

Herbal medicinal oils in traditional Persian medicine

Azadeh Hamedi¹, Mohammad M. Zarshenas^{2,3}, Maryam Sohrabpour², and
Arman Zargaran

REVIEW ARTICLE

2013

Pharmaceutical Biology

Keywords: Ancient time, history of medicine, medieval
period, persia

Introduction

Oils :

Oils are one of the most ancient forms of natural herbal medicines (Kasthuri et al., 2010).

History of medical:

Since the beginning of civilization, herbal, animal and mineral medicaments have been used to treat illnesses (Rezaeizadeh et al., 2009), however, most remedies in traditional medical systems have focused on medicinal herbs (Gurav et al., 2011).

Type of medications:

These medicaments have been historically administered either individually or in combinations in the form of pills, powders, extractions, etc. (Kiyohara et al., 2004; Wadud et al., 2007)

manuscripts:

Medical and pharmaceutical manuscripts authored by medieval Persian practitioners present not only an accumulation of traditional medical systems, but also contain a collection of ingenious studies (Khaleghi Ghadiri & Gorji, 2004) that provide valuable information in the field of medicinal herb formulation.

Physician:

In fact, pioneering medieval practitioners, namely Rhazes (865–925 AD) and Avicenna (980–1037 AD), are credited as the founders of the golden age of Persian medical sciences which occurred from the eighth to seventeenth centuries (West, 2008; Zargaran et al., 2012a).

ethnopharmacological knowledge in Iran:

Most current ethnopharmacological knowledge in Iran has been derived from historical manuscripts. An *Atta[̄]r* is a traditional Iranian herbalist who dispenses medicinal plants and practices traditional methods. Mostly, being an *Atta[̄]r* is a familial position, in which knowledge has been handed-down across many generations and continues to be widely used in the current era (Naghibi et al., 2005; Yesilada, 2005).

traditional knowledge:

In this regard, traditional knowledge of natural medicine recorded in historical manuscripts can help to unravel the ethnopharmacological roots of traditional Iranian concepts and herbal classifications.

Manuscripts:

Historical medical and pharmacological manuscripts describe various pharmaceutical applications of medieval Persian medicine.

Medicinal oil in ITM:

One of the known **forms of application for therapeutic** purposes via topical or systemic administration is medicinal oils prepared from numerous medicinal herbs (Avicenna, 1988; Heravi, 1765).

The formulation and preparation of herbal oils are known as “**Dohn**” or the plural term “**Adhaan**” and

described in a series of historical Persian pharmaceutical manuscripts, namely “**Qarabadin**” (pharmacopeia), which consists of medical texts on drug compounds, formulas and indications (Levey, 1966).

Medicinal oils are largely ignored and rarely investigated in contemporary medical research. However, the application of herbal oils and extracts for medical purposes originated and continues in **traditional Chinese, Indian and Egyptian** medicine (Shikov et al., 2009). **Massage therapy** using herbal oils continues to be practiced in several East Asian countries (Mullany et al., 2005).

Moreover, **aromatherapy** with volatile oils has been shown to improve immunological and physiological conditions (Kuriyama et al., 2005).

Aim:

Several herbal oils are easily prepared and continue to be used as practical therapeutic interventions in Iranian **folk medicine**. However, **no acceptable** relevant investigations have been performed on the **efficacy, safety or toxicity of** such pharmaceutical products.

All traditional drugs and therapeutic approaches for using in current medicine **should to** be evaluated and standardized with current standards of pharmaceuticals and medical approaches.

To reach this aim, we should first have a clear view on traditional knowledge compared to current concepts.


Therefore, the present review investigated common medicinal oils used in traditional Persian medicine (TPM) to derive :

the preparation methods, dosages and reported therapeutic approaches.

Method

We investigated surviving Persian medical and pharmaceutical manuscripts from the tenth to the eighteenth century AD, which included **Canon** of Medicine (Avicenna, 1025), book of **Qarabadin-e-azam** (Azamkhan, 1853), **Qarabadin-e-ghaderi** (Arzani, 1714), **Qarabadin-e-kabir** (Aghili Shirazi, 1772), **Qarabadin-e-salehi** (Heravi, 1765) and **Tohfah ol Moemenin** (Tonekaboni, 2007). It should be noted that these texts are used exclusively as references for the Iranian PhD program in traditional pharmacy (Ministry of Health and Medical Sciences Education, 2007).

