A Mini-review on Medicinal Plants Used for the Treatment of Jaundice in the Canon of Medicine

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Received 2020 February 24; Revised 2020 September 03; Accepted 2020 October 09.

Abstract

Context: Jaundice is a common gastrointestinal system disorder globally. Considering the potential of herbal remedies in traditional medical systems, this study was performed to explore medicinal plants used for the treatment of jaundice in the Canon of medicine.

Evidence Acquisition: This narrative review was done on one of the most important textbooks in traditional Persian medicine. Different keywords, like Yárághân and Zárdı, were searched in the book, and a list of plants used was prepared. We searched for recent literature to find any supportive evidence to find the established mechanism of action, as well.

Results: At the end of the study, 32 plants were found in the Canon of medicine, which most of them had at least one experimental or clinical study clarifying their mechanism of action to treat jaundice or decrease bilirubin.

Conclusions: There are potential remedies in traditional Persian medicine resources, which may be useful in future trials to treat jaundice.

Keywords: Persian Medicine, Jaundice, Traditional, Choleretic, Cholagogue, Cholekinetic, Iran, Avicenna, Canon

1. Context

Jaundice is the commonest presentation of patients with liver and biliary disease (1). Jaundice is not a disease in itself, but rather a sign, which can be accompanied by various diseases. It is characterized by yellow skin, mucosa, and sclera resulting from the increased production of bilirubin, usually over 2.5 and 3.0 mg/dL. Jaundice may occur either from increased production or reduced excretion of bilirubin due to several diseases and conditions that affect the liver, such as different types of hepatitis, liver cirrhosis, Gilbert syndrome, cholestasis, alcohol or drugs abuse, autoimmune disorders, hemolytic anemia, liver cancer, etc. (2). Despite the emergence of new chemical medications in conventional medicine, there has been a growing interest in searching medicinal plants and their traditional usage worldwide (3). According to the World Health Organization (WHO), about 80% of the people in the world are dependent on traditional medicine for their preliminary healthcare needs (4).

Valuable data are available in traditional Persian medicine (TPM) manuscripts about medicinal plants, which have been used by TPM scientists for the treatment of jaundice. Avicenna (10th and 11th centuries CE) was one of the prominent TPM scholars who meaningfully influenced the progress of Iranian medical science (5, 6); and the Canon of medicine (Al-Qanoon fi al-Tibb) is the most famous medicinal book of him (7). A review on the Canon of Medicine could provide valuable data in the field of medicinal plants effective in treating jaundice. Acceptability, availability, and cost-effectiveness are also important points for such a survey. In this paper, we investigated medicinal plants, which are mentioned in the Canon of medicine for the treatment of jaundice.

2. Evidence Acquisition

In this narrative review study, medicinal plants mentioned in the Canon of medicine for jaundice were investigated using keywords of “Yárághân”, “Yárághân -e-ásfār”, “Zárdı”, and “Yárághân -e-zárd” as the terms that indicated jaundice. Then, the collected medicinal plants
were matched with scientific names using descriptions of Iranian physicians about the morphological and characteristics of the plants. Then, the scientific names of the collected plants were confirmed using some textbooks, including popular medicinal plants of Iran and dictionary of medicinal plants. Probable toxicity of these plants were searched in patient desk reference. In order to make relationships between traditional date and current findings, the effects and biological mechanisms of the mentioned medicinal plants were searched using PubMed, ScienceDirect, and Google Scholar databases and keywords, such as jaundice and the scientific name of the plants.

3. Results

Data collected from this investigation are presented in Table 1. A total of 32 plant species were mentioned for the treatment of jaundice in the Canon of medicine, that most of them were confirmed with current studies. We did not find a clinical trial for only four plant species, including Ajuga chamaepitys L., Laccifer lacca, Potentilla Reptans, and Laricifomes officinalis (Villus). For each plant, species, scientific name, common English name and TPM names, family, and parts used were recorded. The most dominant families were Asteraceae and Lamiaceae, with three species, followed by Leguminosae, Paeoniaceae, Brassicaceae, and Asparagaceae, with two species each. Different plant parts had been used for the treatment of jaundice.

