. The most numerous family is Lamiaceae, while the most commonly obtained herbal raw material are leaves. *Datura stramonium*, *Rhazya stricta*, *Rydingia persica, Teucrium polium*, are the most important medicinal plants in this region of Iran (Sadeghi et al., 2014). The availability of good quality herbal raw materials has an impact on regional drug formulas. The powdered root of *Berberis integerrima* is used to stop bleeding from gunshot wounds in gazelles, and the aerial parts of *Citrullus colocynthis* and *Astragalus podolobus* are used to treat helminthiasis in livestock in Mount Taftan in southeastern Iran (Maleki, Akhani, 2018).

A factor shaping the availability and diversity of medicinal plants around the world is the climate – this applies to all ethnic medicines. It also has a significant impact on emerging diseases and ailments. In hot climates, insect bites are a big problem for people and animals, hence many regional medicines have in their recipes herbal medicines and repellents used for centuries (Niroumand et al., 2016). In ITM, such types of plants have also been and are still used (Tab. 10).

Tab. 10. Anti-insect plants in Traditional Iranian Medicine (Niroumand et al., 2016)

Scientific name	Family	Common name	Mode of application	Traditional use
Allium sativum	Liliaceae	Garlic	Decoction; Incense	Lousicide; Bee repellent
Artemisia absinthium	Asteraceae	Wormwood	Powder Poultice	Insect repellent; Mosquito repellent
Boswellia sacra	Burseraceae	Frankincense	Decoction	Killing flies
Citrullus colocynthis	Cucurbitaceae	Colocynth	Decoction	Killing fleas; Repelling fleas
Ferula ammoniacum	Apiaceae	Ammoniacum	Embrocating	Insect repellent, Used in insecticide mixtures
F. assa-foetida	Apiaceae	Asafetida	Incense power rubbed onto surface	Insect repellent; Ant repellent
Iris ×germanica	Iridaceae	Orris	Incense of root	Insect repellent
Laurus nobilis	Lauraceae	Bay leaf	Incense power; Smoke of leaves and fruits	Insect repellent; Insecticide
Malva sylvestris	Malvaceae	High mallow	Extract	Bee repellent
Myrtus communis	Myrtaceae	Myrtle	Incense of laves	Insect repellent
Nerium oleander	Apocynaceae	Oleander	Leaves	Flea repellent
Ocimum basilicum	Lamiaceae	Basil	Fragrance	Insect repellent
Origanum majorana	Lamiaceae	Marjoram	Incense	Insect repellent
Peganum harmala	Nitrariaceae	African rue	Incense	Mosquito repellent
Picea orientalis	Pinaceae	Oriental spruce	Wood ashes; Smoke of wood	Insect repellent; Mosquito repellent
Punica granatum	Lythraceae	Pomegranate	Incense; Powering surfaces	Insect repellent
Ruta graveolens	Rutaceae	Common rue	Decoction	Mosquito repellent
Vitex agnus-castus	Lamiaceae	Chaste tree	Incense; Powdering surfaces	Insect repellent; Insecticide

The group of insect-repellent species includes both poisonous plants (e.g. *Artemisia absinthium*, *Nerium oleander*) and those that have a very strong aroma (e.g., *Ocimum basilicum*, *Origanum majorana*) resulting from the presence of esters or other strongly smelling substances.

The increased interest in ethnic therapies and herbal medicine, as a consequence of eliminating the effects of synthetic drug therapy, also applies to ITM. The huge interest in this subject is evidenced by the number of various scientific publications analyzing the compositions of ethnic herbal medicines. The analyses conducted for this study presented numerous examples of medicinal species taken from ITM recipes (Tab. 11 – Appendix 1). Groups of medicinal species used in specific diseases were also provided (Tab. 12 – Appendix). The growing interest in ITM herbal therapies is also evidenced by the fact that many of these species have a studied chemical composition, which allows for their conscious use. This also applies to traditional Persian

medicinal oils that have been popular and widely used for centuries. Medicinal plant species that are used to prepare traditional Persian oils are: *Allium rotundum*, *A. sativum*, *Artemisia absinthium*, *Boswellia sacra*, *Citrus ×aurantium*, *Corylus avellana*, *Crocus sativus*, *Croton tiglium*, *Cucurbita pepo*, *Cydonia oblonga*, *Drimia maritima*, *Erysimum ×cheiri*, *Ferula ammoniacum*, *F. persica*, *Juniperus sabina*, *Lactuca sativa*, *Lawsonia inermis*, *Myrtus communis*, *Nigella sativa*, *Nicotiana tabacum*, *Ocimum basilicum*, *Origanum majorana*, *Phyllanthus emblica*, *Piper nigrum*, *Pistacia lentiscus*, *P. terebinthus*, *Prunus amygdalus*, *Rosa damascena*, *Trachyspermum ammi*, *Tribulus terrestris*, *Tulipa gesneriana*, *Urtica dioica*, *Viola odorata*, and others. These herbal oils have been administered via oral, topical, and nasal routes, for gastrointestinal, musculoskeletal, and neural diseases (Hamedi et al., 2013). For example, the composition of *Ziziphora clinopodioides*, *Trachyspermum ammi*, and *Zataria multiflora* oils were examined (chromatography/mass spectroscopy GC/MS). In the case *Ziziphora*, the oil contained pulegone, carvacrol, neomenthol, 1,8-cineole, menthol, verinone, thymol, γ-terpinene, germacrene D, carvone, eugenol, linalool, and β-pinene; the main components of *Trachyspermum* oil were thymol, γ-terpinene, sabinene, β-ocimene, α-thujene, and α-pinene, and the major components of *Zataria* oil were carvacrol, thymol, linalool, β-caryophyllene, β-phellandrene, carvacrol methyl ether, and thymol methyl ether (Hamedi et al., 2013). These three examples already show how many medicinal substances these plant raw materials contain.