In these references, sections containing **information on the preparation and administration of medicinal oils** were evaluated and relevant data were collected, categorized and analyzed. Additionally, a short survey on some examples of medicinal oils from **ancient Persia** was included.



The **scientific names** of the plant species of the medicinal oils were authenticated using botanical textbooks, including **the Dictionary of Medicinal Plants** (Soltani, 2004), **Popular Medicinal Plants of Iran** (Amin, 2005), **Pharmacographia Indica** (Dymook, et al., 1893) and **Indian Medicinal Plants** (Khare, 2007).

Additional reports on **current pharmacological effects** of the included medicinal herbs were derived from **PubMed**, **Scopus** and **Google Scholar** databases to establish relationships between traditional knowledge and current findings.

Results and discussion

Examples of medicinal oil **use** in ancient Persia

The medical and pharmaceutical use of oils in Persia dates back to ancient times. Prior to 637 AD (Wiesehofer, 2006) (**entrance of Islam to Iran**), Persia was ruled by three dynasties: Achaemenid (550–330 BC), Parthian (247 BC– 224 AD) and Sassanid (224–637AD), which all have well documented histories (Zargaran et al., 2012b). However, there is limited information concerning medical and pharmaceutical practices from these periods. One of the most important documents, **Bondahesh**, a **Sassanid Pahlavi manuscript**, classified all plant species into 11 groups, including oily herbs that were identified through their oily seeds (Dadegi, 2006).

Examples of medicinal herbs mentioned in the Bondahesh include olive oil (*Olea europaea* L. (Oleaceae)),

castor oil [*Ricinus communis* L. (Euphorbiaceae)] and hemp [*Cannabis sativa* L. (Cannabaceae)] (Dadegi, 2006; Biruni, 2004).

Remnants of a tool used for oil extraction from seeds, dating to the Sassanid period, was discovered in Bishapur (Figure 1), an ancient city located in the Fars province of Iran.

A design on a stone showing a man with an oil jar in one hand and a towel in the other (Figure 2) exists in Persepolis (the Achaemenid capital, 500 BC). However, this figure may represent the cosmetic application of oils, which was widely practiced in ancient Persia, especially **as demulcent agents used after bathing** (Mohagheghzadeh et al., 2011).

Saffron (*Crocus sativus* L.) and labdanum oil (*Cistus ladanifer* L.) were used in the production of hand and face creams as early as 330 BC (Gershevich, 2006).

Extraction of oil-soluble ingredients from medicinal plants was reported in ancient

documents, such as **lily oil** extracts used as **topical analgesics** (Adhami et al., 2007).

Preparation and formulation of medicinal oils used in medieval Persia

Medieval Persian scholars and physicians recorded **dosages** of medicinal oils (dohn) based on methods attributed to Pythagoras and Socrates (Tonekaboni, 2007).

They described medicinal oils and also the **preparation** methods and **applications** of the formulas.

Generally, pharmaceutical dosages of medicinal oils were **prepared by two primary methods**: **direct extraction** from the herbs via compression of oil-bearing components or **distillation** of aromatic plants parts, or **indirect**, which involved the extraction of plants to prepare vegetable oils (Mikaili et al., 2012) (Figure 3).

In the latter group, soft, fragrant aerial parts such as flowers, leaves or fleshy fruits were soaked in traditionally prepared almond, sesame and olive oils, among others, and exposed to the sun or an artificial heat source for several days while replacing the spent parts with fresh ones until they are based on the color and aroma of the particular herb (**maceration in heated oil**) (Heravi, 1765; Avicenna, 1025).

This method is comparable to modern-day **enfleurage** (Eltz et al., 2007). However, in the enfleurage process, **animal fat** was used.

The above processes were often referred to as “the method of Greek practitioners” (Heravi, 1765).

Currently, the **oil infusion** method is widely used by steeping plant parts containing the desired chemical compounds or flavors in an oily solvent (Jones, 2010).

