TRADITIONAL AND INTEGRATIVE MEDICINE

Trad Integr Med, Volume 10, Issue 4, Autumn 2025

Review

A Review of the Components and Effects of Rhubarb Oxymel (Sekanjabin Rivandi) with Network Causes of Liver Diseases

Mohammad Shahbazi, Mehrdad Karimi, Hossein Rezaeizadeh, Zakiyeh Ekhlasi, Azadeh Zarei*

Department of Traditional Medicine, School of Persian Medicine, Tehran University of Medical Sciences, Tehran, Iran

Received: 2 Jan 2025 **Revised:** 12 Jan 2025 **Accepted:** 13 Jan 2025

Abstract

Traditional Persian Medicine (TPM), a holistic system with a history of several thousand years, uses single and compound herbal remedies to treat a wide range of diseases based on their temperaments and actions. One notable remedy is oxymel (Sekanjabin), which has been used for centuries across various cultures. Rhubarb oxymel (Sekanjabin Rivandi), a form of medicinal oxymel, has shown effectiveness in treating liver diseases like non-alcoholic fatty liver disease (NAFLD). In this paper, pharmacy books on TPM (Qarabadin medical texts) were reviewed for Rhubarb oxymel. The medicinal effects of the herbs included in these formulations were thoroughly analyzed using R Studio, with the aim of identifying potential correlations between the therapeutic actions of the herbs and the underlying causes of liver diseases. This analysis was conducted across multiple formulations to determine how specific herbal components may target various aspects of liver diseases. The study provides insights into the role of herbal medicine in addressing the root causes of liver disorders, Rhubarb oxymel is made from a combination of 24 herbs, such as *Rheum palmatum* L. (rhubarb), *Cichorium intybus* L. (chicory), and *Fumaria parviflora* Lam. (fumitory), each with specific therapeutic properties like deoppilant (opening or unblocking), tonic (strengthening), and purgative (expellant) effects. TPM texts detail the preparation, benefits, and actions of these herbs, which support liver and digestive health. The most common effect among the herbs in Rhubarb oxymel is their liver obstruction deoppilant property. Other more frequently mentioned effects include tonic, rarefactive (softening), and abstergent (cleansing or purifying) actions. Future preclinical and clinical studies are recommended to further clarify the biological activities and underlying mechanisms of Rhubarb oxymel in different diseases.

Keywords: Sekanjabin Rivandi; Traditional Persian medicine; Liver diseases; Iranian traditional medicine; Rhubarb

http://doi.org/10.18502/tim.v10i4.20732

Citation: Shahbazi M, Karimi M, Rezaeizadeh H, Ekhlasi Z, Zarei A. **A Review of the Components and Effects of Rhubarb Oxymel (Sekanjabin Rivandi) with Network Causes of Liver Diseases**. Trad Integr Med 2025;10(4): 438-450. http://doi.org/10.18502/tim.v10i4.20732

*Corresponding Author:Azadeh Zarei
Department of Traditional Medicine, School of Persian Medicine, Tehran University of Medical Sciences, Tehran, Iran
Email: drzarei.azadeh@gmail.com

Introduction

Liver is the largest solid organ in the human body and plays a crucial role in sustaining vital function [1]. Its primary responsibilities include aiding digestion, storing nutrients, regulating metabolism, supporting the immune system, and detoxifying harmful substances from the body [2]. Liver diseases encompass a broad spectrum of conditions that pose significant challenges to global health, arising from factors such as toxins, infections, and lifestyle-related issues. Chronic liver disease (CLD), in particular, is associated with complex symptoms and a substantial impact on quality of life, making early diagnosis and effective management essential for successful treatment. From the perspective of conventional medicine, liver diseases are categorized into distinct types based on their etiologies. Liver diseases can result from exposure to toxins such as mycotoxins, pyrrolizidine alkaloids, and chronic copper poisoning [3]. Common conditions include viral hepatitis, non-alcoholic fatty liver disease (NAFLD), cirrhosis, and hepatocellular carcinoma (HCC). The progression of liver diseases typically involves inflammation, fibrosis, and cirrhosis, which can lead to severe complications such as HCC [4].

Traditional medicine encompasses a wide range of knowledge, skills, and practices rooted in cultural beliefs and experiences, primarily focused on maintaining health and treating diseases. It remains widely utilized, with approximately 80% of the world's population relying on these therapies [5,6]. Known for being accessible and cost-effective, traditional treatments are often tailored to the traditions and cultural practices of each region.

In recent years, the integration of traditional medicine into the treatment of various diseases, including liver disorders, has gained attention for its potential to complement conventional therapies. Studies suggest that traditional medicinal preparations can enhance treatment outcomes for conditions such as primary liver cancer and liver cirrhosis; while also addressing NAFLD through diverse mechanisms [7,8]. In Traditional Persian Medicine (TPM), special attention is given to the liver's role in the body, as it is considered the second site of digestion. TPM with a rich history spanning over thousands of years, has utilized various herbal remedies to address liver disorders, often focusing on their underlying causes. The incorporation of TPM into liver disease management, including NAFLD, underscores its potential as a complementary approach. TPM emphasizes lifestyle modifications and the use of specific herbal remedies, which have demonstrated improvements in liver health and reductions in disease severity.

In TPM, the treatment process begins with dietary interventions. Proper dietary adjustments not only help manage diseases, but also reduce dependence on medications. These diets can significantly lower body mass index (BMI), enhance liver function, and positively impact liver enzyme levels. Additionally, their cost-effectiveness suggests they may help reduce long-term healthcare costs [9,10].

The next step involves using medicinal plants with known hepatoprotective properties in single form, as identified in TPM teachings [9]. Research indicates that these plants offer multiple benefits, including anti-obesity and antioxidant effects, which are crucial for maintaining liver health [11].

The final stage involves the use of plant-based medicinal products tailored to specific diseases. These compounds are prepared based on the therapeutic properties of the plants to maximize their efficacy. TPM promotes a holistic approach by combining lifestyle changes with herbal treatments to restore liver function and balance [12,13].

One commonly used remedy for liver diseases in TPM is *Sekanjabin*, also known as oxymel. This traditional preparation combines honey and vinegar, often enhanced with various herbs, and is valued for its health benefits and therapeutic applications [14]. Oxymels are prepared in different forms: simple oxymels and compound oxymels. Different formulations of oxymels are designed for specific health purposes, with variations ranging from simple to complex, depending on the inclusion of additional herbal ingredients [15].

A notable oxymel in TPM books for liver treatment is Rhubarb oxymel (*Sekanjabin Rivandi*) [16]. This preparation, frequently mentioned in classic Qarabadin medical texts, features *Rheum palmatum* L. as its primary herb. *R. palmatum* is recognized for its significant therapeutic effects on liver diseases [17].

This article reviews the various formulations of Rhubarb oxymel described in TPM literature and examine its therapeutic potential for liver diseases.

Material and Methods

Qarabadin medical texts (ancient forms of pharmacopoeias in TPM), including *Khavas-al-Ashia*, *Qarabadin Alghalanesi*, *Qarabadin Shafaei, Qarabadin Kabir*, *Zakhireh Kharazmshahi*, *Alaghraz Tebiyeh*, *Qarabadin Azam*, *Qarabadin Ghaderi*, and *Qarabadin Masomi*, were analyzed using Noor software (Version 1.5). The keywords "Sekanjabin Rivandi" (سکنجبین ریوندی،شربت ریوندی، سکنجبین راوندی، شربت راوندی) was employed to locate relevant prescriptions, which were then thoroughly reviewed to identify the herbs used.

Additionally, articles from PubMed and Scopus databases were examined to gather evidence from conventional medicine regarding the effects of the herbs found in various formulations of Rhubarb oxymel on liver diseases.

In the next phase, all medicinal properties and ther-

apeutic actions related to the identified herbs were extracted from *Makhzan Al-Adwiyya*. The action ontology was standardized using the Iranian Traditional Medicine General Ontology databases available at https://unaprod.com/ and https://ir-go.net/.