There is a great need for biochemical and clinical studies of ITM herbal raw materials, which will enable their use in more demanding therapies. In connection with this, attempts were made to study selected samples of ITM herbs in tests for inhibition of heme detoxification. Many species of herbs were used for this purpose, including *Astrodaucus orientalis*, *Berberis crataegina*, *Biebersteinia multifida*, *Bryonia aspera*, *Buxus sempervirens*, *Capparis spinosa*, *Centaurea bruguierana* subsp. *belangeriana*, *Cephalanthera caucasica*, and others (Mosaddegh et al., 2012). Another example may be the studies on the effect of herbs from traditional ITM prescriptions on SARS-CoV-2, and the adopted treatment methods were tested in various clinical trials in Iran (e.g. Bahramsoltani, Roja, 2020; Besharati et al., 2022). The inspiration for this was the fact that traditional herbal medicines (frankincense, myrtle, Damask rose, sandalwood, asafetida, barberries, apple, quinces, pomegranates, Syrian rhubarb, camphor, myrobalan, amaltas and garlic) are still widely used to treat and prevent viral infections, mainly in influenza or chronic cough (Ghaemi et al., 2020; Iranzadasl et al., 2021).

Traditional Turkish Medicine

Like other traditional ethnomedicine, Turkish Traditional Medicine (TTM) was also based on knowledge provided by ancient Greeks, Arabs, and Persians. One of the most famous medieval Ottoman physicians was Şerafeddin Sabuncuoğlu (1385-1468 AD).

Fig. 5. Illustration from *Cerrahiyyetü'l-Haniyye* by Şerafeddin Sabuncuoğlu, showing the author with a patient (Source: Wikimedia commons – Public domain)

He was the author of *Cerrahiye-i Ilhaniye* (*Cerrahiyyetü'l-Haniyye*, *Imperial Surgery*), one of the oldest works on surgery, which he wrote in Turkish in 1465 (Michaleas et al., 2020). It was later believed that his work was merely a translation of the Arabic manual of surgery by Abulcasis – Az-Zahrawi Abu Al-Kasim (936-1013 AD). However, it turned out that it brought a lot of new medical information for that time, including drawings showing various medical procedures (Fig. 5). The medical procedures performed were accompanied by types of herbal therapies, based on medicinal

species available from the immediate surroundings. It is worth emphasising that Turkey is located at the intersection of three phytogeographic regions: Mediterranean, Irano-Turanian, and Euro-Siberian. It is among the important genetic centers of origin and/or diversity of many plants of economic and medicinal importance (Uysal et al., 2019).

In addition to traditional medicine, based on scientific premises, traditional folk medicine has been functioning in present-day Turkey since immemorial. It existed even much earlier than the emergence of Islam. In folk medicine, the treatment practices were performed by shamans, functioning in the ancient religion and tradition, after the emergence of Islam, the healing practices were maintained by folk doctors and folk healers ("*Ocaks*" stove – a type of folk healer in Anatolia) and older pious women. Ancient healing practices contain traces of contemporary faith and beliefs from the past. Folk healers of the old tradition used nature to make medicines or heal patients. They very often used various medicinal plants. Despite the advances in conventional medicine, these practices of healing patients and producing medicines have survived to this day thanks to traditional ways of transmitting knowledge on the subject. In many regions of Turkey, e.g. in Anatolia, they are still very popular (Uğurlu, 2011). Below, a list of popular medicinal plants still used in Anatolia is presented (Tab. 13).

Tab. 13. Folk remedies in central Anatolia (Sezik et al., 2001)

No	Name of plant	Raw material	Properties
1.	*Achillea arabica*	herb	abdominal pain, stomach ache
2.	*Allium ampeloprasum*	whole	infertility in woman
3.	*A. sativum*	bulb	sunstroke
4.	*Althaea officinalis*	aerial	wound
5.	*Arctium minus*	leaf	sunstroke or colds
6.	*Capsicum annuum*	fruit	stomach ache
7.	*Centaurea pulchella*	herb	abscess
8.	*Cichorium intybus*	root	pass kidney stone
9.	*Colutea cilicica*	fruit	inflammatory wounds
10.	*Cucurbita pepo*	fruit	sore throat, bronchitis
11.	*Cydonia oblonga*	leaf	diarrhea
12.	*Datura stramonium*	fruit, seed	bruises
13.	*Helianthus tuberosus*	tuber	diabetes mellitus
14.	*Helichrysum plicatum* subsp. *plicatum*	whole	wound healing
15.	*Hypericum lydium*	herb	hemorrhoids
16.	*H. perforatum*	flowering herb	wound healing
17.	*H. scabrum*	herb	hemorrhoids
18.	*Juniperus sabina*	resin	wound healing
19.	*Linum usitatissimum*	seed	abscess
20.	*Malva neglecta*	leaf	pain in mouth
21.	*M. setigera*	flower	sore throat and bronchitis
22.	*Melilotus officinalis*	root	abortifacient
23.	*Nasturtium officinale*	herb	abdominal pain