Alternatively, rigid botanical parts such as roots and bark are **traditionally** decocted in water (**aqueous extraction**). In this type of oil preparation, the resulting extract is then boiled in an oily vehicle to evaporate the water portion (**boiling and evaporating method**) (Tonekaboni, 2007).

Persian practitioners applied special methods to produce **gummy derivatives** such as Frankincense, in which gum was thoroughly dispensed in oil in a glass container, which was then submerged in boiling water until the gum fully dissolved in the oil (**boiling water bath**) (Heravi, 1765).

The oil of **aromatic gum resins** such as myrrh was reportedly extracted via the **distillation** method (Aghili Shirazi, 1772).

Approximately more than **50 different medicinal oils** prepared by the above-mentioned methods were retrieved from pharmaceutical manuscripts describing TPM.

Figure 4 is a photograph representing the first page of oil preparation chapter from the book of Qarabadin-e-salehi (Heravi, 1765).

There, the author classically described the rules of oil preparation from different herbal parts through ways as mentioned.

Table 1 lists the plant species, as well as specific plant parts, preparation methods and literature references

(Aghili Shirazi, 1772; Arzani, 1861; Avicenna, 1025; Heravi, 1765; Tonekaboni, 2007). The clinical use of herbal oils and the diseases that they purportedly ameliorate are listed in

Table 2. Furthermore, current medical research pertaining to traditional applications of the oils and their active components is cited in Table 2.