The extracted data on medicinal effects were analyzed using R Studio software. The relationships between the therapeutic actions of herbs and the causes of liver diseases were identified and assessed. To standardize the ontology of the causes, the *Database of Material Causes* on https://AsabITM.ir/ was used and analyzed.

Results

From the analysis of nine medical texts, 24 distinct versions of *Sekanjabin Rivandi* were identified. The list of prescriptions and the herbs included in them is presented in figure 1. A review of these formulations revealed that 24 different medicinal herbs were used in preparing various types of *Sekanjabin Rivandi*. The effects of each of these individual remedies were extracted in both TPM and conventional medicine sources. Each herbal ingredient was analyzed using the *Makhzan Al-Adwiyya* database, accessible via the UNAPROD website, to extract their actions and therapeutic properties related to liver health and liver diseases [18].

The Effect of each herbal remedy when used individually

***Cichorium intybus* L. (chicory)** is a medicinal plant with bioactive compounds offering various health benefits. In TPM, it is considered hot and dry in temperament and is used for obstruction deoppilant, treating dropsy and jaundice [17]. Chicory's key effects include:

1. Anti-inflammatory and Antioxidant: Reduces cellular damage and chronic disease risk through polyphenols and phenolic acids [19].
2. Digestive Health: Improves gut health with the prebiotic activity of inulin, enhances bile secretion, and supports liver function [20].
3. Anticancer: Contains compounds that may inhibit cancer cell growth [19].
4. Diabetes Management: Lowers blood glucose and improves insulin sensitivity [21].
5. Antimicrobial and Antiviral: Helps combat infections [20].

Chicory's diverse properties make it valuable in traditional and modern medicine.

***Rheum palmatum* L. (Chinese rhubarb)** is used in both traditional and modern medicine for its bioactive compounds, including anthraquinones, stilbenes, tannins, and flavonoids. It has a hot and dry temperament. According to TPM, Chinese rhubarb has several effects, including drying, constricting, abstergent, maturant, and scraping properties. It acts as a purgative for both thin and thick humors and serves as a deoppilant for liver, spleen, and intestinal obstructions. Additionally, it effectively resolves coldness in the liver, stomach, and intestines. Chinese rhubarb is also

Persian medicine books	Rivandi Oxymel Version	Cichorium intybus	Rheum palmatum	Fumaria parviflora	Cuscuta monogyna	Rosa damascene	Ipomoea turpethum	Polypodium vulgare	Polyporus officinalis	Amomum cardamom	Zingiber officinale	Capparis spinosa	Salix alba	Tamarix gallica	Cuscuta epithymum	Agrimonia eupatoria	Cucumis sativus	Cucumis melo var. flexuosus	Cucumis melo	Pimpinella anisum	Foeniculum vulgare	Curcuma longa	Gentiana lutea	Apium graveolens	Andropogon schoenanthus
khavas-al-ashia	1	√	√	√	√																				
Qarabadin Alghalanesi	1	√	√																						
Qarabadin Alghalanesi	2	√	√	√	√	√																			
Qarabadin	1	√	√	√	√																				
Qarabadin	2	√	√				√	√	√	√	√														
Qarabadin Kabir	1		√	√	√	√																			
Qarabadin Kabir	2	√	√		√																				
Qarabadin Kabir	3	√	√	√	√																				
Qarabadin Kabir	4	√	√		√				√			√	√	√	√	√									
Qarabadin Kabir	5	√	√														√	√	√	√	√				
Qarabadin Kabir	6	√	√				√	√	√		√														
Qarabadin Kabir	7	√	√		√				√			√		√	√	√						√	√		
Qarabadin Kabir	8	√	√														√		√		√			√	√
Qarabadin Kabir	9	√	√														√		√		√			√	
Qarabadin Kabir	10	√	√														√	√	√		√				
Zakhireh Kharazmshahi	1	√	√	√	√	√																			
Alaghraz Tebiyeh	1	√	√	√	√	√																			
Alaghraz Tebiyeh	2	√	√		√				√			√	√	√	√	√									
Alaghraz Tebiyeh	3	√	√				√	√	√		√														
Qarabadin Azam	1	√	√		√												√	√	√		√				
Qarabadin Ghaderi	1	√	√	√	√	√																			
Qarabadin Ghaderi	2	√	√					√	√		√														
Qarabadin Ghaderi	3	√	√		√				√			√	√	√	√										
Qarabadin Masomi	1	√	√				√	√	√		√														

Figure 1. The single plants that make up *Rhubarb oxymel* in various prescriptions are listed in 9 TPM books

beneficial in treating dropsy and jaundice via acting as a liver tonic [17].
The bioactive components of Chinese rhubarb contribute to a variety of pharmacological effects:
1.Anti-inflammatory and Antioxidant Properties: Compounds like emodin and chrysophanol help reduce oxidative stress and inflammation.
2. Digestive Health: Traditionally used as a purgative, it treats constipation and gastrointestinal discomfort by stimulating bowel movements.
3. Anticancer Potential: Anthraquinones such as aloe-emodin and rhein inhibit the growth of cancer cells, including in leukemia, prostate, and breast cancer.
4. Liver and Metabolic Benefits: The plant promotes liver function and regulates blood glucose, offering hepatoprotective and antidiabetic effects [22-24].
***Fumaria parviflora* Lam. (fine-leaved fumitory)** has been traditionally used in herbal medicine and offers a range of pharmacological effects due to its bioactive compounds, including alkaloids like protopine and fumariline. With a hot and dry temperament, it acts as a deoppilant for liver and spleen obstructions and serves as an effective tonic for both the liver and stomach [17].
Fumitory has several important medicinal effects:
1. Anti-inflammatory and Antioxidant: It reduces inflammation and oxidative stress, helping manage inflammatory conditions.
2. Liver Protection: It protects the liver from damage caused by toxins like carbon tetrachloride and certain drugs, similar to other liver-protective agents.
3. Digestive Health: It works as a mild laxative and relieves gastrointestinal issues by improving bowel movements and reducing spasms.
4. Antimicrobial and Antiparasitic: It fights infections caused by microorganisms and parasites.
5. Other Benefits: It may help manage blood sugar levels and has pain-relieving effects [25-28].
***Cuscuta monogyna Vahl*. (Monogynous dodder)** is a parasitic plant known for its medicinal uses, thanks to its bioactive compounds like flavonoids, alkaloids, and polyphenols. It has a hot and dry temperament and is believed to cleanse and expel waste and rotten humor from the vessels. Additionally, it serves as a rarefactive, laxative, and suitable deoppilant for liver and intestinal obstructions [17].
Dodder has several notable medicinal effects:
1. Antioxidant Properties: It neutralizes free radicals, reducing oxidative stress and potentially protecting cells and promoting anti-aging.
2. Hepatoprotective Effects: It helps improve liver function by reducing liver enzyme levels, preventing lipid peroxidation, and protecting against toxins.
3. Anti-inflammatory and Wound Healing: The plant aids in managing inflammation and supports wound healing by promoting cell regeneration [29-31].
***Rosa damascena* Herrm. (damask rose)** is highly valued in TPM for its antioxidant and anti-inflammatory properties. It has cold and dry temperament and has various notable effects, including being elating, astringent, rarefactive, and abstergent. Additionally, it alleviates yellow bile and thin phlegm, and acts as a tonic for organs like the heart, lungs, liver, stomach, and uterus [17].
1. Rich in antioxidants: Combats oxidative stress and chronic diseases.
2. Hepatoprotective Effects: Beneficial for hepatotoxicity.
3. Anti-inflammatory: Helps with inflammatory disorders, arthritis, diabetes, and hyperlipidemia [32, 33].
***Operculina turpethum* (L.) Silva Manso (Indian jalap or Turpeth root or Ipomoea turpethum)** is known for its medicinal uses, particularly as a purgative. It has a hot and dry temperament and helps eliminate phlegm, thin moisture, and burnt humors from the body. It clears thick, viscous phlegm from the body, brain, and stomach, removing obstructions [17]. Other medicinal properties:
1. Hepatoprotective: Its extracts protect the liver from damage caused by toxins, reducing liver enzymes and enhancing antioxidant activity.
2. Anti-inflammatory and Analgesic: The plant reduces inflammation and pain, as shown by its effects on edema and granuloma in animal models.
3. Laxative and Purgative: Its resin acts as a strong purgative, commonly used to treat constipation and detoxify the digestive system.
4. Antioxidant and Anticancer: Phenolic compounds and flavonoids in the plant help reduce oxidative stress, potentially aiding in cancer prevention.
5. Antimicrobial: The plant has antibacterial properties, effective against a range of pathogens [34-37].
***Polypodium vulgare* L. (common polypody fern)** is valued for its medicinal benefits, particularly in supporting liver health. It is characterized by a hot and wet temperament and serves as a purgative, effectively clearing choleric black bile and thick phlegm [17].
1. Stimulates bile secretion: Aiding in conditions like jaundice and hepatitis.
2. Exhibits antioxidant properties: Protecting the liver from oxidative stress.
3. Hepatoprotective: Contains flavonoids, alkaloids, and polyphenolic compounds, supporting hepatoprotective effects.
4. Anti-inflammatory properties: Beneficial for liver-related inflammation [38, 39].

