Review Article

Review on Herbal Plants with Hepatoprotective Activity Against Alcohol Inducing Liver Cirrhosis

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ABSTRACT

Different combinations of plants and herbal extracts are most likely to provide desired activities or actions to cure different liver diseases. An approach to modern drug development can provide different valuable drugs but search for pure phytochemicals and drug form is more time consuming and expensive. Various polyherbal formulations and medicinal plants are used to treat and prevent various types of liver diseases. Herbal drugs are broadly used over than allopathic drugs for various hepatic disorders, due to less expensive, more acceptability, good compatibility with human body. Hepatic cirrhosis is a major health concern, it became a big challenging health care professionals and scientists. It is a life-threatening condition such as hepatitis, liver cirrhosis. Hepatic cells may get damaged. Hence hepatoprotective activity of herbal plants such as *"eclipta alba", "Acacia confusa", "Curcuma longa", "Glycyrrhiza glabra", "solanum nigrum".* Present review is aimed at collecting data on various medicinal plants that have proved for hepatoprotective activity in laboratory animal models.

Keywords: Hepatoprotective activity, Hepatotoxicity, Herbal drugs, Polyherbal formulations.

INTRODUCTION

Liver disease is a major cause of illness and death which accounts for approximately 2 million deaths per year worldwide, in that 1 million deaths are due to complications of cirrhosis and 1 million is due to viral hepatitis and hepatocellular carcinoma. Liver diseases are steadily increasing over the years and World Health Organization (WHO) has projected it as the 12th most important cause of death in the world by 2030 and may be the 10th most common cause of death in India by 2040. In India about 10 lakh people are diagnosed with liver diseases every year and it affects every one in five Indians.

It is estimated that about 7,500 plants are used in local health traditions in rural and tribal villages of India. The classical systems of medicine such as Ayurveda, Siddha, Amchi, Unani and Tibetan use about 1,200 plants. [1] Hence it is seeking the researchers' attention to find out the effective treatment strategies. Phytochemicals from natural resources are the main leads for the development of noble hepatoprotective drugs. The majority of the natural sources whose active compounds are currently employed actually have an ethnomedical use. Liver is the most vital organ, considered to be Centre of metabolism for nutrients such as carbohydrates, proteins, lipids and drugs. It also involved in excretion of waste metabolites and other xenobiotics. There by providing protection against foreign substances by detoxifying and eliminating through bile and urine. Injury to hepatocytes caused due to exposure of various toxicants such as chemotherapeutic agents, halothane and paracetamol. Enhanced lipid peroxidation in alcoholic people may result in development of hepatitis which may induce liver cirrhosis.

From decades onwards it was proved that plants are used for various cases of hepatic disorders similarly number of researchers are stated that hepatoprotective activity of many herbals like Terminalia arjuna, Pleurotus pulmonarias, Nigella sativa. He From decades onwards it was proved that plants are used for various cases of hepatic disorders similarly number of researchers are stated that hepatoprotective activity of many herbals like Terminalia arjuna, Pleurotus pulmonarias, Nigella sativa. Hence there is an ever-increasing need for safe hepatoprotective agent since there is an ever-increasing need for safe hepatoprotective agent [2].

Figure 1: Risk factors for liver diasease

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Medicinal plants play a key role in the human health care. The traditional medicine refers to a broad range of ancient natural healthcare practices including folk/tribal practices as well as Ayurveda, Siddha, Amchi and Unani[3]. The selection of the plant species is a crucial factor for the ultimate success of investigation. Through random selection gives some hint, targeted collection based on chemotaxonomic relationships and ethnomedical information derived from tradition medicine are more likely to yield pharmacologically active compounds [4]. Hepatic cirrhosis is a major health concern challenging health care professional and scientists This can be a life-threatening condition that can lead to jaundice, hepatitis, abdominal pain, nausea, vomiting and, over time, cirrhosis of the liver. Detailed study and documentation of plants used in local health traditions and pharmacological evaluation of these plants and their taxonomic relatives can lead to the development of invaluable herbal medicines against many dreaded diseases. Random screening of plants has not been shown to be economically efficient Most of the hepatotoxic chemicals damage liver cells mainly by inducing lipid peroxidation and other oxidative damages in liver. It has been estimated that about 90% of the acute hepatitis is due to viruses [5]. The major viral agents involved are Hepatitis B, A, C, D (delta agents), E and G. Of these, hepatitis B infection often causes chronic liver disease. Primary liver cancer has also been shown to be produced by these viruses [6].