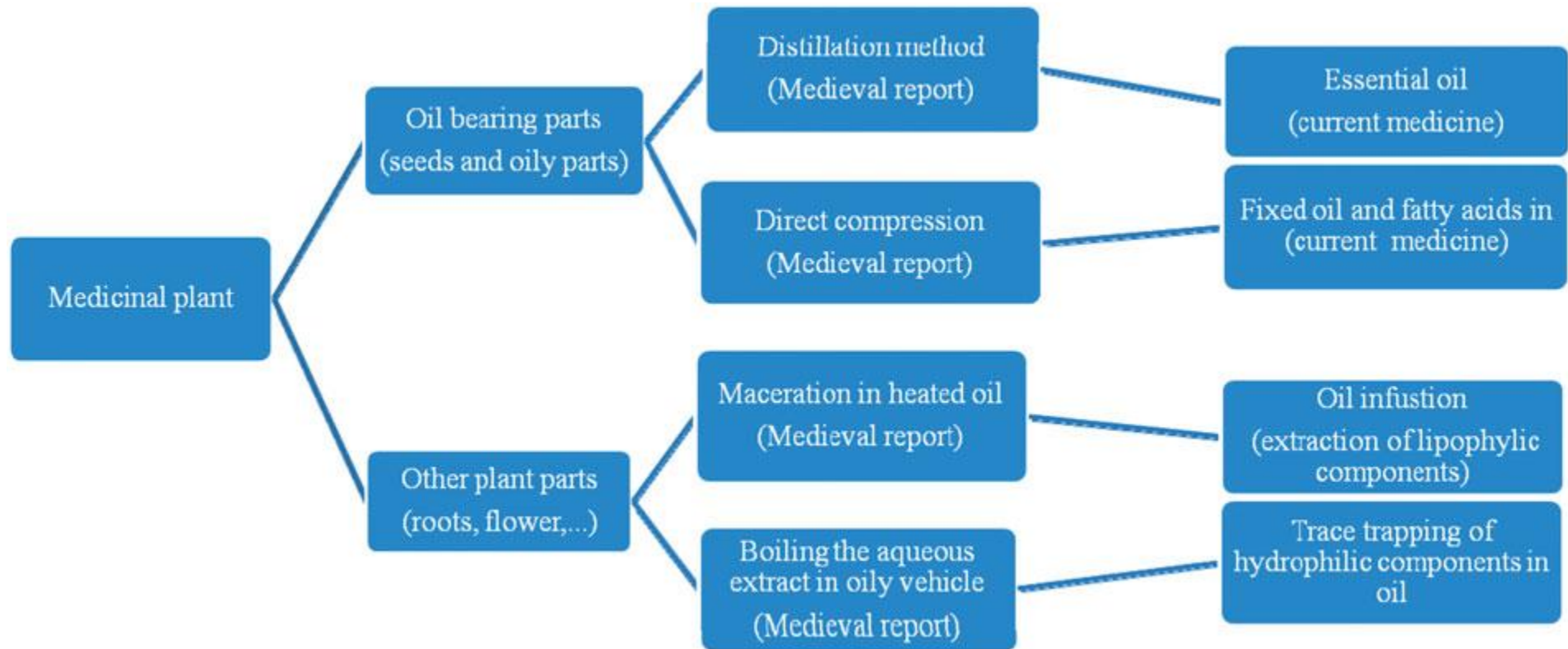


Table 1

❖ Title: Medicinal plant species which were used to prepare traditional Persian oils.

- Family
- Scientific name (Main part)
- Traditional name
- Growtha Part
- Preparationc
- Literature

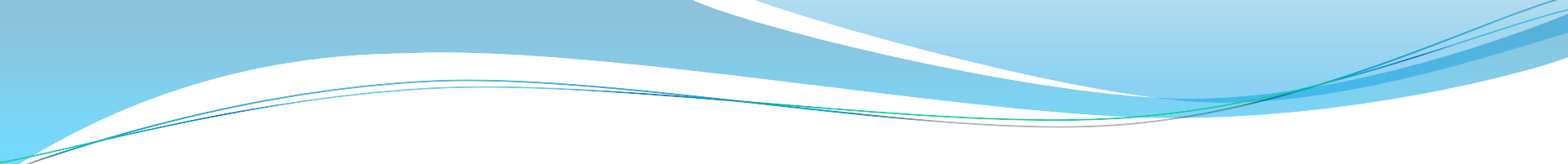
Table 2

- ❖ Title: Comparing the pharmacological usage of traditional Persian medicinal oils with current findings.
- Scientific name (oil name)
- Disease(s) or use(s) in Persian literatures
- Component(s) or fraction(s)/effect(s)
- Study method (in vitro/in vivo)
- Reference

Other than simple oils, **compound herbal medicinal oils** were reported in **Persian pharmaceutical** manuscripts, which also describe:

- the inhibition of unwanted effects,
- reduction in potency,
- reinforcement of efficacy,
- improvement in taste,
- multiple therapeutic benefits
- and modification of undesirable effects using other medicinal herbs (Aghili Shirazi, 1772).

Medicinal oils (Adhaan) have been used in TPM for thousands of years to treat various ailments. Currently, many of these formulations are used as ethnomedical preparations by traditional practitioners in Iran (Mikaili et al., 2012). Fundamentally, herbal medicinal oils comprise essential and fixed oils depending on the part of the plant used as the source; however, the classification of herbal oils is not limited to these two groups.