24.	*Nigella sativa*	seed	abortifacient
25.	*Onopordum anatolicum*	seed	urethral disorders
26.	*Parietaria judaica*	aeria	eczema
27.	*Pelargonium endlicherianum*	root	as antihelminthis
28.	*P. zonale*	leaf	abscess
29.	*Plantago lanceolata*	leaf	abscess
30.	*P. major*	leaf	antipyretic in sunstroke
31.	*Prunus avium*	stalk	to pass kidney stone
32.	*P. persica*	leaf	abdominal pain
33.	*Pyrus elaeagnifolia*	fruit	diarrhea
34.	*Quercus pubescens*	root bark	cough
35.	*Ranunculus illyricus*	herb	abscess
36.	*Rhamnus petiolaris*	fruit	jaundice
37.	*Rhus coriaria*	fruit	diarrhea and diabetic mellitus
38.	*Salvia dichroantha*	leaf	abdominal pain and stomachache
39.	*S. russellii*	herb	common cold and abdominal pain
40.	*Sinapis arvensis*	seed	cough and pneumonia
41.	*Urtica dioica*	herb	abscess
42.	*Vicia faba*	flower	kidney problems
43.	*V. lens*	seed	burns
44.	*Vicia sativa*	aerial	infertility in woman
45.	*Vitis vinifera*	fruit	bruises and pounded dry raisin is applied to bruises to relieve pain

There are many plants that have been used in Turkey in both conventional and folk herbal medicine for a very long time, for example, *Origanum onites* (Turkish oregano) and *O. majorana* L. (white marjoram). In Turkey, they consume and sell mainly air-dried *O. onites* leaves, and they obtain essential oil traditionally by steam distillation from *O. majorana*. Due to its high oil yield, the native people use dried plant material and essential oil to cure various diseases such as cough, wounds, chronic colds, gastrointestinal disorders, and skin problems in humans as well as in domestic animals (Cinbilgel, Kurt, 2019). Oregano and marjoram also have been traditionally used in Turkey since ancient times as a spice, herbal tea, condiment, essential oil, garden/kitchen herb and also used in a folk medicine to treat different health disorders (Baricevic, Bartol, 2002). Major antioxidants in these popular medicinal plants are rosmarinic acid, α-tocopherol, quercetin, carnosic acid, β-carotene, and ascorbic acid (Ozkan et al., 2016). Another example of a very popular medicinal plant in TTM is *Nepeta* sp. Species of *Nepeta* genus are used in folk medicine as an antispasmodic, antifungal, diuretic, antiasthmatic, anti-bacterial, and anti-inflammatory (Bisht et al., 2010; Mahnaz et al., 2012). The leaves of *Nepeta* species are also prepared and consumed as herbal tea, and for food flavoring (Khajeh et al., 2010). *Nepeta italica* subsp. *cadmea* is one of the endemic species of the *Nepeta* genus and it is distributed throughout the West, South, and Southwest Anatolian regions of Turkey (Kaska et al., 2019). It also has healing properties.

Also in the case of plants used in TTM, studies are increasingly being undertaken to verify their properties and test their effects. For example, Erbay et al. (2018) analysed 46 species from 30 families during a two-month study of TTM plants in Sakarya Province (northwestern Turkey) to test their antimicrobial activity. The most commonly used plants by the natives were *Artemisia absinthium*, *Equisetum telmateia*, *Lavandula stoechas*, *Melissa officinalis*, *Tussilago farfara*, and *Urtica dioica*. In this province, plants are mainly used to treat infectious diseases, neurological and psychological disorders, cardiovascular conditions, skin sailments, and respiratory disorders. Many of these species have been shown to have high antimicrobial activity, and in the case of species such as *Arum maculatum*, *Equisetum telmateia*, *Geranium asphodeloides*, *Plantago major* subsp. *intermedia*, *Senecio vulgaris*, and *Trachystemon orientalis* it has been described here for the first time. Similar tests have also been performed using TTM plants by other researchers (e.g. Güler et al., 2015; Moghaddam et al., 2019). Performing such types of laboratory or clinical tests gives hope for the safe therapy of many other ailments that are treated with synthetic drugs, often causing many side effects.

Conclusions

The traditional medicines of Central Asia and the Middle East constitute an extraordinary reservoir of medical and pharmaceutical knowledge. They carry with them vast practical knowledge concerning various therapies and methods of herbal treatment, but also shaping attitudes towards a healthy, hygienic, and cheerful life, which is still very relevant today. They are often based on popular ancient views that it is better to prevent disease than to cure it. Of course, they are also burdened with folk superstitions and unconfirmed or even disqualified views. The conclusions from the review indicate the fact, that herbal medicine is proving to be a potential effective competitor to modern medication. However, more evidence from clinical trials is needed to better evaluate the effectiveness of herbal medicines as a safe treatment option in various therapies.

Conflict of interest

The author declare no conflict of interest related to this article.

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Tab. 3. Herbal tea plants sold in traditional Chinese markets (Li et al., 2017)

