Folklore medicinal plants used in liver disease: A review

Saber Abbaszadeh¹,², Ali Nosrati Andevari³, Abed Koohpayeh⁴, Nasrollah Naghdi⁵, Mohsen Alizadeh¹,², Fatemeh Beyranvand¹, Zahra harsej⁶

¹Department of Medicinal Plants, Razi Herbal Medicines Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran, ²Department of Biochemistry, Student Research Committee Lorestan University of Medical Sciences, Khorramabad, Iran, ³Department of Biochemistry, Hormozgan University of Medical Sciences, Bandar Abbas, Iran, ⁴Researches Center of Medicinal Plants, Islamic Azad University of Shahrekord Branch, Shahrekord, Iran, ⁵Department of Medicinal Plants, Biotechnology and Medicinal Plants Research Center, Ilam University of Medical Sciences, Ilam, Iran, ⁶Department of Biochemistry, Student Research Committee, Guilan University of Medical Sciences, Rasht, Iran

Abstract

The liver is the largest organ of the body and the main site of essential biochemical reactions in the human body. This is useful for detoxification of toxic substances and the production of biological molecules. Therefore, liver damage leads to severe consequences. Because herbs and herbal antioxidants are used to detoxify and treat liver disorders, this review was conducted to report the most important medicinal plants affecting liver disorders and diseases. Key terms liver cancer, medicinal plants, liver disorder and medicinal plants, liver disease and medicinal plants, effect of extract and essential oil of effective medicinal plants on liver tissues in rats, mice, and laboratory mice, and effect of extract and essential oil of medicinal plants on liver disease were used to retrieve relevant publications indexed in databases IranMedex, Irandoc, ISI, PubMed, Scopus, SID, Magiran, and Google Scholar. Based on the evidence found in this review, the medicinal plants Zingiber officinale, Cucurbita pepo, Citrus reticulate, Petroselinum crispum, Andrographis paniculata, Silybum marianum, Camellia sinensis, Physalis peruviana, Thonningia sanguinea, Nigella sativa, Cichorium intybus L., Terminalia catappa, Glycyrrhiza glabra, Curcuma zanthorrhiza, Hibiscus sabdariffa, Vaccinium vitis-idaea, Salvia miltiorrhiza, Kigelia africana, Alchornea cordifolia, Boerhavia diffusa, Schisandrae chinensis, Tinospora cordifolia, Brassica rapa subsp. rapa, Lygodium flexuosum, Carica papaya, Solanum fastigiatum, and Cheilanthes farinosa are some of the most important medicinal plants affecting liver disorders and diseases.

Key words: Liver cancer, liver disease, liver disorder and medicinal plants, medicinal plants, medicinal plants

INTRODUCTION

The liver is the largest organ of the body and the main site of essential biochemical reactions in the human body. This is useful for detoxification of toxins and the production of biological molecules. Thus, liver damage leads to severe consequences.¹² The liver plays an important role in many essential physiological processes such as glucose homeostasis, the production of essential proteins, the production of lipoprotein and lipids, the production and secretion of bile acids, and vitamin storage.³ This damage is caused by chronic alcohol abuse, viral hepatitis, or inherited metabolic disorder. Liver damage is associated with cell necrosis, fibrosis, increase in tissue lipid peroxidation, and decrease in tissue glutathione levels. Most toxic chemicals cause damage to the hepatocytes by inducing lipid peroxidation and other oxidative effects.⁴ Antioxidants have also shown to reduce this toxicity.⁵⁶ Natural antioxidants in many compounds are classified as secondary metabolites. For example, polyphenols (phenolic acids and flavonoids) and terpenoids (carotenoids) and the consumption of foods containing these compounds in large quantities play an important role in preventing many diseases.⁷⁸ Remedies derived from plant extracts are increasingly used to treat...
### Table 1: A number of anti-liver cancer medicinal plants and additional information