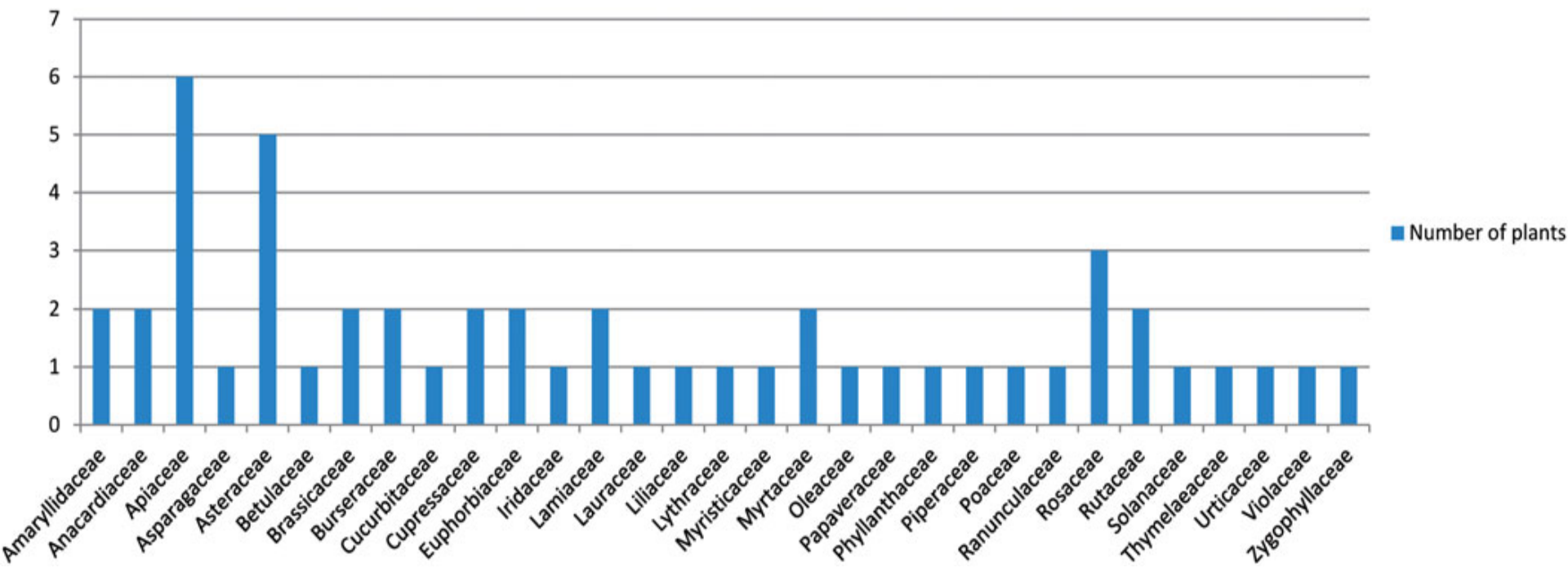


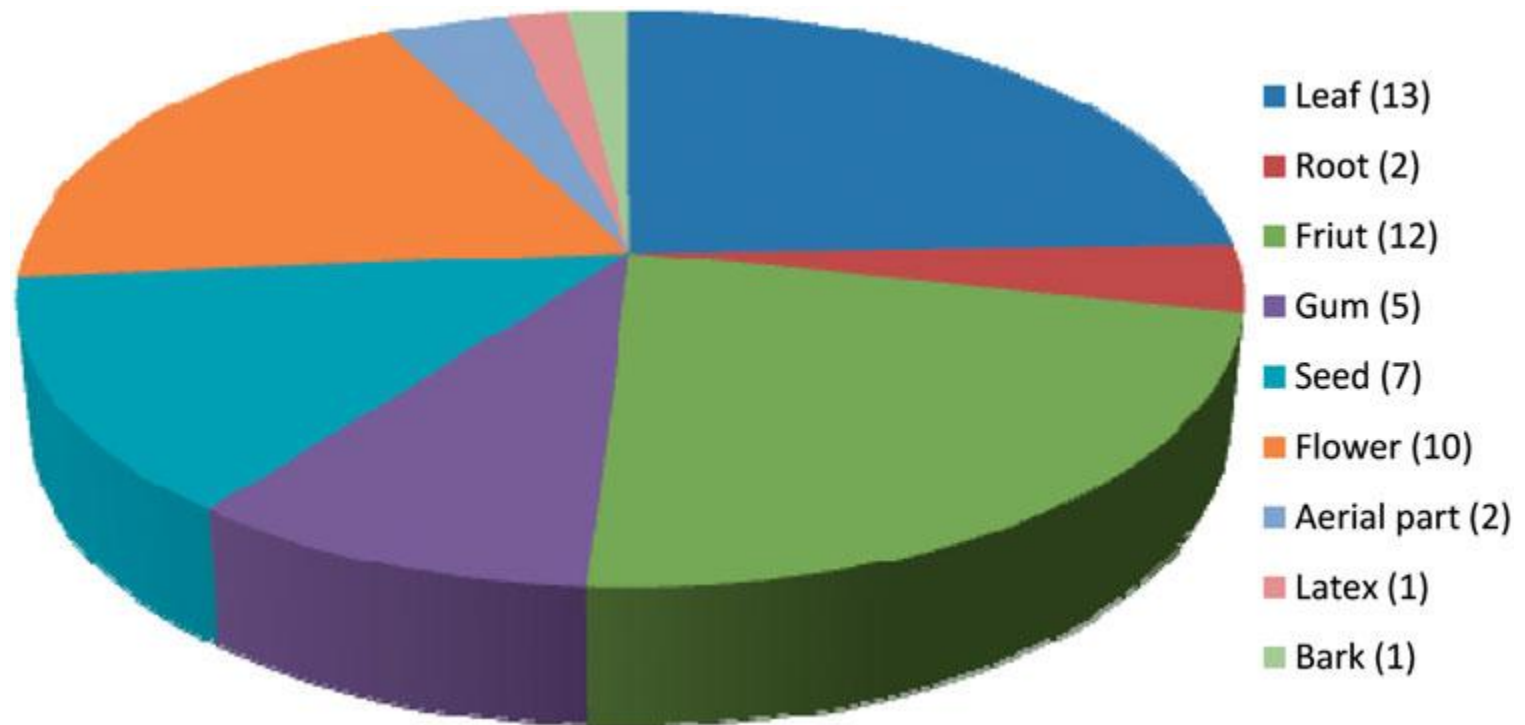
The enfleurage method or oil infusion, which is a simple means of extracting oil-soluble ingredients from plants, can be used in the traditional preparation method of herbal oils.