Liver diseases and its metabolism:

Liver is the most prominent digestive gland that metabolizes drugs by oxidation, reduction, hydrolysis, condensation, conjugation, or isomerization. Two stages of hepatic drug metabolism convert drugs into conjugated water-soluble substances through Phase-I, and Phase -II metabolism, which are excreted either urine or bile. Due to lack of metabolism in liver, in disease condition, the drugs may induce the hepatotoxicity, apoptosis of hepatocytes, injury to bile duct, inhibition of mitochondria, and cytolytic T-cell activation. Various researches were done on herbals for their hepatoprotective activity, found highly efficacy against the drug induced hepatic toxicity. The manifestations of hepatotoxicity include weight loss, malaise, jaundice, dyspepsia, blood coagulation, oedema, and pruritus [7].

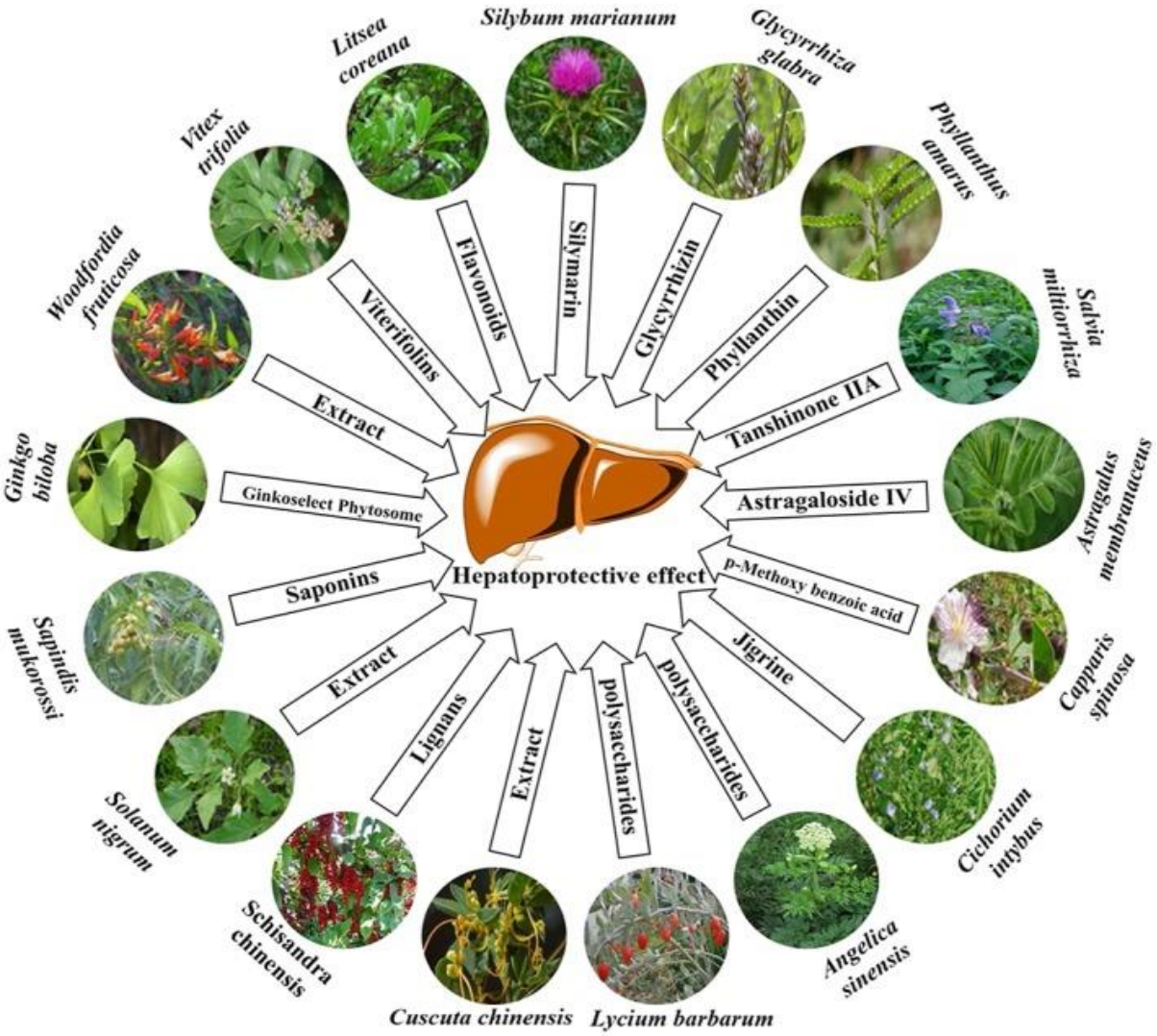

Figure 2: Important medicinal plants and their active ingredients

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Table 1: Hepatoprotective activity of medicinal plants with part were used