Several studies have been conducted on herbal medicine to treat jaundice (11-13), such as a study by Bakhshi Jouybari et al. (3), which was done to find the effectiveness of materia medica for jaundice based on some important TPM manuscripts, such as the Canon of medicine. They identified 111 materia medica belonging to 51 families as herbal remedies for treating jaundice. We found six plant species, including Laccifer lacca, Paenia officinalis L., Cassia fistula L., Laricifomes officinalis (Vill.), Lactuca sativa L., Ecballium elaterium L. had not been mentioned in their study; however, similar keywords were used in both studies. Also, they had not mentioned that how the medicinal plants had been used in the various liver or bile duct disorders, and for which type of jaundice they can be most effective. In a study by Amiri et al. (11), 37 ethnomedicinal plants belonging to 26 families were documented for their therapeutic use against jaundice. They introduced 9 medicinal plants, which were repeatedly mentioned by the traditional healers as the most extensively used herbs for the treatment of jaundice in Mashhad (one of the major cities of Iran). They reported the pharmaceutical form and ethnomedicinal uses of these medicinal plants (11).

In our study, the therapeutic effects of the medicinal herbs mentioned in the Canon of medicine for the treatment of jaundice were investigated while current investigations on these medicinal herbs were also considered. In previous studies, the morphology of plants, the parts used for the production of medicines, and medicinal forms of plants useful for pharmacists have been focused on; however, in the current survey, more attention has been given to the therapeutic effects of herbs and their temperament. Temperament, as the principle of TPM, is based on four qualities: hot, cold, dry, and wet; as well as four senses of humor, including phlegm, blood, yellow bile, and black bile (14). In accordance with the results of this study, most herbs had a hot temperament, and just four herbs had a cold temperament; however, the inner part of the Citron (Citrus medica) is cold and wet, as well (Table 1).

In TPM, jaundice has various etiologies, such as gastrointestinal disorders, liver disorders, anemia, etc., and its treatment is based on the treatment of its cause. For example, if hepatic disorder leads to increased yellow bile, treatment should include medications that reduce yellow bile, which are usually medicinal herbs with cold temperament. However, if jaundice is caused by a liver disorder, such as liver weakness and anemia, treatment should include liver augmentation and correction of the anemia, which is usually treated by medicinal herbs with hot temperament. Also, in TPM manuscripts the beneficial effects, such as Mofatleh, Mofatteh and, Mohallel for these herbs have been noted. Mohalleh herb is a medicinal herb that functions as a solvent. Mofatleh herb is a medicinal herb that acts as a detergent and removes all kinds of visceral obstructions, especially those in the liver caused by humors. Mofatleh herb is a medicinal herb that acts as a diluent. As Table 1 showed, the most repeated effect was “Mofatleh effect” (18 plant species), followed by the “Mofatteh effect” (11 plants) and “Molattef effect”. This means that these herbs are effective to dissolve and remove the substances, which cause obstruction. Awareness about these effects as well as the temperament of herbs can help in choosing the best medicinal herbs for the treatment of jaundice. Table 1 also lists other beneficial effects, such as the effectiveness of Laccifer lacca, Lactuca sativa L., and Ecballium elaterium L. on reducing ascites, as well as the effects of Artemisia absinthium L., Laccifer lacca (Kerr.), Raphanus sativus L., Cassia fistula L., Laricifomes officinalis (Vill.), Laricifom Matricaria chamomilla L. and Arnebia euchroma (Royle) in reducing liver pain. Also, nine plant species were listed as liver, stomach, or both enhancers.
4. Conclusions

A historical approach may be helpful in the discovery of some viewpoints that cannot be paid attention to by a purely medical one. This study gives us an insight into the ideas of Avicenna and could be valuable in finding new data on the clinical use of the medicinal herbs, which can be used for the treatment of jaundice leading to future opportunities to investigate their potential medicinal use.

Footnotes

Authors’ Contribution: Jamileh Mahdavi Jafari did conceptualization, data collection, writing the original draft, and final approval of the manuscript. Shahdis Barimani did conceptualization, methodology, writing the original draft, and final approval of the manuscript. Mehdi Heydarirad did formal analysis, methodology, writing the original draft, and final approval of the manuscript. Shahdis Barimani did conceptualization, methodology, writing the original draft, and final approval of the manuscript. Mehdi Heydarirad did formal analysis, methodology, writing, review, and editing, and final approval of the manuscript.

Conflict of Interests: The authors have no conflict of interest to declare.

Funding/Support: Nothing to declare.