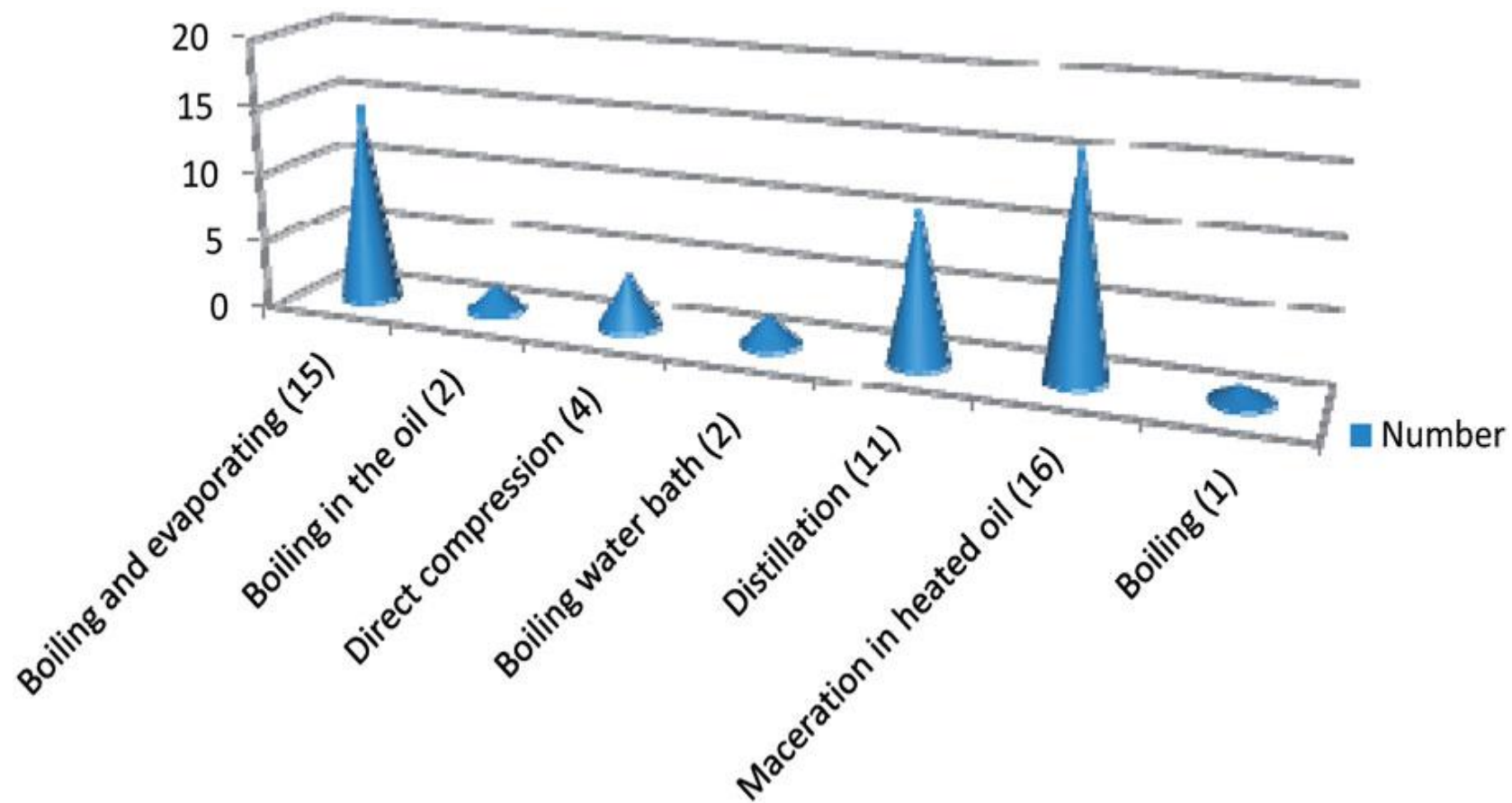
Of the 31 plant families noted in the historical documents, most medicinal plant species used to prepare oils belonged to families of Apiaceae (six varieties) and Asteraceae (five plant species) (**Figure 5**).