***Polyporus officinalis* (also known as *Fomitopsis officinalis* or Agarikon)** is a medicinal mushroom known for its diverse therapeutic benefits, particularly its positive effects on liver health. It is characterized by a hot and dry temperament and functions as a purgative for

mixed phlegm, yellow bile, and black bile. Additionally, *P. officinalis* is liver obstruction deoppilant and helps dissolve thick wind and flatulence; while also acting as a rarefactive agent and scraping thick humors [17]. *P. officinalis* contains bioactive compounds like triterpenoids, flavonoids, and polysaccharides, known for:

1. Anti-inflammatory, antioxidant, and immune-boosting properties.
2. Hepatoprotective effects: Reducing oxidative stress and inflammation linked to liver damage, hepatitis, and cirrhosis.
3. Polysaccharides and triterpenoids help neutralize free radicals and support liver detoxification.
4. Extracts enhance liver function and boost antioxidant enzyme activity in liver tissues.

Elettaria cardamomum **(L.) Maton (Cardamom)** has medicinal benefits, particularly its liver-related properties as described in TPM, include its use as a liver tonic, stomach cleanser, and liver and spleen obstructions deoppilant. With a hot and dry temperament, it is also recognized for its ability to disperse wind within the body. [17]

1. Antioxidant Effects: Cardamom contains flavonoids and essential oils that neutralize free radicals and reduce oxidative stress, protecting the liver.
2. Anti-inflammatory Effects: It helps protect the liver from conditions like hepatitis and fatty liver disease by reducing inflammation.
3. Hepatoprotective Properties: Studies show cardamom protects the liver from toxicity, reducing liver damage caused by substances like acetaminophen.
4. Liver Toxicity Protection: Cardamom reduces liver injury markers (ALT, AST, ALP) elevated due to liver damage.
5. Cancer Protection: Cardamom's compound cardamonin has anticancer properties, specifically against hepatocellular carcinoma (HCC) cells [42, 43].

Zingiber officinale **Roscoe (Ginger)** is a key medicinal herb in TPM, known for its hot and dry temperament. It serves as an effective tonic for the liver, stomach, and digestive system. Ginger helps dissolve thick wind and phlegm in the stomach and intestines, drying excess moisture and phlegm in the body. It also acts as a powerful scraping, laxative, and expels thick humors [17].

1. Hepatoprotective Effects: Ginger administration can improve various aspects of NAFLD through mechanisms like insulin sensitivity, antioxidant enzyme stimulation, reduction of reactive oxygen species (ROS), antidyslipidemic activities, and lowering hepatic fat content. Alaos, according to preclinical studies, ginger has significant anti-NAFLD effects and can reduce fructose-induced fatty liver when administered as an ethanolic extract
2. Antihyperglycemic Effects: Ginger extract lowers blood glucose levels compared to the diabetic group.
3. Organoprotective Effects: The treated group shows improved glomerular structure, normal acinar cells in the pancreas, and preserved liver histology [44-46].

Capparis spinosa **L. (caper),** is recognized for its properties as a deoppilant, abstergent, dissolver, and rarefactive. It is effective in scraping phlegm, black bile, and viscous humors, and serves as a purgative for raw humors. The plant has a hot and dry temperament [17].

1. *C. spinosa* has antimicrobial, anticancer, and antidiabetic properties.
2. Antidiabetic Effects: It reduces carbohydrate absorption, inhibits gluconeogenesis in the liver, enhances glucose uptake by tissues, and protects/regenerates beta cells. The plant helps ameliorate cardiovascular disorders, liver damage, and nephropathy in diabetic animal models, due to its antioxidant phytochemicals.
3. Organoprotective Effects: The methanolic extract of its leaves shows antioxidant, nephroprotective, and hepatoprotective effects. Its leaf and fruit extracts demonstrate significant hepatoprotective effects, potentially halting liver damage progression
4. Antihypercholsterolemic Properties: *C. spinosa* improves triglyceride and cholesterol levels and may help treat metabolic syndrome and fatty liver by inhibiting gluconeogenesis [47,48].

Salix alba **L. (willow)** has cold and wet temperament. It is soothing and strengthening for the brain and heart with a hot temperament. It is liver obstructions deoppilant and effective in relieving headaches, thirst, and stomach weakness. Its extract acts as a purgative for phlegm, bile, and black bile. It is used to treat liver congestion, jaundice, and spleen stiffness]17[.

1. *Salix subserrata* has shown hepatoprotective effects, reducing liver damage caused by carbon tetrachloride toxicity.

Tamarix gallica **L. (French tamarisk)** is a halophytic shrub with notable ecological and medicinal significance. It is a drying, constrictive, and repercussive herb, and is also effective in relieving liver obstructions. Its temperament is cold and dry [17].

1. Its extracts help prevent the progression of liver cancer by restoring antioxidant enzyme levels.
2. The plant has hepatoprotective properties, aiding in liver disease management.
3. Its antioxidants, particularly flavonoids, protect against free radicals and prevent liver cell damage.
4. It reduces levels of ALP, ALT, AST, bilirubin, lactate dehydrogenase, and cholesterol [49, 50].

Cuscuta epithymum **L. (clover dodder)**, is a parasitic plant species from the Convolvulaceae family. It is an effective dissolver and rarefactive herb, functioning as a deoppilant for obstructions and a purgative for phlegm, yellow bile, and black bile. *C. epithymum* has a hot and dry temperament [17].

1. *C. epithymum* shows cytotoxic effects against cancer cell lines, inducing apoptosis in esophageal squamous cell carcinoma and breast cancer cells.
2. It exhibits neuroprotective properties.
3. Traditionally used for liver disorders, *C. epithymum* has hepatoprotective activity.
4. It is diuretic, laxative, and acts as a tonic for the liver and kidneys [30, 51].

***Agrimonia eupatoria* L. (common agrimony),** has hot and dry temperament. It is recognized for its properties as a demulcent, stomachic, blood purifier, diuretic, emmenagogue, anti-inflammatory, and astringent agent. Traditionally, it has been used to treat liver and spleen inflammation, fevers, ulcers, jaundice, wounds, and gastrointestinal disorders. In TPM texts, it is known as scraping, rarefactive, abstergent and attractant herb and acts as a cleanser and deoppilant for liver and spleen obstructions. Additionally, it alleviates liver pain and helps dissolve liver swelling. *A. eupatoria* is a liver tonic and is effective in treating dropsy [17].

1. *A. eupatoria* is known for its antioxidant, antimicrobial, and diuretic effects in ethnopharmacological practices.
2. Recent studies highlight its potential in managing diabetes, neuropathic pain, and oxidative stress-related disorders.
3. It has hepatoprotective activity, helping to protect the liver from damage and support its function.
4. The plant neutralizes free radicals and reduces inflammation, protecting liver cells from damage caused by oxidative stress and toxins [9,26,52].