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Part of plant</th>
<th>Family name</th>
<th>Common name</th>
<th>Origin of plant</th>
<th>Country of study</th>
<th>Year</th>
<th>Result</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zingiber officinale</td>
<td>Root (aqueous extract)</td>
<td>Zingiberaceae</td>
<td>Ginger</td>
<td>In Indian subcontinent to Southern Asia, China</td>
<td>Cairo, Egypt</td>
<td>2016 <em>in vitro</em> Zingiber officinale root aqueous extract may exert hepatoprotective effects against aspartame, which may cause hepatotoxicity and oxidative stress. Zingiber officinale root extract exerts hepatoprotective effects against aspartame-induced hepatotoxicity and reduces liver damage markers (ALT, AST, ALP, and γ-GT), total serum protein, total albumin and bilirubin levels, serum LDH activity, α-photoprotein, and TNF, which increases the levels of antioxidant enzymes and reduces the level of MDA.</td>
<td>[17]</td>
<td></td>
</tr>
<tr>
<td>Cucurbita pepo</td>
<td>Seeds</td>
<td>Cucurbitaceae</td>
<td>Pumpkin</td>
<td>North America</td>
<td>Cairo, Egypt</td>
<td>2016 <em>in vitro</em> Cucurbita maxima oil plays an important role in protecting against alcohol hepatotoxicity and alcohol-induced oxidative stress. Prevention using Cucurbita maxima oil may have diverse hepatoprotective effects including oxidation, anti-lipid peroxidation, detoxification, and protection against glutathione removal.</td>
<td>[17]</td>
<td></td>
</tr>
<tr>
<td>Citrus reticulata</td>
<td>Fruit</td>
<td>Rutaceae</td>
<td>Mandarin</td>
<td>Particularly from Japan, and in Canada, the United States, and Russia</td>
<td>Cairo, Egypt</td>
<td>2016 <em>in vitro</em> Rutin (quercetin rutinoside) is a flavonoid glycoside. Hesperidin is a flavanone glycoside (flavonoid C_{28}H_{34}O_{15}), which is found abundantly in citrus fruits. Hesperidin plays an important role in preventing doxorubicin-induced hepatotoxicity by improving the activity of the liver enzymes (ALT, AST, ALP, and GGT) in addition to improving total bilirubin, albumin, and sialic acid levels. Rutin and hesperidin significantly increase the activity of liver glutathione, glutathione peroxidase, and glutathione S-transferase and peroxidase, and reduce lipid peroxidation levels. Preventive treatment with rutin and hesperidin may protect the liver against doxorubicin-induced hepatotoxicity.</td>
<td>[17]</td>
<td></td>
</tr>
<tr>
<td>Petroselinum crispum</td>
<td>Leaves and flowers</td>
<td>Apiaceae</td>
<td>Parsley or garden parsley</td>
<td>Native herb of the central Mediterranean region (Southern Italy, Algeria, and Tunisia).</td>
<td>Cairo, Egypt</td>
<td>2016 <em>in vitro</em> Petroselinum crispum oil plays an important role in exerting an effect on the liver function enzymes, and antioxidant and anti-lipid peroxidation effects, which increases detoxification and protects against glutathione reduction against chemical toxicity due to alcohol and oxidative stress.</td>
<td>[17]</td>
<td></td>
</tr>
</tbody>
</table>

(Contd...)
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Part of plant</th>
<th>Family name</th>
<th>Common name</th>
<th>Origin of plant</th>
<th>Country of study</th>
<th>Year</th>
<th>Result</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Andrographis</em></td>
<td>Aerial parts</td>
<td>Acanthaceae</td>
<td>King of bitters</td>
<td>Native to India and Sri Lanka. It is widely cultivated in Southern and Southeastern Asia</td>
<td>Cairo, Egypt</td>
<td>2016</td>
<td><em>in vitro</em></td>
<td>[17]</td>
</tr>
<tr>
<td><em>Silybum marianum</em></td>
<td>Seed</td>
<td>Asteraceae</td>
<td>Milk thistle</td>
<td>Native in Southern Europe through to Asia, it is now found throughout the world</td>
<td>Cairo, Egypt</td>
<td>2016</td>
<td><em>in vitro</em></td>
<td>(17)</td>
</tr>
<tr>
<td><em>Camellia sinensis</em></td>
<td>Leaves</td>
<td>Theaceae</td>
<td>Green tea</td>
<td>Native to East Asia, the Indian Subcontinent, and Southeast Asia</td>
<td>Cairo, Egypt</td>
<td>2016</td>
<td><em>in vitro</em></td>
<td>[17]</td>
</tr>
<tr>
<td><em>Nasturtium</em></td>
<td>Aerial parts</td>
<td>Brassicaceae</td>
<td>Watercress</td>
<td>Native to Europe and Asia</td>
<td>Tabriz, Iran</td>
<td>2014</td>
<td><em>in vivo</em></td>
<td>[18]</td>
</tr>
<tr>
<td><em>Physalis peruviana</em></td>
<td>Fruit</td>
<td>Solanaceae</td>
<td>Goldenberry</td>
<td>England, and in South Africa, and grows wild across the world in temperate and tropical regions</td>
<td>India</td>
<td>2006</td>
<td><em>in vivo</em></td>
<td>[19]</td>
</tr>
</tbody>
</table>