No.	Name of species	Therapeutic action
1.	*Abrus melanospermus* subsp. *melanospermus*	cold, hepatitis, and rheumatism
2.	*Abutilon indicum*	cold, fever, deaf, mumps, and tinnitus
3.	*Acalypha australis*	heat-clearing and relieve diarrhea, dampness, and vomiting
4.	*A. wilkesiana*	expel wind and dampness, heat-clearing, cool the blood
5.	*Achyranthes aspera*	dysentery, and laryngitis
6.	*Adiantum flabellulatum*	cough
7.	*Ageratum conyzoides*	swollen poison, and bleeding
8.	*Alternanthera bettzickiana*	heat-clearing and detoxication, and cool the blood
9.	*A. sessilis*	jaundice, toothache, constipation and dysentery
10.	*Amaranthus spinosus*	dysentery, constipation, and sore throat
11.	*A. tricolor*	heat-clearing and detoxicating
12.	*Anisomeles indica*	expel wind and dampness
13.	*Bacopa monnieri*	sore throat, diarrhea
14.	*Buddleja asiatica*	swollen poison and pain
15.	*Cardiospermum halicacabum*	cool the blood, and swollen poison
16.	*Carica papaya*	stomachache and dysentery
17.	*Celosia argentea*	hypertension, conjunctivitis, and night blindness
18.	*Centella asiatica*	heat-clearing sunstroke and gallstones
19.	*Clerodendrum bungei*	traumatic injury, hypertension and rheumatism
20.	*Clinacanthus nutans*	liver heat and hypertension
21.	*Clinopodium chinense*	cool the blood, swollen poison and conjunctivitis
22.	*Corchorus capsularis*	sunstroke, sore throat, dysentery, and swollen poison
23.	*Dendrobium nobile*	heat-clearing
24.	*D. officinale*	tumor and indigestion
25.	*Dichondra micrantha*	dysentery, bellyache and fever
26.	*Dicliptera chinensis*	cough, cold, fever, sunstroke, and conjunctivitis
27.	*Dimetia hedyotidea*	cough
28.	*Drosera indica*	traumatic injury, rheumatism, swollen poison, and ringworm
29.	*Eclipta prostrata*	sore throat, cough and sunstroke
30.	*Elephantopus scaber*	cold, cough, stomachache and toothache
31.	*Eleusine indica*	toothache, dysentery and pain
32.	*Eleutherococcus trifoliatus*	rheumatism, and remove blood stasis
33.	*Grona styracifolia*	headache and cough
34.	*G. triflora*	stomachache and cold
35.	*Gynura bicolor*	heat-clearing and detoxicating
36.	*G. formosana*	hypertension
37.	*Imperata cylindrica*	heat-clearing, promote diuresis, cool the blood, and stop bleeding
38.	*Inula cappa*	headache, toothache, heat-clearing and promote diuresis
39.	*Iresine herbstii*	clear lung, and cool the blood
40.	*Juncus effusus*	heat-clearing and detoxicating
41.	*Justicia gendarussa*	traumatic injury and rheumatism
42.	*Kalimeris indica*	indigestion and hepatitis
43.	*Laphangium affine*	heat-clearing and detoxicating
44.	*Lobelia chinensis*	nephritis, tonsillitis, cough, and sore throat
45.	*Lonicera japonica*	sunstroke, cold, constipation, and toothache
46.	*Lophatherum gracile*	heat-clearing, pharyngitis, and stomatitis
47.	*Mentha canadensis*	cold, headache, cough, and eye-pain
48.	*Mimosa pudica*	fever, chronic bronchitis, and dysentery

49.	*Mirabilis jalapa*	irregular menstruation, tonsillitis, and rheumatism
50.	*Oldenlandia corymbosa*	heat-clearing and detoxicating
51.	*Phyllanthus emblica*	cough, toothache
52.	*P. urinaria*	sunstroke, headache, and dysentery
53.	*Physalis angulata*	heat-clearing and detoxicating, sore throat, cold, and fever
54.	*Rostellularia procumbens*	sore throat, toothache, and fever
55.	*Scleromitrion diffusum*	lung fire, cough, sunstroke and hepatitis
56.	*S. pinifolium*	hepatitis
57.	*S. verticillatum*	cold, fever, laryngitis and constipation
58.	*Smilax glabra*	heat-clearing and relieving dampness, and dysentery
59.	*Solanum americanum*	dysentery, jaundice, hypertension and cough
60.	*Spilanthes paniculata*	heat-clearing and relieving dampness, dysentery, malaria, and toothache
61.	*Tamarix chinensis*	cold, fever, cough and constipation
62.	*Tinospora sinensis*	traumatic injury
63.	*Viola inconspicua*	keratitis
64.	*V. diffusa*	hepatitis, cough, and mastitis
65.	*Vitex negundo*	cold
66.	*Wedelia chinensis*	swollen poison, cool the blood, cough, sore throat, pneumonia and periodontitis

Tab. 9. A review of selected medicinal plant of Middle East and North Africa (MENA)

Country	Properties	Names of species	Authors
Israel	antioxidant activity and cytotoxicity	*Asphodelus microcarpus*, *Ecballium elaterium*, *Eryngium creticum*, *Mercurialis annua*, *Pistacia lentiscus*, *Rhamnus alaternus*, *Teucrium polium*, *Urtica pilulifera*.	Abdel-Kader et al., 2018
Egypt	antimycobacterial activities	*Ambrosia polystachya*, *Cascabela thevetia*, *Chiliadenus candicans*, *Cichorium intybus*, *Euphorbia paralias*, *Justicia adhatoda*, *Nerium oleander*, *Onopordum acanthium*, *Sonchus oleraceus*, *Tagetes patula*, *Tanacetum sinaicum.*	Dehyab et al., 2020
Iraq	antimycobacterial activities	*Apium graveolens*, *Boswellia serrata*, *Cuminum cyminum*, *Lepidium sativum*, *L. vesicarium*, *Pimpinella anisum*, *Pulicaria gnaphalodes*.	Dehyab et al., 2020
Iran	antimycobacterial activities	*Aloe vera*, *Capparis spinosa*, *Citrus limon*, *Datura stramonium*, *Hypericum perforatum*, *Punica granatum*	Dehyab et al., 2020
Turkey	antimycobacterial activities	*Berberis aquifolium*, *Centaurea depressa*, *Cerinthe minor* L. subsp. *auriculata*, *Cistus laurifolius*, *Crambe orientalis*, *Echinops pungens*, *Echium italicum*, *E. plantagineum*, *Elaeagnus angustifolia*, *Erysimum ×cheiri*, *E. cuspidatum*, *Helianthus annuus*, *Helichrysum plicatum* subsp. *pseudoplicatum*, *Heliotropium dolosum*, *Inula helenium* subsp. *turcoracemosa*, *I. peacockiana*, *Myosotis olympica*, *Onopordum anatolicum*, *Raphanus raphanistrum*, *Salvia tomentosa*, *S. fruticosa*, *Silene arguta*, *S. chlorifolia*, *Spinacia oleracea*	Dehyab et al., 2020
Sudan	antimycobacterial activities	*Balanites aegyptiaca*, *Boswellia papyrifera*, *Capparis decidua*, *Khaya senegalensis*, *Kigelia africana*, *Portulaca oleracea*, *Vachellia seyal.*	Dehyab et al., 2020