***Cucumis sativus* L. (cucumber),** belongs to the Cucurbitaceae family and is used both as a food source and in traditional medicine. It helps quench thirst, relieve jaundice, and acts as a deoppilant for liver obstructions. It is also effective in alleviating blood heat, yellow bile excess, and visceral inflammation. Its temperament is cold and wet [17].

1. Hormonal Effects: An aqueous extract of *C. sativus* improves male reproductive hormones and lipid profiles in male rats.
2. Antimicrobial Properties: It shows antibacterial activity against *Staphylococcus aureus* and *E. coli*, suggesting therapeutic potential.
3. Cardioprotection: The seeds offer cardiovascular protection, including vasorelaxant and hypotensive effects, and guard against myocardial infarction.
4. Anti-inflammatory and organoprotective Effects*C. sativus* demonstrates various pharmacological actions, including anticancer, cytotoxic, wound healing, anti-ulcer, anti-inflammatory, antidiabetic, antioxidant, analgesic, and hepatoprotective effects.
5. Hepatoprotection: Cucumber fruit extract also exhibits hepatoprotective and antioxidant effects against cumene hydroperoxide-induced hepatotoxicity [53-56].

***Cucumis melo* var. *flexuosus* (L.) Naudin (Armenian cucumber or snake melon),** various parts of this plant have anti-inflammatory and antioxidant effects. It has a hot and wet temperament. It helps alleviate blood, yellow bile, and visceral inflammation, acts as a diuretic and stone expellant, and relieves thirst. It also functions as a liver obstruction deoppilant and is effective in treating jaundice [17].

1. The fruits and seeds of this plant are traditionally used for their cooling, moisturizing, and digestive properties.
2. Anti-inflammatory and Antioxidant activities: Helpful in managing oxidative stress and inflammation in diabetic conditions.
3. Antidiabetic Properties: Melon leaf extract significantly reduces blood glucose, cholesterol levels, liver enzymes, and malondialdehyde; while increasing insulin, body weight, HDL cholesterol, total protein, catalase, and superoxide dismutase levels [57].

***Cucumis melo* L. (melon),** has a hot and wet temperament. It is abstergent, scraping, and rarefactive. It can act as a whole-body agent that may contribute to obesity. Additionally, it has a brain-wetting effect. It serves as a liver obstruction deoppilant and is effective in treating dropsy and jaundice. It also cleanses the intestines and acts as a laxative. Furthermore, it facilitates the delivery of drugs to specific organs such as the liver and urinary tract [17].

1. Antioxidant Effects: Melon extract effectively prevents lipid peroxidation.
2. Antioxidant Effects: It reduces body weight gain, organ weight, blood glucose, cholesterol (total, LDL), triglycerides, kidney and liver function markers, and malondialdehyde levels; while increasing insulin.
3. *C. melo* shows significant potential in treating inflammation, pain, cancer, cough, liver disease, and cardiovascular disorders [58-61].

***Pimpinella anisum* L. (anise),** has hot and dry temperament. Known as a theriac plant, it is constrictive, rarefactive, abstergent, and a wind dissolver. It acts as a liver and spleen obstruction deoppilant and is effective in treating dropsy and jaundice [17].

1. Anise has analgesic, anti-inflammatory, appetizing, hypnotic, antispasmodic, expectorant, antibacterial, and hepatic-protective properties.
2. Hepatoprotection: The oil from *P. anisum* protects protein metabolism in the liver. It exerts hepatoprotective effects through antioxidant activity, boosting serum antioxidant enzymes and inhibiting oxidative stress.
3. The plant has antimicrobial, anticonvulsant, bronchodilator, estrogenic, insecticidal, and sedative effects.
4. It is also effective for treating nausea, constipation, menopause symptoms, viruses, diabetes, obesity, and

more [62, 63].

***Foeniculum vulgare* Mill. (fennel),** is rich in antioxidants and has long been used in TPM to treat various conditions. It has a hot and dry temperament. It serves as an obstruction deoppilant and pain reliever for the chest and liver. Additionally, it acts as both a tonic for the liver and the eyes, helping to dissolve wind and thick humor from the body [17].

1. Methanolic extract of fennel inhibits human liver cytochrome P450 activity.
2. Exhibits antifungal, antibacterial, antioxidant, antithrombotic, and hepatoprotective effects.
3. Useful for treating chronic fever and eliminating obstructions in the liver, intestines, respiratory, and urinary tracts [64,65].

***Curcuma longa* L. (turmeric),** is considered a hot and dry herb in traditional medicine. Known for its cleansing properties, it is visual abstergent and acts as liver obstruction deoppilant and is effective in treating conditions such as dropsy and jaundice [17].

1. Curcumin, the major active ingredient of turmeric, helps reduce inflammation and oxidative stress, alleviating conditions like rheumatoid arthritis.
2. It is used in treating cancer, diabetes, and liver diseases due to its broad pharmacological effects.
3. Turmeric protects the liver and stimulates bile secretion.
4. Curcumin prevents fatty acid accumulation in the liver, helping to avoid conditions like nonalcoholic steatohepatitis.
5. Its potent antioxidant activity protects against chronic liver diseases, carcinogenesis, and age-related processes.
6. Curcumin also offers protection against heavy metal toxicity [66,67].

***Gentiana lutea* L. (yellow gentian),** is a plant celebrated for its medicinal properties, particularly its bitter compounds. It has hot and dry temperament in traditional medicine. Known for its constricting, rarefying, cleansing, abstergent, and dissolving qualities, and also obstruction deoppilant. Yellow gentian is effective in relieving cold-related pain and reducing swelling in the spleen, liver, and stomach [17].

1. Extracts from its roots show significant spasmolytic effects on the rat ileum.
2. It acts as a stimulant for the gallbladder and liver.
3. *Gentiana lutea* ssp. *symphyandra* roots exhibit strong hepatoprotective activity [68, 69].

***Apium graveolens* L. (celery),** belongs to the Apiaceae family. It is considered a hot and dry temperament. It is an obstruction deoppilant in the liver and spleen. It also helps dissolve wind and reduce swellings. Additionally, it is known to stimulate both appetite and sexual desire [17].

1. It has shown anticancer properties, particularly against prostate cancer cells (LNCaP), by increasing apoptosis markers like caspase-8 and Apaf-1.
2. Ethanol extracts of celery demonstrated dose-dependent effects on apoptotic pathways, suggesting potential as an anticancer agent.
3. It may influence blood glucose and plasma insulin levels, especially in elderly pre-diabetics, with specific dosages.
4. Celery seeds contain L-3-n-butylphthalide, which has antihyperlipidemic effects, helping manage lipid levels [70,71].

***Cymbopogon schoenanthus* (L.) Spreng. (camel grass or Andropogon schoenanthus),** is a desert grass species renowned for its aromatic oils and medicinal properties. This grass has traditional uses in various cultures, particularly in TPM, where it is referred to as Ethkher or Idkhir. It is considered a hot and dry herb. Camel grass acts as a dissolving and scraping agent and thick humors maturant. It relieves cold pain, is effective in treating dropsy, and serves as a tonic for the liver and stomach since it is liver obstruction deoppilant [17].

1. Phytochemical analysis reveals alkaloids, flavonoids, sterols, tannins, and volatile oils.
2. The plant exhibits significant diuretic activity, preventing glycolic acid-induced nephrotoxicity and kidney stone formation.
3. It demonstrates antistress effects by reducing serum corticosterone and increasing dopamine and norepinephrine levels in the cerebral cortex [72,73].

B) Material causes in liver diseases

According to TPM texts, at least thirteen distinct terms have been used to describe various types of liver diseases. Additionally, 88 different material causes have been identified for these liver diseases [74, 75]. Recognizing these material causes is considered crucial for selecting the most suitable and effective herbal treatments. Each medicinal plant has a specific effect on these pathogenic agents. After analyzing the actions of the plants mentioned in various compounds of Rhubarb oxymel, the frequency of these actions was examined. The results are presented in a word cloud plot, shown in figure 2.