(Contd...)
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Part of plant</th>
<th>Family name</th>
<th>Common name</th>
<th>Origin of plant</th>
<th>Country of study</th>
<th>Year</th>
<th>Result</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thonningia sanguinea</td>
<td>Root</td>
<td>Balanophoraceae</td>
<td>Ground pineapple</td>
<td>Southern and Western Africa, and tropical regions</td>
<td>Japan</td>
<td>2000</td>
<td>The results showed that GST activity in the liver cytosol is significantly inhibited by Thonningia sanguinea extract in vitro, and its injection into the plant vitamin has no effect on the enzyme and the GSH level. GST inhibition may have a qualitative effect</td>
<td>[20]</td>
</tr>
<tr>
<td>Nigella sativa</td>
<td>Seeds</td>
<td>Ranunculaceae</td>
<td>Black cumin</td>
<td>Native to South and Southwest Asia</td>
<td>Egypt</td>
<td>2015</td>
<td>Nigella sativa altered liver function and increased alanine transaminase, AST, and levels of LDH, decreased total protein levels, and increased superoxide dismutase and MDA by extracting APAP against (N-acetyl-P-aminophenol) at the administered dose in mice, while reduction in catalase, glutathione peroxidase, and glutathione decreased the activity. Nigella sativa extract is the strongest agent to reduce the toxicity of APAP and improve liver function and antioxidant capacity of the mouse.</td>
<td>[21]</td>
</tr>
<tr>
<td>Terminalia catappa</td>
<td>Leaves</td>
<td>Combretaceae</td>
<td>Malabar-almond</td>
<td>Asia, Africa, and Australia</td>
<td>Japan</td>
<td>2007</td>
<td>In a study, the antioxidant and protective activities of the Terminalia catappa leaf were observed. The Terminalia catappa leaf extract exhibited a strong radical disinfectant for ROS</td>
<td>[22]</td>
</tr>
<tr>
<td>Glycyrrhiza glabra</td>
<td>Root</td>
<td>Fabaceae</td>
<td>Liquorice</td>
<td>Native to Southern Europe and parts of Asia, such as India</td>
<td>China</td>
<td>2011</td>
<td>Glycyrrhiza glabra extract inhibits the activity of AST, ALP, and ALT and decreases Alb levels in liver damage. The data of this study support the chemical potential of the Glycyrrhiza glabra extract against oxidative damage to the liver</td>
<td>[23]</td>
</tr>
<tr>
<td>Curcuma zanthorrhiza</td>
<td>Rhizome or entire plant</td>
<td>Zingiberaceae</td>
<td>Javanese ginger</td>
<td>South East Asia, cultivars in China, Indochina, Barbados, India, Japan, Korea, the United States, and some countries in Europe</td>
<td>Taiwan</td>
<td>1996</td>
<td>The results clearly showed that Curcuma xanthorrhiza extract significantly reduced the acute increase of serum aminotransaminases induced by hepatotonic and reduced liver damage 24 h after intraperitoneal administration of hepatotoxins</td>
<td>[24]</td>
</tr>
<tr>
<td>Hibiscus sabdariffa</td>
<td>Flower</td>
<td>Malvaceae</td>
<td>Roselle</td>
<td>Native to West Africa</td>
<td>Taiwan</td>
<td>2005</td>
<td>Hibiscus sabdariffa L. extract protects the liver against CCl4-induced fibrosis. This protective effect appears to be due to the antioxidant properties of Hibiscus sabdariffa extract. The Hibiscus sabdariffa extract also significantly inhibits the activation of the liver stem cells. Hibiscus sabdariffa extract significantly reduced the levels of AST and ALT</td>
<td>[25]</td>
</tr>
<tr>
<td>Scientific Name</td>
<td>Part of plant</td>
<td>Family name</td>
<td>Common name</td>
<td>Origin of plant</td>
<td>Country of study</td>
<td>Year</td>
<td>Result</td>
<td>Ref.</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------</td>
<td>---------------------------</td>
<td>---------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Vaccinium vitis-idaea</td>
<td>Leaves</td>
<td>Ericaceae</td>
<td>Lingonberry</td>
<td>Northern Hemisphere from Eurasia to North America</td>
<td>Japan</td>
<td>2003</td>
<td>The results showed that galactosamine (GalN)-induced hepatotoxicity and oxidative stress caused hepatotoxicity in mice, and the activity of serum ALT and glutathione-S-transferase (GSH), and lipid peroxidation in liver hemoglobin increased for 24 h. The <em>Vaccinium vitis-idaea</em> extract is a strong antioxidant and protects against GalN-induced hepatotoxicity</td>