Tab. 11. Selected plant species, their properties and active substances documented in Iranian Traditional Medicinal

No	Name of plant species	Properties	Chemical compounds	Authors of publication
1.	*Achillea millefolium*	anti-inflammatory, carminative and anti-infective activities; haemorrhoids, cancer, vertigo, anemia, anorexia, dyspepsia, gastralgia, haemorrhage and dysmenorrhoea	(*) chomazolene, sinoel, champhor, and limonene	Miraldi et al., 2001; Naieni et al., 2009
2.	*Althaea officinalis*	migraine – anti-inflammatory activity	mucilage, flavonoids, glycoside, coumarin and scopoletin	Mehrabadi et al., 2018
3.	*Anchusa azurea*	sedative, calmant, diaphoretic and hypotensive		Miraldi et al., 2001
4.	*Anethum graveolens*	migraine – antinociceptive, and smooth muscle relaxant	Furanocoumarin, polyphenols, mineral gallic acid, and catechin	Mehrabadi et al., 2018
5.	*Artemisia sieberi*	antiseptic, anti-infective, and anti-malassezia properties	(*) thujone and β thujone	Naieni et al., 2009
6.	*Artemisia dracunculus*	epilepsy; eupeptic, laxative, carminative and useful to treat gastriti	estragole	Miraldi et al., 2001; Basiri, Nadjafi, 2019
7.	*Berberis vulgaris*	choleretic, laxative; blood refiner, cardiotonic	vitamin C	Miraldi et al., 2001; Zarshenas et al., 2016
8.	*Brassica nigra*	migraine – anti-inflammatory	Phenolic compounds	Mehrabadi et al., 2018
9.	*Cannabis sativa*	migraine – in vomiting, treating chronic pain and muscle spasm	cannabidiolic acid	Mehrabadi et al., 2018
10.	*Capparis spinosa*	haemorrhoids	sodium, iron, vitamin K, riboflavin	Miraldi et al., 2001
11.	*Carthamus tinctorius*	digestive, laxative, emmenagogue, vermifuge, and for coughs	oleic acid, linoleic acid	Miraldi et al., 2001
12.	*Cichorium intybus*	eupeptic, stomachic, depurative, choleretic, laxative, hypotensive, tonic and antipyretic; migraine – inihibitors of cyclooxygenase 2; blood refiner	e.g. sesquiterpene lactones, specially 8-deoxy lactucin	Miraldi et al., 2001; Zarshenas et al., 2016; Mehrabadi et al., 2018
13.	*Cinnamomum camphora*	refresher, tranquilizer	camphor, linalool, 1,8-cineole, nerolidol, safrole, and borneol	Zarshenas et al., 2016
14.	*C. verum*	Cardiotonic; anti gastric ulcer, gastroprotective and antidiarrheal	turpentine	Zarshenas et al., 2016; Mahmoudpour et al., 2018
15.	*Citrus medica*	cardiotonic	citric acid	Zarshenas et al., 2016
16.	*Cornus mas*	tonic, astringent, antipyretic, and flavoring;	polyphenols, organic acids, vitamin C and anthocyanins	Miraldi et al., 2001
17.	*Coriandrum sativum*	cardiotonic, refresher	linalool	Zarshenas et al., 2016
18.	*Crocus sativus*	migraine – anti-inflammatory effects; in diseases gastrointestinal tract, and act as anti helicobacter, and anti ulcer; cardiotonic	crocin and safranal	Zarshenas et al., 2016; Mahmoudpour et al., 2018; Mehrabadi et al., 2018
19.	*Cuminum cyminum*	carminative, antidiarrhoeaic and antispasmodic activities	(*) pinene, cineole, and linalool	Naieni et al., 2009
20.	*Doronicum pardalianches*	potent refresher		Zarshenas et al., 2016
21.	*Dracocephalum moldavica*	general tonic, carminative, stomachic, digestive, diaphoretic, sedative and antiemetic	citrate	Miraldi et al., 2001
22.	*Drimia maritima*	migraine – effective against	proscillaridin A	Mehrabadi et al.,