Additionally, twenty actions with frequencies higher than the others are shown in figure 3. Among the characteristics of the herbs used in these prescriptions, liver-obstruction deoppilant plays the most significant role. Following this, tonic, rarefactive, and abstergent properties are the next most abundant.

The 19 individual plants mentioned in various formulas of Rhubarb oxymel haae the action of liver obstruction deoppilant (Figure 4), which indicates the importance of this action in the treatment of liver-related diseases.

Discussion

Traditional Persian medicine, also known as Iranian traditional medicine, is a holistic medical system with

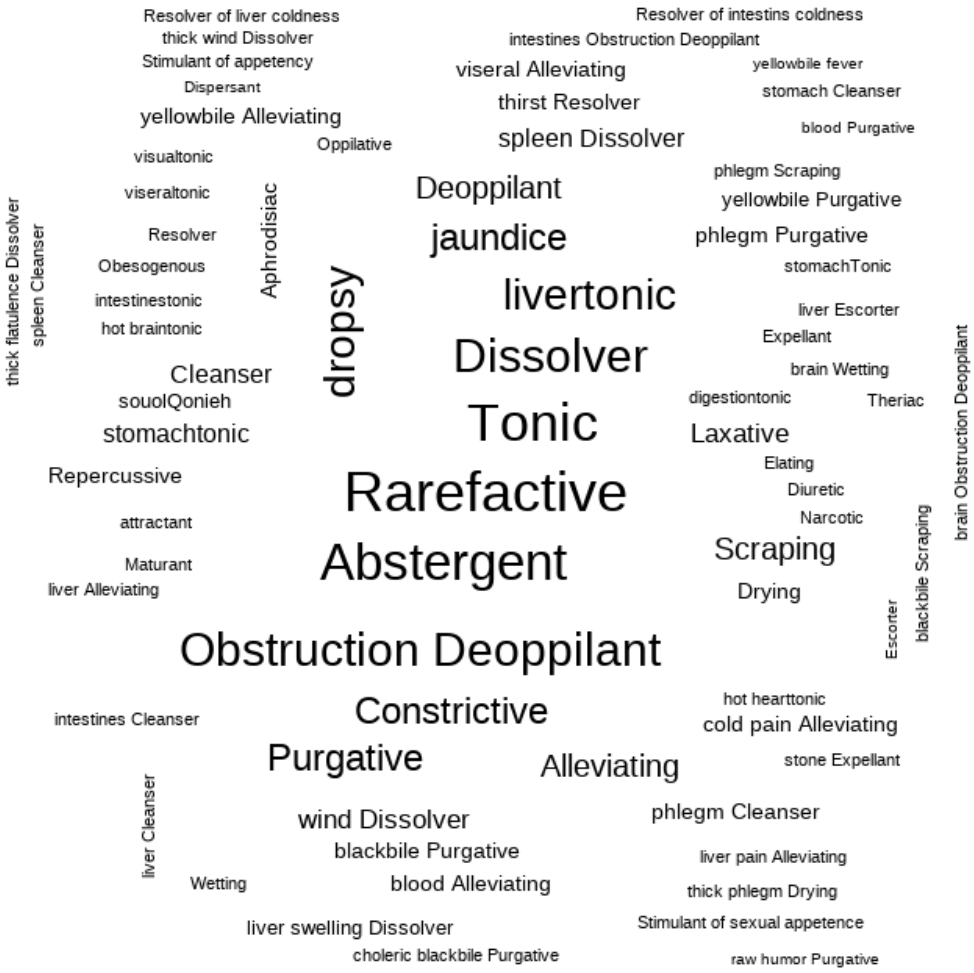

Figure 2. The frequency of the actions of the plants used in various compounds of Rhubarb oxymel is presented in the form of a word cloud plot.

a history spanning several thousand years. Prominent scholars within TPM have significantly contributed to the advancement of medical knowledge, particularly before the Renaissance.

In TPM, the causes and mechanisms underlying disease development are diverse. Single and compound herbal medicines are employed for treatment based on their temperaments and actions. Compound herbal formulations are particularly notable for their ability to target multiple mechanisms involved in disease processes.

One form of medicinal preparation in TPM is oxymel (Sekanjabin), a functional beverage with a rich historical background and widespread use across various societies. Both simple and compound oxymels are utilized in complementary and traditional medical systems, including TPM. In recent years, clinical and preclinical studies in the pharmaceutical and food industries have explored the efficacy of different oxymel formulations [76].

TPM texts provide detailed information about various types of oxymel, including their preparation methods, indications, benefits, and potential side effects. Remarkably, there is even a dedicated treatise focused entirely on oxymel. Medicinal oxymels are used to address a wide range of disorders, including those affecting the liver, spleen, gastrointestinal system, and respiratory system [77].

Oxymels come in diverse varieties, each with unique effects on organs and disease causes, depending on their composition. One example is Rhubarb oxymel (*Sekanjabin Rivandi*), which has shown effectiveness in treating liver diseases, such as NAFLD [78].

Rhubarb oxymel is a TPM remedy formulated from a combination of medicinal herbs. An analysis of nine classical medical texts revealed 24 distinct formulations, incorporating 24 different herbs, each contributing unique therapeutic properties. Among these, *Rheum palmatum* (Rhubarb) was present in all formulations, followed by *Cichorium intybus* (Chicory),

Table 1. Explanation of the plants' actions used in various compounds of Rhubarb oxymel

Row	Term		Explanation
1	Mufattih	Liver obstruction deoppilant	Helps clear blockages in the liver, improving its function.
2	Muqavvi	Tonic	Strengthens and invigorates the body or specific organs.
3	Mulattif	Rarefactive	Dilutes or thins bodily fluids, promoting better circulation.
4	Jali	Abstergent	Cleanses or purifies bodily systems.
5	Muhallil	Dissolver	Breaks down accumulated substances or obstructions in the body.
6	Muhallil	Dropsy treatment	Remedies fluid retention and swelling in tissues.
7	Raf e Yaraqan	Jaundice treatment	Supports the liver in treating jaundice and related symptoms.
8	Mufattih	Spleen obstruction deoppilant	Clears blockages in the spleen, enhancing its efficiency.
9	Qabiz	Constrictive	Tightens or strengthens tissues,
10	Mushil	Purgative	Promotes the evacuation of waste from the body
11	Mussakkin	Alleviating	Reduces pain, inflammation, or discomfort.
12	Muqatti	Scraping	Cutting residues in the body or specific organs
13	Munaqī	Cleanser	Purifies the body by eliminating waste or harmful substances.
14	Mulayyin	Laxative	Facilitates bowel movements, relieving constipation.
15	Muhallil	Spleen dissolver	Breaks down and clears harmful accumulations in the spleen.
16	Muhallil	Wind dissolver	Reduces gas and bloating in the body
17	Mubahi	Aphrodisiac	Enhances sexual desire or performance.
18	Mushil e Soda	Black bile purgative	Expels excess black bile from the body, balancing humors.
19	Taskin e Khun	Blood alleviating	Soothes and regulates blood
20	Musakhen	Drying	Removes excess moisture or dampness from the body.
21	Muhallil	Liver swelling dissolver	Reduces inflammation or swelling in the liver.
22	Munaqī	Phlegm cleanser	Clears excess phlegm from the body
23	Mushil	Phlegm purgative	Promotes expulsion of phlegm, improving balance in bodily fluids.
24	Rādi	Repercussive	It prevents the organ from accepting the material.
25	Muqavvi	Stomach tonic	Strengthens and revitalizes the stomach, aiding digestion.
26	Mussakkin	Yellow bile alleviating	Eases symptoms caused by excess yellow bile.
27	Mushil	Yellow bile purgative	Expels excess yellow bile from the body, balancing humor

Cuscuta monogyna (Dodder), *Polyporus officinalis* (Larch Fungus), and *Fumaria parviflora* (Fumitory), which appeared frequently in prescriptions.