Also, most of the oils were derived from leaves, fruits and flower (**Figure 6**).

Distillation was the most common direct extraction method of medicinal oils, whereas the most common indirect methods were maceration in heated oil and boiling and evaporating (**Figure 7**).







Medicinal oils have been **traditionally used** via topical, oral and even nasal routes to target particular areas of the body to combat specific ailments. **Oils** for gastrointestinal, respiratory, urinary and reproductive interventions were administered **orally**, while the **nasal route** was considered for disorders effects in medieval Persian reports, in which analgesic and anti-inflammatory effects were the most relevant pharmacological effects.

Most of the effects have **been confirmed** by **recent in vitro or in vivo medical trials**. **Only one study on humans relevant to the traditional report was found (Table 2);**


hence, there is a lack of related human studies not only for oils, but also for other herbs and their dosages.

In this regard, the oils cited in TPM can be good candidates for further investigation in the quest to discover new herbal drugs.?

Notably, only **a few** pharmacological effects of **essential oils** noted in the ancient literature can be directly matched to current reports, such as **clove** and **damask rose oil** as **analgesic agents** (Daniel et al., 2009; Hajhashemi et al., 2010), **cinnamon oil** for its **carminative and antimicrobial** properties (Bouhdid et al., 2010; Harries et al., 1977) and **the sedative** effect of **bitter orange** (Carvalho-Freitas & Costa, 2002) (**Table 2**).

There are, however, **several** modern clinical reports documenting the effects of traditional medicinal **oils obtained via direct compression**, such as the **anti-inflammatory and neuroprotective effects** of **terebinth oil** (Giner-Larza et al., 2002; Orhan et al., 2012), **antiepileptogenic and neuroprotective** properties of **black cumin oil** (Kanter et al., 2006) and **the xanthine oxidase inhibitory effect of almond oil polyphenols** (Chen & Blumberg, 2008), which can be considered as evidence of these medicinal oils effectiveness. ?

Overall, for these types of herbal oils, the medieval dosages are the same as that of the herbal metabolites.?



Oil infusion of desirable parts of an herb (**maceration in heated oil**) was also popular with **Persian practitioners**. In this **method**, lipophilic constituents are infused into the oil, which acts as a nonpolar solvent, to produce concentrated herbal oils for aromatherapy (Jones, 2010). **In this review**, we identified **16 oils prepared by this method**. However, we were unable to **locate clinical research on oils** of the investigated herbs mentioned in the historical documents. Therefore, **oil infusion or maceration in heated oil can be considered as a newly rediscovered field, particularly for aromatherapy?**

Several traditional oils were prepared by a **boiling and evaporation method** (Tonekaboni, 2007), in which chemical constituents in the aqueous phase become trapped in the oil phase following evaporation. Obviously, however, large amounts of heat-sensitive components extracted in the aqueous phase may decompose by overheating. As **this method is not well accepted in current medicine**, we found no credible evidence indicating the use of the form of preparation in contemporary science.