<td>[26]</td>
</tr>
<tr>
<td>Salvia miltiorrhiza</td>
<td>Root</td>
<td>Lamiaceae</td>
<td>Red sage</td>
<td>Native to Asia and China and Japan.</td>
<td>Korea</td>
<td>2000</td>
<td>Hepatotoxicity treatment with <em>Salvia miltiorrhiza</em> extract significantly reduced aspartate transaminase, alanine transaminase, alkaline phosphatase, and total cholesterol in mouse model of BDL. The amount of hydroxyproline in the liver in the extract-treated BDL mice was reduced to 68% of the control BDL mice. The amount of MDA in the extract-treated BDL mice was reduced to 47% of the control BDL mice</td>
<td>[27]</td>
</tr>
<tr>
<td>Kigelia africana</td>
<td>Leaves</td>
<td>Bignoniaceae</td>
<td>Lam</td>
<td>Africa from Eritrea and Chad South to Northern South Africa, and West to Senegal and Namibia</td>
<td>Nigeria</td>
<td>2007</td>
<td>The effect of plant extract on the activities of superoxide dismutase, catalase, and glutathione peroxidase statistically significantly decreased liver peroxidation</td>
<td>[28]</td>
</tr>
<tr>
<td>Alchornea cordifolia</td>
<td>Leaves</td>
<td>Euphorbiaceae</td>
<td>Thonn</td>
<td>African</td>
<td>Nigeria</td>
<td>2007</td>
<td>The results of a study showed that the plant can act as an antioxidant for the liver and significantly reduced the activity of superoxide dismutase, catalase, glutathione peroxidase, and aminolevulinate dehydratase</td>
<td>[29]</td>
</tr>
<tr>
<td>Salvia miltiorrhiza</td>
<td>Roots</td>
<td>Lamiaceae</td>
<td>Red sage</td>
<td>Native to China and Japan</td>
<td>China</td>
<td>2008</td>
<td>This study showed that the extract of this plant had the antiviral effects of SMPS in liver immunity damage and decreased serum levels of ALT, AST, and nitrogen oxide, as well as liver hemoglobin levels of tumor necrosis factor 1 alpha and interferon 1 beta</td>
<td>[29]</td>
</tr>
<tr>
<td>Schisandrae chinensis</td>
<td>Fructus</td>
<td>Schisandraceae</td>
<td>Chinese magnolia-vine</td>
<td>Northern China and the Russian Far East</td>
<td>China</td>
<td>2009</td>
<td>Extract of <em>Schisandra chinensis</em> leaf serum ALT and AST activity decreased in rats. The effects of plant leaves and their combination on serum ALT, AST, and ALP levels, significantly change antioxidant enzymes in rat liver tissue</td>
<td>[30]</td>
</tr>
<tr>
<td>Scientific Name</td>
<td>Part of plant</td>
<td>Family name</td>
<td>Common name</td>
<td>Origin of plant</td>
<td>Country of study</td>
<td>Year</td>
<td>Result</td>
<td>Ref.</td>
</tr>
<tr>
<td>----------------</td>
<td>---------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-----------------</td>
<td>------------------</td>
<td>------</td>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td><em>Curcuma longa</em></td>
<td>Rhizome</td>
<td>Zingiberaceae</td>
<td>Turmeric</td>
<td>Native to the Indian subcontinent and Southeast Asia</td>
<td>India</td>
<td>2007</td>
<td><em>in vivo</em></td>
<td>[31]</td>
</tr>
<tr>
<td><em>Tinospora cordifolia</em></td>
<td>Leaves</td>
<td>Menispermacae</td>
<td>Guduchi</td>
<td>India, Myanmar, and India Sri Lanka</td>
<td>2007</td>
<td><em>in vivo</em></td>
<td>[31]</td>
<td></td>
</tr>
<tr>
<td><em>Lygodium flexuosum</em></td>
<td>Rhizomes, roots, and leaves</td>
<td>Lygodiaceae</td>
<td>Climbing fern</td>
<td>Southern China South to Northern Australasia, Kerala (South India).</td>
<td>2006</td>
<td><em>in vivo</em></td>
<td>[32]</td>
<td></td>
</tr>
<tr>
<td><em>Carica papaya</em></td>
<td>Unripe and ripe fruits and leaves</td>
<td>Caricaceae</td>
<td>Papaya</td>
<td>Originally from Southern Mexico (particularly Chiapas and Veracruz), Central America, and Northern South America</td>
<td>Spain</td>
<td>2012</td>
<td><em>in vitro</em></td>
<td>[33]</td>
</tr>
<tr>
<td><em>Solanum fastigium</em></td>
<td>Leaves</td>
<td>Solanaceae</td>
<td>False Jurubeba</td>
<td>Worldwide, in America, Asia, and Africa</td>
<td>Brazil</td>
<td>2008</td>
<td><em>in vivo and in vitro</em></td>
<td>[34]</td>
</tr>
</tbody>
</table>

