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Medicinal plants with hepatoprotective activity in Iranian folk medicine

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PEER REVIEW

Peer reviewer

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Comments

This is a valuable review. It introduced 15 plants which are used as hepatoprotectives in Iranian folk medicine. 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

There are a number of medicinal combinations in the Iranian traditional medicine which are commonly used as tonic for liver. In this review, we have introduced some medicinal plants that are used mainly for the treatment of liver disorders in Iranian folk medicine, with focus on their hepatoprotective effects particularly against CC1₄ agent. In this study, online databases including Web of Science, PubMed, Scopus, and Science Direct were searched for papers published from January 1970 to December 2013. Search terms consisted of medicinal plants, traditional medicine, folk medicine, hepatoprotective, Iran, liver, therapeutic uses, compounds, antioxidant, CC1₄, anti-inflammatory, and antihepatotoxic, hepatitis, alone or in combination. *Allium hirtifolium* Boiss., *Apium graveolens* L., *Cynara scolymus*, *Berberis vulgaris* L., *Calendula officinalis*, *Nigella sativa* L., *Taraxacum officinale*, *Tragopogon porrifolius*, *Prangos ferulacea* L., *Allium sativum*, *Marrubium vulgare*, *Ammi majus* L., *Citrullus lanatus* Thunb, *Agrimonia eupatoria* L. and *Prunus armeniaca* L. are some of the medicinal plants that have been used for the treatment of liver disorders in Iranian folk medicine. Out of several leads obtained from plants containing potential hepatoprotective agents, silymarin, β-sitosterol, betalain, neoandrographolide, phyllanthin, andrographolide, curcumin, picroside, hypophyllanthin, kutkoside, and glycyrrhizin have been demonstrated to have potent hepatoprotective properties. Despite encouraging data on possibility of new discoveries in the near future, the evidence on treating viral hepatitis or other chronic liver diseases by herbal medications is not adequate.

KEYWORDS

Medicinal plants, Iran, Compounds, Liver, Therapeutic uses, CC1₄

1. Introduction

Liver diseases which are still a global health problem may be classified as acute or chronic hepatitis (inflammatory liver diseases), hepatosis (non inflammatory diseases) and cirrhosis (degenerative disorder resulting in liver fibrosis). Unfortunately,

treatments of choice for liver diseases are controversial because conventional or synthetic drugs for the treatment of these diseases are insufficient and sometimes cause serious side effects[1].

Since ancient times, mankind has made use of plants in the treatment of various ailments because their toxicity factors appear to have lower side effects[2]. Many of the currently available drugs

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were derived either directly or indirectly from medicinal plants. Recent interest in natural therapies and alternative medicines has made researchers pay attention to traditional herbal medicine. In the past decade, attention has been centered on scientific evaluation of traditional drugs with plant origin for the treatment of various diseases. Due to their effectiveness, with presumably minimal side effects in terms of treatment as well as relatively low costs, herbal drugs are widely prescribed, even when their biologically active constituents are not fully identified[3].

The utility of natural therapies for liver diseases has a long history. Despite the fact that most recommendations are not based on documented evidence, some of these combinations do have active constituents with confirmed antioxidant, anti-inflammatory, anticarcinogenic, antifibrotic, or antiviral properties. Although a large number of these plants and formulations have been investigated, the studies were mostly unsatisfactory. For instance, the therapeutic values, in most of these studies, were assessed against a few chemicals-induced subclinical levels of liver damages in rodents. The reasons that make us arrive at such a conclusion are lack of standardization of the herbal drugs, limited number of randomized placebo controlled clinical trials, and paucity of traditional toxicologic evaluations[4].

Hundreds of plants have been so far examined to be taken for a wide spectrum of liver diseases[5,6]. Natural products, including herbal extracts, could significantly contribute to recovery processes of the intoxicated liver. According to reliable scientific information obtained from the research on medicinal plants, plants such as *Silybum marianum*, *Glycyrrhiza glabra*, *Phyllanthus* species (amarus, niruri, emblica), and *Picrorhiza kurroa* have been widely and most of the time fruitfully applied for the treatment of liver disorders, exerting their effects via antioxidant-related properties[7-10].