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Table 1. Medicinal Plants Reported in the Canon of Medicine and Their Mechanism of Action

| No | Scientific Name | Common Name | Persian Name | Part Used | Family | Temperament (Mizadj) | Useful Effects in TPM | Useful Effects in the Current Studies |
|----|----------------|-------------|--------------|-----------|--------|----------------------|------------------------|---------------------------------------|
| 1  | Artemisia absinthium L. | Wormwood | Afsantin | Stem and leaves | Asteraceae | Hot in the first and dry in the second degree | Mofatteh\(^a\), Molattef\(^b\), Moshele Safra\(^a\), stomach strengthening, removing hepatic obstructions, useful in hepatalgia, and useful in jaundice | Reducing serum levels of total bilirubin (in vivo) \((15)\) |
| 2  | Asarum europaeum L. | European wild ginger | Asaroon | Rhizome | Aristolochiaceae | Hot and dry in the third degree | Mofatteh, Mohalleh\(^d\), Monagh\(^e\) of stomach and liver, liver strengthening, useful in liver swelling, removing hepatic obstructions, useful in jaundice | Reversing the altered levels of bilirubin (in vivo) \((16)\) |
| 3  | Asparagus officinalis L. | Asparagus | Helyoun | Seed | Asparagaceae | Hot and dry in the first degree | Mofatteh, useful in jaundice, removing hepatic obstructions | Anti-inflammatory effects, hepatoprotective effects \((3)\), decreasing the level of serum bilirubin and the liver enzymes (in vivo) \((17)\) |
| 4  | Cicer arietinum L. | Chickpea | Hemnas | Seed | Leguminosae | Hot and dry in the first degree | Mofatteh, useful in jaundice, useful in swelling | None |
| 5  | Ajuga chamaepepitys (L.) Schreb. | Yellow bugle | Komafeytous | Flower, leave, and seed | Lamiaceae | Hot in the second, dry in the third degree | Mofatteh, useful in black jaundice removes hepatic obstructions useful in some hepatic and splenic diseases, removing splenic obstructions | None |
| 6  | Laccifer lacca | Lak | Lac | Scarlet resinous secretion of a lac insects | Lacciferidae | Hot in the second, dry in the third degree | Mohalleh, Mofatteh, useful in jaundice useful in ascites, liver strengthening, useful in hepatalgia | None |
| 7  | Nardostachys jatamansi (D.Don) DC | Indian Nard | Sumbul | Rhizome | Valerianaceae | Hot in the first and dry in the second degree | Mofatteh, Mohalleh, removing hepatic obstructions, liver and stomach strengthening, useful in jaundice | Reducing the increased serum levels of ALT, AST, and ALP induced by CCl4 in rats \((18)\) |
| 8  | Paeonia officinalis L. | European peony | Favania | Root | Paeoniaceae | Moderately hot | Mofatteh, Mohalleh, stomach strengthening Removing gastric irritation, useful in jaundice, removing hepatic obstructions | Reducing serum levels of total bilirubin (in vivo) \((19, 20)\) |
| 9  | Raphanus sativus L. | Radish | Fuji | Leaf and steam | Brassicaceae | Hot and dry in the first degree | Mofatteh, Mohalleh, removing hepatic obstructions, useful in jaundice, useful in hepatalgia | Effective in decreasing total bilirubin level \((21)\) |
| 10 | Aloe vera (L.) Burm.f. | Yellow aloe | Cab-e-zard | Dried juice of leaves | Liliaceae | Hot and dry in the second degree | Mofatteh, Mohalleh, Moshele-Safa, removing hepatic obstructions, useful in jaundice | Reducing serum bilirubin concentration (in vivo) \((22, 23)\) |
| No. | Plant Name | Part Used | Family | Effect | Notes |
|-----|------------|-----------|--------|--------|-------|
| 11  | Cassia fistula L. | Golden shower | Leguminosae | Moderate in hotness and coldness, wet in the first degree | Mohallel, Molayyen, reducing the elevated levels of serum bilirubin (in vivo) |
| 12  | Salix alba L. | White willow | Salicaceae | Cold and dry | Removing hepatic obstructions, useful in jaundice, reducing serum bilirubin concentration |
| 13  | Potentilla reptans L. | Creeping cinquefoil | Rosaceae | Moderate in hotness and coldness, dry in the third degree | Mohallel, useful in hepatalgia, useful in jaundice |
| 14  | Lactisomes officinalis (Vill.) | Agaric white | Fomitopsidaceae | Hot in the first and dry in the second degree | Molattef, Mohallel, useful in jaundice, useful in gastralgia, useful in hepatalgia |
| 15  | Mentha longifolia (L.) L. | Wild mint | Lamiaceae | Hot and dry in the third degree | Molattef, Mohallel, useful in jaundice, useful in ascites |
| 16  | Lactuca sativa L. | Lettuce | Asteraceae | Cold and wet in the second degree | Use in jaundice, useful in swelling |