In TPM, these herbs are attributed with various effects on the liver and digestive system, such as being **Mufattih** (Deoppilant), **Muqavvi** (Tonic), **Mulattif** (Rarefactive), **Jali** (Abstergent), **Muhallil** (Dissolver), **Qabiz** (Constrictive), **Munzij** (Maturnant), **Muqatti** (Scraping), **Mushil** (Purgative), **Mussakkin** (Alleviating), **Munaqī** (Cleanser), **Mulayyin** (Laxative), **Mubahi** (Aphrodisiac) and **Rādi** (Repercussive). Each herb, with one or more of these actions, can play a role in addressing liver disease causes and exhibit therapeutic effects.

The most common liver actions attributed to the herbs in Rhubarb oxymel include *Mufattih* (Deoppilant, opening or unblocking obstructions), *Muqavvi* (Tonic, strengthening organs), *Mulattif* (Rarefactive, softening thickened humors), and *Jali* (Abstergent, cleansing or purifying). These actions play a central role in addressing liver diseases by enhancing detoxification, improving bile flow, and resolving pathological blockages in the liver and digestive tract.

For instance, *Mufattih* effects are critical in dissolving obstructions within the liver and spleen, facilitating improved circulation and metabolic function. Similarly, *Muqavvi* actions strengthen liver tissues; while *Jali* and *Mulattif* properties assist in purifying the blood and resolving viscous humors, respectively. Though grounded in cultural and historical traditions, these terms reflect pharmacological properties acknowledged in modern medicine, such as anti-inflammatory, antioxidant, and bile-stimulating effects

Translational Insights: Bridging Traditional and Modern Medicine

The components of Rhubarb oxymel demonstrate sig-

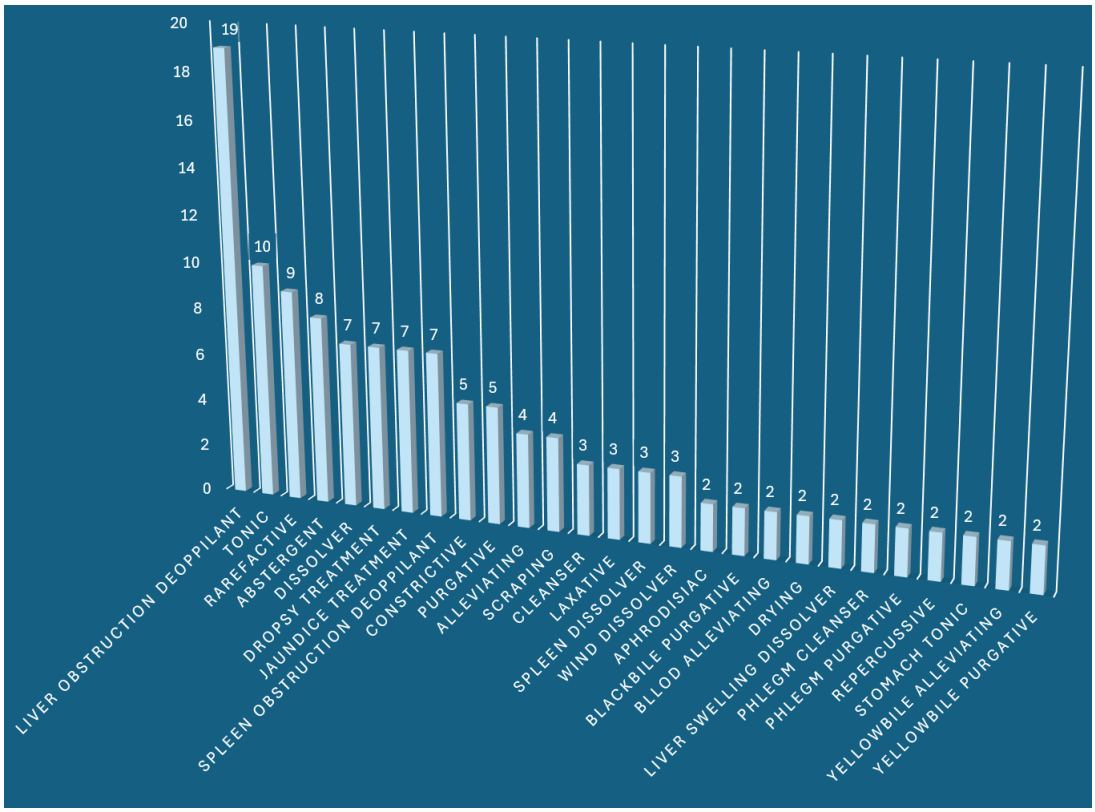

Figure 3. Frequencies of single herbs actions in Rhubarb oxymel

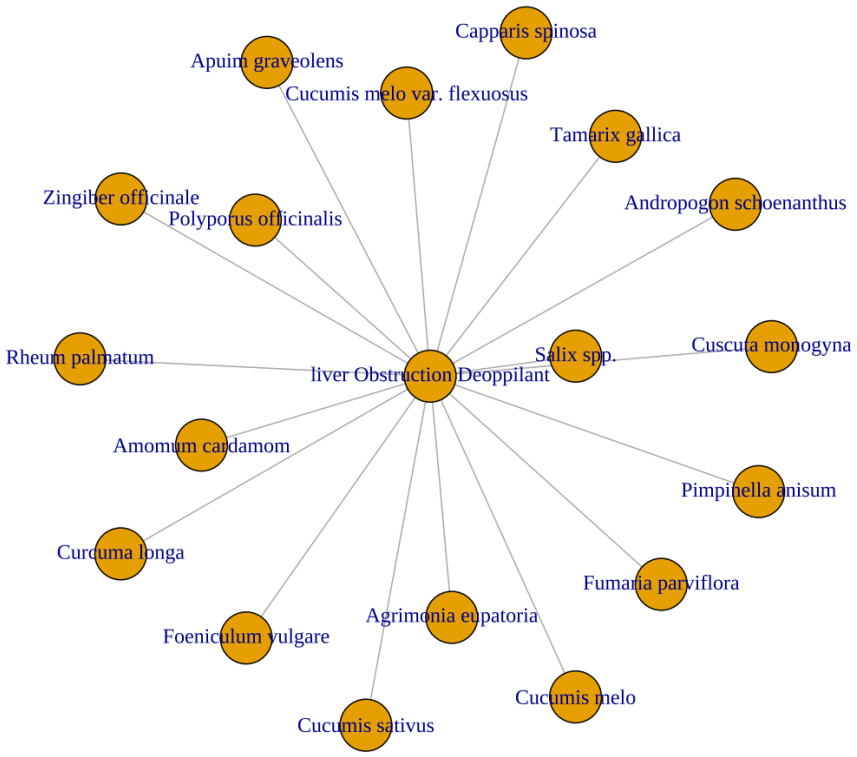

Figure 4. The individual plants listed in different formulas of Rhubarb oxymel act as liver obstruction Deoppilant

nificant overlap between traditional and modern understandings. For example, chicory, identified in TPM as *Mufattih* and *Muqavvi*, is now validated for its antioxidant and hepatoprotective effects, supporting liver detoxification and combating oxidative stress. Similarly, Chinese rhubarb, noted for its *Mufattih* and *Mushil* (Purgative) properties, has shown efficacy in modern research for managing gastrointestinal health and liver function through its laxative and anti-inflammatory effects.

Additional examples include *Fumaria parviflora* and *Cuscuta monogyna*, which are traditionally described as *Mufattih* and *Muqavvi* for their roles in unblocking obstructions and strengthening the liver. Contemporary studies confirm their hepatoprotective and antioxidant activities, demonstrating their relevance in addressing conditions like NAFLD and chronic inflammation.

