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Liver tonics: review of plants used in Iranian traditional medicine

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PEER REVIEW

Peer reviewer

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Comments

This is a valuable review. It introduced plants which have been traditionally used as liver tonics in Iran. This paper will promote the utilization of natural and traditional resources for contemporary health care. Herbal medicines have an extremely valuable, rich, lengthy and extensive practical history.
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ABSTRACT

Considering the fact that liver is one of the most important organs in our body, it deserves special attention and protection. Among various recommended supplements, complementary and alternative medicines particularly herbal remedies have received much attention owing to their truly healing properties. This review profits from Iranian traditional medicine and presents advantageous herbal guide directions for liver protection. According to credible Iranian medical literature such as Al Qanun Fil Tibb, Al-Havi and Makhzan-al-Aadvia, a wide spectrum of plants have been found to be useful for cleansing and protecting the liver. Some herbs such as ghafes (*Agrimonia eupatoria*), kasni (*Cichorium intybus*), anar (*Punica granatum*), darchin (*Cinnamomum zeylanicum*), za'feran (*Crocus sativus*), gole-sorkh (*Rosa damascena*) and zereshk (*Berberis vulgaris*) appeared to get strong consideration and were well documented as outstanding liver tonics. We conducted a comprehensive review of available Iranian medical resources such as scientific information database and medical sciences databases which cover all *in vitro* and *in vivo* studies of medicinal plants as liver tonics and hepatoprotective candidates. Literature survey was accomplished using multiple databases including PubMed, ISI web of knowledge, and Google Scholar.

KEYWORDS
Iranian traditional medicine, Liver tonic, Hepatoprotective agents, Herbal medicine

1. Introduction

The use of medicinal properties of plants in the prevention and treatment of diseases goes back to thousands years ago, and recently, it has received lots of attention due to the available scientific evidences[1]. Now, traditional medicine systems continue to play a fundamental role in health care. It should not be forgotten that about 80% of the world's population relies mainly on complementary and alternative medicines especially herbal therapies for their primary health care[2-4]. From antiquity to now, nature has been the center

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of attention as it is the richest source of medicinal agents. It has provided important opportunities for the scrutinized recognition of diseases and the related preventions[5]. In this regard, isolation and identification of herbal active ingredients have been common strategies in traditional medicine[1,6].

Liver is one of the most important organs which plays a crucial role in the daily functions of our body[7-11]. It is the main site for carbohydrates, proteins and lipid metabolism, synthesis of essential materials, and detoxifying harmful substances. Furthermore, expulsion of waste metabolites, detoxification, blood coagulation, homeostatic activities, storage of vitamins, finally excretion of bile, hormones, and drugs are other significant functions of liver.

Iranian traditional medicine (ITM) includes a wide range of medical experiences used in the prevention, diagnosis, and treatment of diseases based on the humor theory of temperament in which liver is one of the most important organs in the body. Persian scientists such as Sina[12] and Razi[13] believed that liver is one of the three essential organs (liver, heart and brain) in the body. In canon of medicine, the liver was described as a blood factory, refinery and distributor[12]. It was supposed that the liver receives all blood coming from stomach and bowel through portal vein, manufactures nutrients, and then distributes them to the rest of the body.

ITM believes that proper liver function can improve other organs performance and liver failure would lead to the inefficiency of other organs which causes various diseases such as uterine and ovarian diseases, loss of mental ability, chronic fatigue syndrome, *etc*. At this juncture, ITM has focused not only on liver diseases and treatments but also special attention to liver protection.

Liver tonics include principles of liver health protection, nutraceuticals, medications with nutritional implication and effective drugs. According to ITM, the most important principle to keep the liver healthy is to avoid eating different kinds of foods together or immediately after each other. Also, drinking too much water along with a meal, eating different incompatible foods with liver, eating large amount of sweets, and drinking cold water especially during or after exercise are important reasons leading to liver failure.

Functions of liver from both ITM and modern medicine points of view prove that a healthy liver is central to maintaining a healthy body. Liver impairment is one of the serious threats to general health around the world[14]. It is mainly caused by some toxicants such as chemotherapeutic agents (some antibiotics, large doses of acetaminophen, carbon tetrachloride, thioacetamide, peroxidised oil, aflatoxin, *etc*.), chronic consumption of alcohol, infections, and autoimmune disorders[15]. It seems that strengthening the liver against the aforementioned factors is one of the most reliable ways to prevent liver damage. For this purpose, various liver tonics have been designed and developed. Because of the increasing demand for the efficient liver tonics and hepatoprotective agents with minimal side effects[16-19], complementary and alternative therapies including nontoxic, natural and inexpensive products have attracted lots of consideration. Herein, in order to emphasize on the efficacy of ITM, we introduced a well-documented collection of therapeutic herbs acting as liver tonics.

2. Methodology

In this study, related information was obtained from available ancient sources such as Al Qanun Fil Tibb, Al-Havi, and Makhzan-al-Aadvia. Accordingly, a wide spectrum of plants was found to be useful for cleansing and protecting the liver. Finally, the obtained data was compared with those of reported in modern medicinal databases covering all *in vitro* and *in vivo* hepatoprotective investigations. In the present paper, the literature review was performed by using PubMed, ISI web of knowledge, scientific information database and Google Scholar focusing on the following keywords: “liver tonic” and “hepatoprotective”.

3. Modern proofs for the efficacy of medicinal plants used as liver tonics in ITM

3.1. Agrimonia eupatoria (A. eupatoria)

A. eupatoria known as ghafes in ITM has been repeatedly utilized in order to strengthen the liver[12,20]. The study of Yoon *et al*. showed that *A. eupatoria* decreased the toxic effects of chronic ethanol consumption on rat liver, aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels[21]. In addition, oral ingestion of aqueous extract of aerial parts of *A. eupatoria* in the experimental animals which were treated by tetrachloride carbon (CCl_4) decreased AST and ALT levels[22] (Table 1).

3.2. Vitis vinifera L. (V. vinifera)

The fruits of *V. vinifera* known as maveez munaqqa in ITM have been widely used as liver tonic[12]. The hepatoprotective effects of ethanolic extract of *V. vinifera* leaves were investigated against CCl_4-induced acute hepatotoxicity in rats. The AST and ALT levels were reduced in rats pretreated by *V. vinifera* leaves extract[23]. Effects of *V. vinifera* leaf extract on alcohol-induced oxidative stress in rats were investigated by Pari and Suresh. Grape leaf extract at a dose of 100 mg/kg was highly effective than 25 and 50 mg/kg body weight. In addition, it significantly reduced the levels of lipid peroxidation level and restored the enzymatic and non-enzymatic antioxidants level in liver and kidney of alcohol administration rats[24]. In another study reported by Liu *et al*., the hepatoprotective effect of total triterpenoids (VTT) and total flavonoids (VTF) from *V. vinifera* against immunological liver injury (ILI) in mice was investigated. The hepatoprotective effects of *Vitis* VTT and VTF from *V. vinifera* were evaluated in bacille-Calmette-Guérin (BCG) plus lipopolysaccharide (LPS)-induced ILI in mice. Moreover, the increased Bax/Bcl-2 ratio was significantly down which was regulated by VTT and VTF in liver tissue of ILI mice. These results