*Curcuma longa* showed the greatest protective activity and reduced ALP. The hepatoprotective potential of *C. longa* has been clearly demonstrated in the experimental findings of this study. Curcumin has antiviral, antiproteasic, antibacterial, anti-inflammatory, and antioxidant activities; in addition to the protective activity of this hepatoprotein, it is known to cause no complication or toxicity.

*Tinospora cordifolia* showed the greatest protective activity, while *Tinospora cordifolia* had also a strong immune activity. *Tinospora cordifolia* generates enzymes for the metabolism of the drug and the antioxidant system and inhibits lipid peroxidation in mice. This plant produces desirable antioxidant effects and has a good hepatoprotective potential, making the plant an ideal adjuvant for clinical cases.

In extract-treated mice, a significant hepatoprotective effect (*P* ≤ 0.05) was observed after CCl4-induced liver injury, which reduced the amounts and activities of AST, ALT, LDH, and MDA. Levels of liver cholesterol increased significantly (*P* ≤ 0.05), which increased with the extract treatment. *n*-hexane *Lygodium flexuosum* extract can lead to hepatoprotective effects.

Treatment of human liver cancer cells, HepG2, with papaya extract in non-cytotoxic doses (0.5–50 µg/mL) increased glutathione peroxidase activity and decreased MDA and LDH levels. Leaf extract seems to produce the greatest protective effect against cell oxidative damage in the HepG2 cells that can react with free radicals to stabilize and block the reaction of the radical chain.

Aqueous *Solanum fastigium* extracts produced desirable antioxidant effects in the hepatocytes against two oxidant proteins in all tissues. However, in the brain and the liver, it was effective against Fe2+inhibition compared to the TBARS.

(Contd...)
various types of clinical illnesses.[9,10] More attention has recently been paid to the protective effects of natural antioxidants against the toxicity of various, especially in cases where free radicals are produced.[5,6]

Ancient societies have used herbal medicines to induce health conditions including hepatoprotection. The popularity of herbal drugs is increasing, and at least a quarter of patients with liver disease use medicinal plants.11,12 The World Health Organization estimates that 80% of the population of some Asian and African countries currently use herbal medicines for some aspects of primary health care.

Some medicinal plants produce strong and optimal hepatoprotective effects.[13,14] Given medicinal plants and plant antioxidants are used to detoxify and treat liver disorders,[15,16] this review was conducted to report the most important medicinal plants affecting liver disorders and diseases.