Therapeutic Implications

The diverse pharmacological effects of the ingredients in Rhubarb oxymel, such as anti-inflammatory, antioxidant, hepatoprotective, and metabolic regulation, position this remedy as a comprehensive approach to liver health. For example, *Rosa damascena* and *Operculina turpethum* exhibit strong antioxidant properties, mitigating oxidative stress and inflammation linked to liver damage. Additionally, common polypody and *Polyporus officinalis* contribute to bile secretion and detoxification, reinforcing the liver's functional integrity.

Modern studies also highlight the potential of these herbs in managing systemic conditions. Ginger and caper demonstrate antidiabetic and lipid-lowering effects, addressing metabolic syndrome often associated with liver dysfunction. Furthermore, the antimicrobial and anticancer properties of herbs like *Cuscuta epithymum* and *Pimpinella anisum* reveal broader health benefits, showcasing the versatility of Rhubarb oxymel as a holistic remedy.

Future Directions

This thorough analysis not only supports the use of Rhubarb oxymel for enhancing liver function, but also provides opportunities for additional research and future clinical implementation. Standardizing formulations and conducting rigorous clinical trials can help bridge the gap between traditional practices and evidence-based medicine. Additionally, leveraging advanced analytical tools, such as metabolomics and pharmacogenomics, could unravel the molecular mechanisms underlying these herbs' therapeutic effects.

Conclusion

The therapeutic effects of the herbs found in Rhubarb oxymel showcase a rich blend of traditional and modern medicinal properties, particularly in the realm of liver health. These herbs exhibit a range of bioactive compounds that contribute to their hepatoprotective, anti-inflammatory, antioxidant, and detoxifying properties. Both TPM and modern medicine agree on the efficacy of these plants in managing liver diseases, making Rhubarb oxymel a valuable remedy in the treatment and prevention of liver-related conditions. This blend of ancient knowledge and contemporary scientific validation highlights the enduring relevance of traditional herbal remedies in modern healthcare.

Conflict of Interests

The authors declare that there are no conflicts of interest.

Acknowledgements

We would like to extend our sincere gratitude to the library staff at the Traditional Persian School for their invaluable support.

References

[1] Mulaikal TA, Emond JC. Physiology and anatomy of the liver. Liver Anesthesiol Crit Care Med 2012; 3-20.

[2] Guan Y, He Q. A current update on the rule of alternative and complementary medicine in the treatment of liver diseases. Evid Based Complement Alternat Med 2013;2013:321234.

[3] Abbott KA. Diseases of the Liver, in Sheep Veterinary Practice. CRC Press 2024;441-451.

[4] Wazir H. Diagnosis and treatment of liver disease: current trends and future directions. Cureus 2023;15:12.

[5] Che C. Traditional medicine, in Pharmacognosy. Elsevier 2024:11-28.

[6] Singh A. A review on traditional uses, bioactive chemical constituents, pharmacology, and toxicity of tinospora cordifolia (guduchi or giloy). Res J Pharmacogn Phytochem 2024;16:107-111.

[7] Seeff LB. Complementary and alternative medicine in chronic liver disease. Hepatology 2001;34:595-603.

[8] Stickel F. Schuppan D. Herbal medicine in the treatment of liver diseases. Dig Liver Dis 2007;39: 293-304.

[9] Dini S, Singh S, Fatemi F. The Hepatoprotective Possessions of Specific Iranian Medicinal Plants. J Food Biochem 2024;2024:8783113.

[10] Mohammadshahi M. Cost-effectiveness of traditional persian medicine-based diet on nonalcoholic fatty liver disease. Health Technol Assess Action 2024.

[11] Hasheminasab F, Tajadini H, Setayesh M. An evidence-based study on pharmacological treatments of non-alcoholic fatty liver disease based on traditional persian medicine. Curr Tradit Med 2020; 6:188-202.

[12] Zarshenas M. A panoramic view of chronic liver diseases and natural remedies reported in traditional persian medicine. Curr Pharm Des 2016;22:350-364.

[13] Niknafs A, Latifi SA, Salehi M. Treatment of grade 3 fatty liver by the principles of persian medicine: A case report. J Pharm Res Int 2021;32:8-13.

[14] Salmannezhad H. Oxymels (sekanjabin) in Persian medicine: kinds and applications. J Islam Iran Tradit Med 2015;6:116-124.
[15] Darani NS, Alizadeh Vaghasloo M, Kazemi A, Amri H, Rampp T, et al. Oxymel: a review of preclinical and clinical studies. Heliyon, 2023;9:e22649.
[16] Khan HS, Qarabadin-i Kabir. Naval Kishor. 1912.
[17] Aqili Alavi Shirazi MH. Makhzan al-adviyah. 1833.
[18] Naghizadeh A. Research Article UNaProd: A Universal Natural Product Database for Materia Medica. Iran Tradit Med 2020;23:25.
[19] Duda Ł. Medicinal Use of Chicory (Cichorium intybus L.). Scientia Pharm 2024;92:31.
[20] Janda K. The common cichory (Cichorium intybus L.) as a source of extracts with health-promoting properties—a review. Molecules 2021;26:1814.
[21] Riaz T. Phytochemistry and pharmacology of Cichorium intybus. Int Arch Integr Med 2024;11.
[22] Khattak AK, Syeda M, Shahzad S. General overview of phytochemistry and pharmacological potential of Rheum palmatum (Chinese rhubarb). Innov J Ayurvedic Sci 2020;8:1-5.
[23] Xiao P, He L, Wang L. Ethnopharmacologic study of Chinese rhubarb. J Ethnopharmacol 1984;10: 275-293.
[24] Yang X. The phytochemistry and pharmacology of three Rheum species: A comprehensive review with future perspectives. Phytomedicine 2024:155772.
[25] Abdolmaleki A. hydroalcoholic extract of fumaria parviflora l. can potentially detoxificate hepg2 cell line following carbon tetrachloride exposure. J Clin Res Paramed Sci 2024;13:e149140.
[26] Al-Snafi AE. Fumaria parviflora-A review. Indo Am J Pharm Sci 2018;5:1728-1738.
[27] Jamaldeen F. Shahatra (F. parviflora Lam)-a comprehensive review of its ethnopharmacology, phytochemistry and pharmacology. J Ethnopharmacol 2022;286:114839.
[28] Jameel M, Ali A, Ali M. New phytoconstituents from the aerial parts of Fumaria parviflora Lam. J Adv Pharm Technol Res 2014;5:64-69.
[29] Peng W. Hepatoprotective effect of Cuscuta campestris Yunck. whole plant on carbon tetrachloride induced chronic liver injury in mice. Int J Mol Sci 2016;17:2056.
[30] Noureen S. The genus Cuscuta (Convolvolaceac): An updated review on indigenous uses, phytochemistry, and pharmacology. Iran J Basic Med Sci 2019;22:1225.
[31] Şekeroğlu N. Comparison of polyphenolic content, radical scavenging activity, and mineral concentrations of Cuscuta monogyna VAHL on different host plants. Istanbul J Pharm 2024;54: 154-164.
[32] Patel S. Rose hip as an underutilized functional food: Evidence-based review. Trends Food Sci Technol 2017;63:29-38.
[33] Demircioglu MK. Antioxidant effect of Rosa pimpinellifolia L. fruit extract on cholestatic liver injury: an experimental study. Rev Assoc Med Bras 2024;70:e20230720.
[34] Alam J. Micropropagation and antimicrobial activity of 'Operculina turpethum' (Syn.'Ipomoea turpethum'), an endangered medicinal Plant. Plant Omics 2010;3:40-46.
[35] Kohli K, Nipanikar S, Kadbhane K. A comprehensive review on Trivrit [Operculina turpethum syn. Ipomoea turpethum]. Int J Pharma Bio Sci 2010;1.
[36] Sharma V, Singh M. Operculina turpethum as a panoramic herbal medicine: A review. Int J Pharm Sci Res 2012;3:21.
[37] Nafees H, Nafees S, Nizamudeen S. A comprehensive review on Turbud Operculina turpethum (L): A potential unani drug. Int J Herb Med 2020;8:88-92.
[38] Dar PA, Sofi G, Jafri M. Polypodium vulgare linn. A versatile herbal medicine: A review. Int J Pharm Sci Res 2012;3:1616.
[39] Farràs A. Polypodium vulgare L.(Polypodiaceae) as a source of bioactive compounds: Polyphenolic profile, cytotoxicity and cytoprotective properties in different cell lines. Front Pharmacol 2021;12:727528.
[40] Zhang G. Efficacy of Zhuling polyporus polysaccharide with BCG to inhibit bladder carcinoma. Carbohydr Polym 2015;118:30-35.
[41] Tan X, Guo L, Wang G. Polyporus umbellatus inhibited tumor cell proliferation and promoted tumor cell apoptosis by down-regulating AKT in breast cancer. Biomed Pharmacother 2016;83:526-535.
[42] Badroon NA, Abdul Majid N, Alshawsh MA. Antiproliferative and apoptotic effects of cardamonin against hepatocellular carcinoma HepG2 cells. Nutrients 2020;12:1757.
[43] Alkhalifah EAR. Cardamom extract alleviates the oxidative stress, inflammation and apoptosis induced during acetaminophen-induced hepatic toxicity via modulating Nrf2/HO-1/NQO-1 pathway. Mol Biol 2022;44:5390-5404.
[44] Wang J. Beneficial effects of ginger Zingiber officinale Roscoe on obesity and metabolic syndrome: a review. Ann N Y Acad Sci 2017;1398:83-98.
[45] Samadi M. A systematic review and meta-analysis of preclinical and clinical studies on the efficacy of ginger for the treatment of fatty liver disease. Phytother Res 2022;36:1182-1193.
[46] Abd Aziz NF. Effect of zingiber officinale on blood glucose level, pancreas, liver and kidney histology evaluated in diabetic induced dawley rats: a systematic review. Mater Technol Future Adv 2023:209-218.
[47] Jalali MT, Mohammadtaghvaei N, Larky DA. Investigating the effects of Capparis spinosa on hepatic gluconeogenesis and lipid content in streptozotocin-induced diabetic rats. Biomed Pharmacother 2016;84:1243-1248.
[48] Tlili N. Capparis spinosa leaves extract: Source of bioantioxidants with nephroprotective and hepatoprotective effects. Biomed Pharmacother 2017;87:171-179.
[49] Elamin M. A review of biological and pharmacological activities from the aerial part of tamarisk. Int J Pharm Res Allied Sci 2016;5:22-36.
[50] Urfi MK. The role of Tamarix gallica leaves extract in liver injury induced by rifampicin plus isoniazid in Sprague Dawley rats. J Diet Suppl 2018;15:24-33.
[51] Kumar SV. A review on hepatoprotective activity of medicinal plants. Int J Adv Res Pharm Bio Sci 2012;1:31-39.
[52] Mehraj N, Alam M. An Ghafis (Agrimonia eupatoria): An In-depth Review of its Historical Context, Therapeutic properties, Ethnopharmacological applications, and Scientific research. Int J Med Sci Pharm Res 2024;10:35-38.
[53] Heidari H, Kamalinejad M, Eskandari M. Hepatoprotective activity of Cucumis sativus against cumene hydroperoxide induced-oxidative stress. Res Pharm Sci 2012;7:936.
[54] Rose H. A review on hepatoprotective activity of commonly consumed vegetables. Der Pharm Lett 2013;5:290-304.
[55] Idemudia OU, Enogieru AB. phytochemical and pharmacological activities of cucumis sativus: an updated review. Trop J Nat Prod Res 2024;8.
[56] Javid H. Phytochemical, nutritional and medicinal profile of