		congestive heart failure, anti-tumor, and analgesic		2018
23.	*Echium amoenum*	cardiac refresher	naloxone, flavonoids	Zarshenas et al., 2016
24.	*Ephedra sinica*	cardiotonic	ephedrine	Zarshenas et al., 2016
25.	*Elaeagnus angustifolia*	pain reliever, and anti-inflammation as well as anticonvulsants; stomach disorders, amoebic diarrhea, female aphrodisiacs, liver and spleen revival; refresher	alkaloids harmine, harmane, harmol, calligonine	Hoseinifar et al., 2016; Zarshenas et al., 2016; Emaminia et al., 2020
26.	*Foeniculum vulgare*	antiseptic, carminative and flavoring activities	(*) trans-anethole, limonene, and fenchone	Naieni et al., 2009
27.	*Fumaria parviflora*	blood refiner	protopine, adlumidiceine, parfumine, fumariline, dihydrofumariline, cryptopine, (-)-stylopine, 8-oxocoptisine, sanguinarine, and oxysanguinarin	Zarshenas et al., 2016
28.	*Haematoxylum campechianum*	cardiotonic	haematoxylin	Zarshenas et al., 2016
29.	*Heracleum persicum*	flavoring, digestive, antiseptic activities	(*) anethole, terpinolene, and pinocamphon, pinocarvan, and camphor, respectively	Naieni et al., 2009
30.	*Holosteum umbellatum*	blood refiner, refresher		Zarshenas et al., 2016
31.	*Hyssopus officinalis*	carminative, coughing and expectorant characteristics	(*) anethole, terpinolene, and pinocamphon, pinocarvan, and camphor, respectively	Naieni et al., 2009
32.	*Inula helenium*	eupeptic, analgesic, carminative and diaphoretic	sesquiterpene lactones - helenine, elecampane camphor, essential oil, phytosterols, triterpenes, inulin	Miraldi et al., 2001
33.	*Lythrum salicaria*	astringent, antihaemorragic, and appropriate to treat diarrhea, dysentery, haematuria, leucorrhoea, epistaxis, and dismenorrhoe	tannins, pyrogallol, alkaloid cryogenin, glycoside salicarin	Miraldi et al., 2001
34.	*Malus domestica*	potent cardiotonic	vitamins, macro and microelements	Zarshenas et al., 2016
35.	*Matricaria recutita*	anti-inflammatory, antidiarrhoeaic and carminative activities; migraine	(*) flavonoids and essential oil, which are inhibitors of cyclooxygenase	Naieni et al., 2009; Mehrabadi et al., 2018
36.	*Melissa officinalis*	tranquilizer, refresher	rosmarinic acid	Zarshenas et al., 2016
37.	*Mentha spicata*	digestive and carminative properties	(*) carvone, tannins	Naieni et al., 2009
38.	*M. ×piperita*	refresher	peppermint oil, ascorbic acid, carotene, rutin, apigenin, betaine, oleanolic and ursulic acid	Zarshenas et al., 2016
39.	*Myrtus communis*	cardiotonic	myrtle oil	Zarshenas et al., 2016
40.	*Nasturtium officinale*	digestive, disinfectant, antiscorbutic, and useful for bronchitis, diabetes and obesity	glycoside (glucosinolate - gluconasturcin), numerous vitamins	Miraldi et al., 2001
41.	*Nepeta menthoides*	tranquilizer, cardiotonic		Zarshenas et al., 2016
42.	*Nigella sativa*	anti-infective, rheumatism and bronchitis	(*) saponin – melantin (tannins, bitterness – nigelline and alkaloid – damasceine	Naieni et al., 2009
43.	*Nymphaea alba*	tranquilizer	sesquiterpene alkaloids (nufaridine, nufaramine, nufamine), flavonoids, organic acids	Zarshenas et al., 2016

44.	*Ocimum basilicum*	to alleviate palpitation	methylchavicol, cineole, linalool, eugenol, citral, limonene, terpinene, tannins, saponins, flavonoids, bitter substances, oxy fatty acids (trionic acid), mineral salts, vitamins	Zarshenas et al., 2016
45.	*Papaver somniferum*	migraine	codeine and morphine, which is analgesic function	Mehrabadi et al., 2018
46.	*Pelargonium graveolens*	astringent, haemostatic and diuretic	(*) geranium oil	Naieni et al., 2009
47.	*Phyllanthus emblica*	cardiotonic, refresher	ascorbic acid, ellagitannins - emblicanin A i B, punigluconin, pedunculaginm, punicafolin, phyllanemblinin A, phyllanemblin, flavonoids, kaempferol, ellagic and gallic acid	Zarshenas et al., 2016
48.	*Pimpinella anisum*	carminative, expectorant, anti-infective	(*) anise essential oil	Naieni et al., 2009
49.	*Pistacia vera*	cardiotonic	pistachio oil; carotenois - lutein, β-carotene, neoxanthin, luteoxanthin, and violaxanthin, pheophytin A, and pheophytin B	Zarshenas et al., 2016
50.	*Piper longum*	in prevent and reduce colonic inflammation, and improve constipation, diarrhea and stomachache	piperine	Mahmoudpour et al., 2018
51.	*Prunus domestica*	migraine; anti-inflammatory and analgesic effects	flavonoids, ethanol, carbohydrates and sterols	Mehrabadi et al., 2018
52.	*Pyrus communis*	cardiotonic	vitamins, macro and microelements	Zarshenas et al., 2016
53.	*Rosa damascena*	to alleviate palpitation	rose oil: citronellol, paraffins, geraniol, nerol, phenylethanol, linalool, farnesol, eugenol, carvone, rose oxide, β-damascenone and β-ionone	Zarshenas et al., 2016
54.	*Salix alba*	refresher	flavonoids, organic acids and glycosides – salicin	Zarshenas et al., 2016
55.	*Salvia rosmarinus*	digestive and additive activities	(*) cineole, pinene, cymene, borneol, and rosmarinic acid	Naieni et al., 2009
56.	*Santalum album*	cardiotonic, refresher	oleum santali: α-santalol, cis-β-santalol, Z-nuciferol, trans-bergamotol, trans-farnesol	Zarshenas et al., 2016
57.	*Satureja hortensis*	anti-infective and antispasmodic properties	(*) carvacrol and cymene as well as tannins, resins and mucus	Naieni et al., 2009
58.	*Scutellaria lateriflora*	refresher, tranquilizer	polyphenols: lbaicalin, baicalein, wogonin, and oroxylin A, others: lateriflorin, melatonin, serotonin, viscidulin III-2'-O-glucoside, and scutellarin	Zarshenas et al., 2016
59.	*Syzygium aromaticum*	anti ulcer; refresher	clove oil (eugenol)	Zarshenas et al., 2016; Mahmoudpour et al., 2018
60.	*Tamarindus indica*	cardiotonic; laxative effects	thiamine, magnesium and potassium, malic acid, tartaric acid, potassium	Zarshenas et al., 2016