**MATERIALS AND METHODS**

The data of this review were obtained using key terms liver cancer, medicinal plants, liver disorder and medicinal plants, effect of extract and essential oil of effective medicinal plants on liver tissues in rats, mice, and laboratory mice, and effect of extract and essential oil of medicinal plants on liver disease to retrieve relevant publications indexed in databases IranMedex, Irandoc, ISI, PubMed, Scopus, SID, Magiran, and Google Scholar.

**RESULTS**

Based on the evidence found in this review, the medicinal plants Zingiber officinale, Cucurbita pepo, Citrus reticulate, Petroselinum crispum, Andrographis paniculata, Silybum marianum, Camellia sinensis, Nasturtium Officinale, Physalis peruviana, Thonningia sanguinea, Nigella sativa, Cichorium intybus L., Terminalia catappa, Glycyrrhiza glabra, Curcuma zanthorrhiza, Hibiscus sabdariffa, Vaccinium vitis-idaea, Salvia miltiorrhiza, Kigelia africana, Alchornea cordifolia, Boerhavia diffusa, Schisandrae chinensis, Tinospora cordifolia, Brassica rapa subsp. Rapa, Lycogodium flexuosum, Carica papaya, Solanum fastigiatum, and Cheilanthes farinosa are some of the most important medicinal plants effective on liver diseases and liver cancer [Table 1].

**DISCUSSION**

Plants contain various compounds by which they can confer hepatoprotection against hepatotoxic agents. The most important of these components are polyphenols, organic acids, carotenoids,
xanthines, glycosides, alkaloids, lignans, monoterpenes, coumarins, essential oils, and flavonoids. From several hepatoprotective plants which have been reported till now, the most important plants were described in this review. The Opuntia genus has good capacity for hepatoprotection. The plants of this genus other than liver disease are usually used against dyspnea, ulcers, and glaucoma. Opuntia ficus-indica can be used to reduce the hepatotoxicity induced by organophosphorus chlorpyrifos. Ethanol-induced hepatotoxicity in rats was reduced by prickly pear juice. Histopathological markers and lipid oxidation were also decreased. These effects were suggested to be due to the plant capability of counteracting free-radical chain reactions, as well as enhancing endogenous antioxidant capacities. Matricaria chamomilla contains more than 100 components with biological activities. This plant influences the cytochrome P450 activity. The rats fed with this plant, decreased the activity of CYP1A2 isoform by about 40% in comparison to control group. The hydroalcoholic extract of Chamomile capitula reduced paracetamol-induced injury in rats. S. marianum has also been shown a good effect in treatment or protection of liver damage. Although different mechanisms have been suggested for liver protection of various plants, stabilization of cell membrane and decreasing toxin penetration to hepatocytes, stimulation of hepatocyte regeneration, increasing SOD activity, enhancement of hepatocyte protein production, reduction of lipid peroxidation, and increasing glutathione tissue concentration are the most important ones which have been reported. This prevents hepatotoxic agents from entering the hepatocytes. S. marianum is one of the most important of these plants which improves a good liver protection by most of these mechanisms. Hepatotoxicity is always associated with oxidative stress and inflammation. Antioxidant activity of plants is a general mechanism by which most of plants impose their liver protection. A lot of plants presented in this article have been shown to possess antioxidant property. Some of the presented plants here, as well as other plants, have anti-inflammatory activities which may impact on liver toxicity of toxic agents. Fatty liver and lipid peroxidation are also important parameters of lipid toxicity. A lot of the plants presented here and other plants have hypolipidemic activities and/or reduce lipid peroxidation. Furthermore, medicinal plants usually have multiple effects. Hence, other than hepatoprotective activity, they may have extra beneficial effects on patient.

**CONCLUSION**

This herbal plants as antioxidant and natural sources and they are some of the most important medicinal plants affecting liver disorders and diseases.

**REFERENCES**

17. Seif HS. Physiological changes due to hepatotoxicity.


45. Shirzad H, Shahrani M, Rafieian-Kopaei M. Comparison...
of morphine and tramadol effects on phagocytic activity of mice peritoneal phagocytes *in vivo*. Int Immunopharmacol 2009;9:968-70.


**Source of Support:** Nil. **Conflict of Interest:** None declared.