cucumis sativus L.(Cucumber). Food Sci Eng 2024:358-377.
[57] Ibrahim DS. Abd El-Maksoud MA. Antioxidant and antidiabetic activities of Cucumis melo var. flexuosus leaf extract. Indian J Physiol Pharmacol 2018;62:445-452.
[58] Vishwakarma VK, Gupta JK, Upadhyay PK. Pharmacological importance of Cucumis melo L.: An overview. Asian J Pharm Clin Res 2017;10.
[59] Aly-Aldin MM. Influence of honeydew melon,(cucumis melo l.) fruit fractions on the diabetic hypercholesterolemic rats. EEgypt Acad J Biol Sci B Zool 2022;14:89-100.
[60] Naaz F, Mukhopadhyay S, Singh NP. Medicinal properties of Cucumis melo: a review. Biochem Cell Arch 2022;22.
[61] Djidel S. Hepatoprotective and antioxidant effects of ethanolic extract of Cucumis melo L against CCl4-induced oxidative damage in rats. Stud Health Sci 2024;5:e11940-e11940.
[62] Koriem KMM. Approach to pharmacological and clinical applications of Anisi aetheroleum. Asian Pac J Trop Biomed 2015;5:60-67.
[63] Nasır A, Yabalak E. Investigation of antioxidant, antibacterial, antiviral, chemical composition, and traditional medicinal properties of the extracts and essential oils of the Pimpinella species from a broad perspective: a review. J Essent Oil Res 2021;33:411-426.
[64] Subehan. Inhibition on human liver cytochrome P450 3A4 by constituents of fennel (Foeniculum vulgare): identification and characterization of a mechanism-based inactivator. J Agric Food Chem 2007;55:10162-10167.
[65] Rahimi R, Ardekani MRS. Medicinal properties of Foeniculum vulgare Mill. in traditional Iranian medicine and modern phytotherapy. Chin J Integr Med 2013;19:73-79.
[66] Ammon HP, Wahl MA. Pharmacology of Curcuma longa. Planta Medica 1991;57:1-7.
[67] Vera-Ramirez L. Curcumin and liver disease. Biofactors 2013;39:88-100.
[68] Öztürk N. Choleretic activity of Gentiana lutea ssp. symphyandra in rats. Phytomedicine 1998;5: 283-288.
[69] Khare CP. Indian herbal remedies: rational western therapy, ayurvedic and other traditional usage, botany. Springer science & business media. 2011.
[70] Ahmed Q, Sayedda K. Effect of celery (Apium graveolens) seeds extract on protease inhibitor (ritonavir) induced dyslipidemia. NJIRM 2012;3:52-56.
[71] Mehraj N, Alam M. Karafs (Apium graveolens Linn) An in-depth review of its historical context, therapeutic properties, ethno pharmacological applications, and scientific research. J Pharmacogn Phytochem 2024;13:401-405.
[72] Al-Ghamdi SS, Al-Ghamdi AA, Shammah AA. Inhibition of calcium oxalate nephrotoxicity with Cymbopogon schoenanthus (Al-Ethkher). Drug Metab Lett 2007;1:241-244.
[73] Akbar S, Akbar S. Cymbopogon schoenanthus (L.) Spreng.(Poaceae/Graminae) (Syns.: Andropogon schoenanthus L.; A. circinnatus Hochst. ex Steud.; A. eriophorus Willd.). Handbook of 200 Medicinal Plants: A Comprehensive Review of Their Traditional Medical Uses and Scientific Justifications 2020; pp 839-842.
[74] Sina I. Al-qanun fi al-tibb [the canon of medicine]. Alaalami Library. Beirut 2005; pp 48-51.
[75] Azam AKME. Tehran Institute of Meical History. Islamic Med Complement Med 2008;1:575.
[76] Sharifi Darani N, Alizadeh Vaghasloo M, Kazemi A, Amri H, Rampp T, et al. Oxymel: A systematic review of preclinical and clinical studies, Heliyon Journal, 2023;9:e22649.
[77] Salmannezhad H, Mozaffarpur S, Mojahedia M, Saghebi R, Sadeghpour O, et al. Oxymels (sekanjabin) in Persian medicine: kinds and applications. J Islam Iran Tradit Med 2015;6:116-124
[78] Shahbazi M, Alavian SM, Karimi M, Moradi G, SeyedAlinagh SA, et al. The effectiveness of rivandi syrup on non-alcoholic fatty liver disease (NAFLD): a double blind randomized clinical trial. Iran Red Crescent Med J 2024;81:1-7.