			bitartrate	
61.	*Terminalia chebula*	refresher	glycosides: triterpenes arjunglucoside I, arjungenin, and the chebulosides I and II, coumarin, gallic acids - chebulin, phenolic compounds: ellagic acid, 2,4-chebulyl-β-D-glucopyranose, chebulinic acid, gallic acid, ethyl gallate, punicalagin, terflavin A, terchebin, luteolin, and tannic acid	Zarshenas et al., 2016
62.	*Thymus kotschyanus*	anti-infective, expectorant and coughing	(*) thymol, carvacrol, and linalool	Naieni et al., 2009
63.	*T. vulgaris*	migraine – antioxidant	thymol, terpinene, carvacrol, tujene	Mehrabadi et al., 2018
64.	*Trachyspermum ammi*	to alleviate the palpitation	essential oil: thymol, gamma-terpinene, p-cymene, and terpenoids	Zarshenas et al., 2016
65.	*Valeriana officinalis*	anti gastric ulcer, gastroprotective and antidiarrheal	isovaleric acid esters, hyaluronic acid, valeranone, valerenal	Mahmoudpour et al., 2018
66.	*Viscum album*	hypotensive, diuretic, and useful for internal haemorrhages	flavonoids, amines (choline, histamine), triterpenes, organic acids (caffeic, ferulic, betulinic, oleanolic, ursolic acid), viscotoxins, syrenginin and its glycosides.	Miraldi et al., 2001
67.	*Zataria multiflora*	anti-infective, expectorant and coughing	(*) thymol, carvacrol, and linalool	Naieni et al., 2009
68.	*Zingiber officinalie*	gastric emptying, gastrointestinal disorder, functional dyspepsia, in irritable bowel disorder, reflux	α-zingiberene, α-fernazene, α-pinene, camphene, linalool, β-pinene, geraniol, citral, β-phelandrene, limonene, cineole, geraniol acetate, α-myrcene, α-longipinene, β-selenene, β-bisabolol, (+)-β-citronellol, neridol	Mahmoudpour et al., 2018
69.	*Ziziphora clinopodioides*	anti-inflammatory and antiseptic	(*) thymol, carvacrol, and linalool	Naieni et al., 2009

Note: (*) – chemical compounds according Naieni et al. (2009); the rest according to various internet sources

Tab. 12. Selected ethno-medicinal herbs used in Iranian Traditional Medicine for various diseases

Diseases	Group of plants	Authors
urinary stones	*Alhagi maurorum* var. *maurorum*, *Alyssum turkestanicum*, *Amaranthus blitoides*, *Capsella bursa-pastoris*, *Equisetum arvense*, *Fraxinus excelsior*, *Lamium album*, *Muscari neglectum*, *Ononis spinosa*, *Polygonum aviculare*, *Prunus microcarpa*, *Rosa canina*, *R. foetida*, *Ruta graveolens*, *Tribulus terrestris*, *Xeranthemum longepapposum*.	Bahmani, Zargaran, 2015
hemorrhoid	*Allium ampeloprasum*, *Aloe vera*, *Commiphora wightii*, *Phyllanthus emblica*, *Terminalia chebula*, *Vitis vinifera*	Dehdari et al., 2018
peptic ulcer	*Acorus calamus*, *Althaea officinalis*, *Boswellia sacra*, *Hyssopus officinalis*, *Laurus nobilis*, *Melissa officinalis*, *Myrtus communis*, *Pistacia lentiscus*, *Plantago major*, *P. ovata*, *Vachellia nilotica* subsp. *tomentosa.*	Farzaei et al., 2013
liver	*Agrimonia eupatoria*, *Berberis vulgaris*, *Cichorium intybus*, *Punica granatum*.	Akbarzadeh et al., 2015
memory and learning	*Acorus calamus*, *Allium sativum*, *Anacyclus pyrethrum*, *Boswellia* sp., *Boswellia papyrifera*, *B. sacra*, *B. serrata*, *Cocos nucifera*, *Crocus sativus*, *Cyperus rotundus*, *Ferula assa-foetida*, *Lavandula* sp., *L. angustifolia*, *L. angustifolia* subsp. *angustifolia*, *L. ×heterophylla*, *Melissa officinalis*, *Nigella sativa*, *Phyllanthus emblica*, *Ruta graveolens*, *Santalum album*, *Terminalia chebula*, *Teucrium polium*, *Vitis vinifera*, *Zingiber officinale*	Shojaii et al., 2016
inflammatory bowel diseases	*Althaea officinalis*, *Boswellia sacra*, *Cassia fistula*, *Commiphora wightii*, *Cydonia oblonga*, *Elwendia persica*, *Foeniculum vulgare*, *Juglans regia*, *Pistacia lentiscus*, *Plantago ovata*, *Solanum nigrum*, *Terminalia chebula*.	Rahimi et al., 2010
epilepsy	*Aristolochia fontanesii*, *A. rotunda*, *Bryonia alba*, *Bryonia cretica* subsp. *dioica*, *Caesalpinia bonducella*, *Cedrus deodara*, *Commiphora gileadensis*, *Coriandrum sativum*, *Cuscuta epithymum*, *Drimia maritima*, *Ferula assa-foetida*, *F. gummosa*, *F. persica*, *Inula conyza*, *Lagoecia cuminoides*, *Lavandula stoechas*, *Opopanax chironium*, *Origanum majorana*, *Paeonia officinalis*, *Parietaria cretica*, *Populus alba*, *P. nigra*, *Ruscus aculeatus*, *Seseli tortuosum*, *Trigonella caerulea*.	Sahranavard et al., 2014
anticonvulsant	*Anacyclus pyrethrum*, *Brassica nigra*, *Caesalpinia bonducella*, *Ferula assa-foetida*, *F. gummosa*, *Laurus nobilis*, *Lavandula stoechas*, *Nigella sativa*, *Origanum majorana*, *Pimpinella anisum*, *Piper longum*, *Ruta graveolens*, *Terminalia chebula*.	Abdollahi Fard, Shojaii, 2013
managing breast milk oversupply	*Carum carvi*, *Brassica oleracea*, *Ferula ammoniacum*, *Lactuca sativa*, *Ocimum basilicum*, *Plantago ovata*, *Ruta graveolens*, *Trigonella foenum-graecum*, *Vicia faba*, *V. lens*, *Vitex agnus-castus*.	Kabiri et al., 2017
neonates and their feeding mother to treat jaundice	*Alhagi maurorum*, *Cichorium intybus*, *Cotoneaster nummularioides*, *Descurainia sophia*	Heydari et al., 2016
infantile colic	*Foeniculum vulgare*, *Trachyspermum ammi*	Javan et al., 2015
constipation in children	*Agrimonia eupatoria*, *Aloe vera*, *Cassia fistula*, *Cymbopogon schoenanthus*, *Ficus carica*, *Iris ×florentina*, *Mentha longifolia*, *M. spicata*, *Ocimum basilicum*, *Olea europaea*, *Operculina turpethum*, *Plantago ovata*, *Prunus amygdalus*, *Rheum palmatum*, *Ricinus communis*, *Rosa damascena*, *Senna alexandrina* var. *alexandrina*, *Terminalia chebula*, *Viola odorata, Vitis vinifera.*	Motaharifard et al., 2016
dementia and	*Allium sativum*, *Alpinia officinarum*, *Brassica nigra*, *Cicer*	Iranshahy, Javadi, 2019