Iranians have been using herbal medicine for the treatment of some common diseases; as a result, a large number of studies have been conducted to suggest new wild medicinal plants in different parts of Iran. Iranian traditional medicine is mostly relied on the consumption of plant materials. One of the important and well-documented utilities of plant products is their use as hepatoprotective agents. There are a number of medicinal combinations in the Iranian traditional medicine which are commonly used as tonic for liver. *Allium hirtifolium* Boiss. (*A. hirtifolium*), *Apium graveolens* L. (*A. graveolens*), *Cynara scolymus* (*C. scolymus*), *Berberis vulgaris* L. (*B. vulgaris*), *Calendula officinalis* (*C. officinalis*), *Nigella sativa* L. (*N. sativa*), *Taraxacum officinale* (*T. officinale*), *Tragopogon porrifolius* (*T. porrifolius*), *Prangos ferulacea* L. (*P. ferulacea*), *Allium sativum* L. (*A. sativum*), *Marrubium vulgare* L. (*M. vulgare*), *Ammi majus* L. (*A. majus*), *Citrullus lanatus* (*C. lanatus*), *Agrimonia eupatoria* L. (*A. eupatoria*) and *Prunus armeniaca* L. (*P. armeniaca*) are some of medicinal plants that have been used mainly for the treatment of liver disorders in Iranian folk medicine.

2. Medicinal plants

2.1. *A. hirtifolium*

A. hirtifolium from Alliaceae family, commonly known as Persian shallot (moosir in Persian) is endemic to Iran[11]. Based on available pharmaceutical investigations, antioxidant and hepatoprotective effects of *A. hirtifolium* have been also demonstrated. In addition, *A. hirtifolium* extracts had antioxidant properties comparable to or slightly higher than garlic extracts[12].

The commonly known phytochemical compounds identified in *A. hirtifolium* are saponins, saponinins, sulphur containing compounds (e.g. thiosulfates) and flavonoids including shallomin, quercetin and kaempferol[12]. Alliin, alliinase, allicin, s-allyl-cysteine, diallyl disulphide, diallyltrisulphide, and methylallyltrisulphide are the most important biological secondary metabolites of *A. hirtifolium*[13]. Disulphide and trisulfide compounds are among the most important compounds existing in *A. hirtifolium*[14]. Researches have shown that both the corn and the flower of shallot contain a high density of glycosidic flavonols. Linolenic, linoleic, palmitic, palmitoleic, stearic, and oleic acids have been identified in *A. hirtifolium* oil, as well[15].

Treating rats with hydroalcoholic extract of *A. hirtifolium* could protect liver cells against oxidant effects of alloxan, and consequently caused a significant reduction in serum concentration of alkaline phosphatase (ALP), alanine transaminase (ALT), and aspartate transaminase (AST). Biochemical results have confirmed the usefulness of *A. hirtifolium* extract in decreasing the destructive effects of alloxan on liver tissue, and consequently decreasing the enzymes' leakage into cytosol, which is possibly achieved by herbal antioxidant compounds including flavonoids[12]. It was also reported that consumption of *A. hirtifolium* caused a reduction in AST level compared to the group with a hypercholesterolemic diet[16]. A research on the effect of hydroalcoholic *A. hirtifolium* extract on the level of liver enzymes in streptozotocin-induced diabetic rats indicated that hydroalcoholic extract of *A. hirtifolium* could significantly decrease serum levels of liver enzymes [AST, ALT, ALP and (lactate dehydrogenase) LDH] in a dose-dependent manner. Antioxidant micronutrients in the extract of *A. hirtifolium* may also restore liver damages. Shallomin and other active constituents of *A. hirtifolium* did not produce any adverse effect on the organs such as liver and kidney[17].

2.2. *A. graveolens*

A. graveolens, commonly known as celery, is an edible plant of the Umbelliferae family that grows mostly in the Mediterranean areas. It has been considered as a medicinal plant for a long time[18,19]. Data obtained from literature reveal that *A. graveolens* has many pharmacological properties such as antifungal, antihypertensive, antihyperlipidemic, diuretic, and anticancer[20-23]. This plant has also been shown to have some other medicinal features including

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