However, for most constitutive herbs, relative effects were confirmed via current pharmacological methods.

Importantly, current methods typically employ ethanol, methanol or aqueous extractions, in which hydrophilic ingredients are initially extracted in water and the solution is then boiled.

Table 2 compares the respective scientific data on ethanol, methanol and aqueous extracts of related plants to that of medieval methods.

Although aqueous extraction procedures for plant oils continue to be widely used, they are quite different to the historical methods? (Campbell & Glatz, 2009).

For some of the oils cited in the historic literature that were prepared by **oil infusion (maceration in heated oil)**, we considered clinical research which evaluated aqueous fractions.


However, aqueous fractions certainly have no constituents comparable to those extracted by the oil infusion process.

In contrast, organic extractions with nonpolar solvents likely extract similar components. **References?**

Regardless of the extraction process, we analyzed the pharmacological effects of the herbs cited in the historical documents. However, we did **not find any scientific data for the 18 cited oils or their herbal constituents**;


although, two species **Dorema ammoniacum** D. Don. and **Ferula persica** Willd. (Apiaceae) are endemic to Iran and this limitation may be a reason for the lack of related clinical work.

Nonetheless, **those with no scientific data present good candidates for future clinical research.**



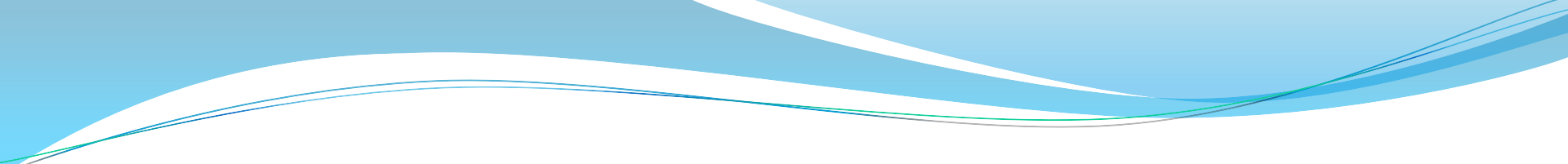
Despite the advantages of herbal oils, such as ease of administration or rapid absorption by massaging, they might be less applicable in comparison to modern pharmaceuticals, due to potential complications in industrial preparation and standardization.

Furthermore, the development of novel topical delivery systems, such as semisolid formulations, presents another reason for abandoning oils.



Also, it should be noted that **unsaturated fatty acids** in plant oils can accelerate the oxidation process and complicate storage (Frega et al.,1999).

Essential oils are still prepared throughout Iranian medicinal plant markets and continue to be widely used in **Persian folk medicine**. Despite the large application of oils in various traditional medical systems, such as Chinese, Unani and Islamic medicine, **pharmaceutical research is scarce and largely neglected by medical scientists**.



Fixed and volatile oils are prepared via direct compression and distillation respectively, whereas **oil infusion** can capture various ingredients and secondary metabolites into an oily vehicle.

In other circumstances, especially in “**boiling and evaporating method**”, herbal ingredients may form by products that possess pharmacological effects.

Therefore, preliminary research on botanical therapeutics may be useful and perhaps preparation according to the exact ethnomedical method should be considered for desirable results.

However investigation of the traditional formulations in a pharmaceutical view is one of the important approaches in **ethnopharmacy** (Heinrich, 2008).

Furthermore, reformulation of ethno-products in current medicine needs in-depth investigations on traditional concepts based on historical studies as well as modern pharmaceutical and clinical evaluations.

Conclusion

Although various aspects of traditional medicinal herb production are observed in modern herbal therapy, considerable information on various traditional plant oil formulations remains **unknown**.

Reports on a number of herbal oils can be found by searching through historical medical and pharmaceutical manuscripts. The oil form of natural medicaments presents a simple preparation method with desirable clinical applications.

Other than historical clarifications, the present review provided a list of data on clinical remedies based on centuries of experience, and thus might be useful for future clinical trials.