memory impairment	*arietinum*, *Cocos nucifera*, *Corylus avellana*, *Crocus sativus*, *Cuminum cyminum*, *Ficus carica*, *Foeniculum vulgare*, *Hordeum vulgare*, *Juglans regia*, *Melissa officinalis*, *Piper nigrum*, *Pistacia atlantica*, *P. vera*, *Rosa damascna*, *Vitis vinifera*, *Zingiber officinale*	
leishmaniasis	*Achillea millefolium*, *Allium stipitatum*, *Alkanna tinctoria*, *Calendula officinalis*, *Camellia sinensis*, *Echinacea purpurea*, *Erythrostemon gilliesii*, *Eucalyptus camaldulensis*, *Ficus benghalensis*, *Gossypium hirsutum*, *Hyssopus officinalis*, *Ixora brachiata*, *Neltuma juliflora*, *Neurotropis szowitsiana*, *Peganum harmala*, *Phytolacca americana*, *Rhamnus persica*, *Satureja hortensis*, *S. khuzistanica*, *Scrophularia striata*, *Stachys lavandulifolia*, *Thymus migricus*, *Trachyspermum ammi*, *Tussilago farfara*, *Vachellia farnesiana*, *Vitex agnus-castus.*	Motaharifard et al., 2016
joint pain	*Acorus calamus*, *Allium sativum*, *Althaea officinalis*, *Aristolochia rotunda*, *Brassica nigra*, *B. oleracea*, *Calendula officinalis*, *Cassia fistula*, *Chamaemelum nobile*, *Cichorium intybus*, *Cocos mucifera*, *Colchicum autumnale*, *Conium maculatum*, *Cuprella homalocarpa*, *Drimia maritima*, *Ecballium elaterium*, *Hordeum vulgare*, *Hyoscyamus albus*, *Inula helenium*, *Lawsonia inermis*, *Lepidium sativum*, *Lupinus* sp., *Mandragora officinarum*, *Nerium oleander*, *Ocimum filamentosum*, *Olea europaea*, *Opopanax chironium*, *Papaver somniferum*, *Platanus orientalis*, *Populus canadensis*, *Ruta graveolens*, *Spinacia oleracea*, *Thymus* sp., *Viola odorata*, *Zygophyllum bruguieri.*	Ziaei et al., 2016

Analiza tradycyjnych nauk medycznych w Azji i na Bliskim Wschodzie w aspekcie fitoterapeutycznym

Streszczenie

Już od czasów starożytnych stosowanie ziół było powszechne wśród rdzennych mieszkańców różnych części świata. Tradycyjna Medycyna Chińska (TCM), medycyna koreańska (TKM), Sasang (SCM), Ajurweda, Unani, Kampo, Tradycyjna Medycyna Aborygeńska, medycyna afrykańska, Rosyjska Medycyna Tradycyjna (RTM), Irańska Medycyna Tradycyjna (ITM), Tradycyjna Medycyna Arabska i Islamska (TAIM), Turecka Medycyna Tadycyjna (TTM), to główne systemy medycyny tradycyjnej znane na całym świecie. Celem tego przeglądu jest przedstawienie podsumowania wybranych tradycyjnych nauk medycznych na Bliskim Wschodzie i w Azji Środkowej, wykorzystujących fitoterapie. Informacje zawarte w tym artykule pochodzą z randomizowanych eksperymentów kontrolnych, publikacji przeglądowych oraz badań analitycznych i obserwacji, które zostały zebrane z licznych odniesień bibliograficznych. Wnioski z przeglądu wskazują na fakt, że ziołolecznictwo okazuje się być potencjalnie skutecznym konkurentem dla współczesnej medycyny. Jednak potrzeba więcej dowodów, w postaci badań klinicznych, aby dalej zmieniać ziołolecznictwo w bezpieczną metodę leczenia w różnych terapiach, zarówno głównych, jak i wspomagających.

Słowa kluczowe: rośliny lecznicze, Tradycyjna Medycyna Arabska, Tradycyjna Medycyna Chińska, Tradycyjna Medycyna Irańska, Tradycyjna Medycyna Turecka

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