| 17  | Caesalpinia bonduc L. | Nickernut | Caesalpiniaceae | Hot and dry in the second degree | Mohallel, stomach strengthening, useful in jaundice |
| 18  | Echallium elaterium (L.) A.Rich. | Squirtling cucumber | Cucurbitaceae | Hot and dry in the second degree | Molattef, Molattef, removes hepatic obstructions, useful in jaundice, protecting liver from injuries |
| 19  | Rubia tinctorum L. | Madder | Rubiaceae | Hot and dry in the second degree | Molattef, useful in jaundice, decreasing the level of serum bilirubin (in vivo) |
| 20  | Mentha spicata L. | Spearmint | Lamiaceae | Hot and dry in the second degree | Molattef, Mohallel, useful in jaundice, useful in ascites, decreasing the level of serum bilirubin (in vivo) |
| 21  | Chelidonium majus L. | Celandine | Papaveraceae | Hot and dry in the third degree | Molattef, Mohallel, useful in jaundice, protecting liver from injuries |
| 22  | Brassica oleracea L. | Cabbage | Brassicaceae | Hot and dry in the second degree | Molattef, useful in jaundice, useful in splenic disease, removing obstructions of the liver and spleen, useful in jaundice |
| 23  | Physalis alkekengi L. | Winter cherry | Solanaceae | Cold and dry in the second degree | Molattef, useful in jaundice, decreasing the level of serum bilirubin (in vivo) |
| 24  | Allium cepa L. | Onion | Alliaceae | Hot and dry in the third degree | Molattef, useful in jaundice, useful in splenic disease |
| 25  | Matricaria chamomilla L. | Chamomile | Asteraceae | Hot in the second and dry in the first degree | Molattef, Mohallel, useful in jaundice, decreasing the level of serum bilirubin (in vivo) |
|   | Plant Name | Part | Family | Hotness and Dryness | Medicinal Use | Pharmacological Activity |
|---|------------|------|--------|---------------------|--------------|--------------------------|
| 26 | *Arnebia euchroma* (Royle) I.M. Johnst | Root | Boraginaceae | Hot in the first and dry in the second degree | Mohalleh, useful in hepatalgia, useful in jaundice, useful in splenic diseases | Decreasing serum total bilirubin level (in vivo) (32) |
| 27 | *Citrus medica* L. | Fruit | Rutaceae | The outer part of the fruit is hot in the first and dry in the second degree and the inner part of the fruit is cold and wet in the second degree | Molattef, Monaghi, cleaning the blood from bile, useful in jaundice, liver, and stomach strengthening | Anti-helminthic, anti-cytotoxic, anti-diabetic, hypolipidemic, antifungal, antimutagenic and anti-ulcer effects (in vivo) (3) |
| 28 | *Ferula assa-foetida* L. | Seed | Apiaceae | Hot in the beginning of fourth and dry in the second degree | Mohalleh, useful in jaundice | Anti-hypoglycemic and anti hyper lipidemic effects (in vivo) (10) |
| 29 | *Cuscuta monogyna* Vahl | Whole part | Convolvulaceae | Hot in the first and dry in the third degree | Monaghi, Molatteh, stomach and liver strengthening, removing hepatic and gastric obstructions | Hepatoprotective activity (in vivo) (33) |
| 30 | *Lycium barbarum* L. | Fruit and leave | Solanaceae | Moderate in hotness and coldness and dry in the second degree | Mohalleh, useful in jaundice | Hepatoprotective activity, decreasing the level of serum bilirubin and the liver enzymes (in vivo) (34) |
| 31 | *Adiantum capillus-veneris* L. | Whole part | Pteridaceae | Moderate in hotness and coldness (hot and dry in the first degree) | Molattef, Monaghi, useful in jaundice, useful in splenic disease | Hepatoprotective activity, decreasing the level of serum bilirubin and the liver enzymes (in vivo) (35) |
| 32 | *Rumex acetosa* L. | Aerial parts | Polygonaceae | Cold and dry in the second degree | Ghameb Safra, useful in jaundice | Hepatoprotective activity (in vivo) (36) |

Abbreviation: TPM, traditional Persian medicine.

aMofatteh: It is a detergent agent, which removes all kinds of visceral obstructions, especially those in the liver. Eliminating liver obstructions caused by humours.
bMolattef: It is a diluent agent, which dilutes all kinds of humours in the body.
cMoshel-e Safra: Bile purgative.
dMohalleh: It is an agent, which dissolves thick humours.
eMonaghi: It is a purifying agent, which removes excess humours.
fMolayyen: It is an agent, which helps to soften thick humous in the body.
gMonzedj: It is an agent, which ripens premature humours to reach its perfect state.
hGhame: It is a quenching agent, which calms erupting humours.