Name of the plant	Family	Part used	Active constituents	Mechanism of action
Tinospora cardifolia	Menispermaceae	Whole plant	Saponarin Galactoarabinan	Increased GSH, CAT levels and reduce LPO enzyme [8]
Curcuma longa	Zingiberaceae	Rhizomes	Curcumin	Reduces liver enzymes like ALP, ALT [9,10]
Glycyrrhiza glabra	Fabaceae	Root	Glycyrrhizin, Isoliquiritin	Concentration dependent inhibition in cell growth of the HePG2 [11]
Kleinhovia hospita	Sterculiaceae	Leaves	Eleutherol	It scavenged the radical [12]
Morinda pubescens	Rubiaceous	Leaves	Hyoscyamine	DPPH Radical scavenging [13]
Asparagus racemosus	Liliaceae	Whole plant	Crude extract and purified aqueous fraction	Lipid peroxidation, Oxidation [14]
Rosmarinus officinalis L	Lamiaceae	Whole plant	Rosmanol, Carnosol	Increased anti-oxidant activity [15]
Semecarpus anacardium	Anacardiaceae	Nut	Anacardioside, Galluflavanone	Increase glutathione levels [16]
Symplocos racemosa	Symplocaceae	Bark	Symploquinone A, B, C	Increases glutathione, catalase and reduces LPO [17]
Cochlospermum angolensis	Bixaceae	Whole plant	Gallic acid, propocatechuic acid	Increased DPPH scavanging activity [18]
Berberis vulgaris	Berberidaceae	Whole plant	Cannabisin G	Lowers nitrous oxide levels [19]
Viscum album	Viscaceae	Whole plant	Viscumin	Stimulates lymphocytes [20]
Urtica dioica L	Urticaceae	Seeds	P- coumaric acid	Increase the level of anti-oxidants[21]
Acacia mellifera	Leguminosae	Leaves	Sterols, saponins, flavonoids	Cures tissue lesions of liver [22]
Catharanthus roseus	Apocynaceae	Whole plant	Vincristine	Induces anti-body protection [23]
Adansonia digitata	Malvaceae	Leaf	Terpenoids, amino acids, vitamins, lipids	Minimize the necrosis and regeneration of hepatocytes [24]
Lepidium sativum	Brassicaceae	seeds	Coumarins, saponins, Tri terpenes	Mild to moderate changes in hepatocytes[25]
Nigella sativa	Ranunculaceae	seeds	Quinine, thymoquinone	Induces apoptosis and inhibit proliferation in PDA cells [26]
Aegle marmelos correa	Rutaceae	Leaves	Marmin, umbelliferon	Suppresses lipid peroxidation (LPO), xanthine oxidase [27]
Ficus pseudopalma blanco	Moraceae	Whole plant	Lupeol	DPPH, Nitric oxide and FRAP scavenging activity [28]
C-Lansium(lour)	Rutaceae	Whole plant	8-hydroxy psoralen	Increase DPPH and superoxide anion scavenging activity [29]
Caesalpinia bonducella	Leguminosae	Whole plant	5-hydroxy vihaticanal	Reduces lipid peroxidation [30]
Terminalia arjuna	Combretaceae	Bark	Terminoside-A	Increase SOD, CAT, GSH, levels and reduce LPO enzyme [31]
Zingiber officinale roscoe	Zingiberaceae	Rhizome	Flavonoids, poly phenols	Decrease liver enzymes like bilirubin in plasma [32]
Fagonia schweinfurthii	Zygophyllaceae	Whole plant	Phenols and flavonoids	By inhibiting lipid peroxidation and increase in the anti-oxidant enzymatic activity [33]
Origanum vulgare	Lamiaceae	Leaves	Terpenoids, tannins, saponins, phenolic compounds, flavonoids	By lowering the serum ALT, ALP and AST levels [34]
Nerium oleander	Apocynaceae	Flower	Glycosides, terpenoids, flavonoids, saponins	By elevating level of SOD and decreasing level of MDA [35]

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CONCLUSION

The hepatoprotective effect of the plants is mainly due to presence of secondary metabolites such as flavonoids, alkaloids, terpenoids, glycosides and steroids. Plant extracts for liver diseases have to possess sufficient efficacy to remedy extreme liver cirrhosis resulting from poisonous chemicals, viruses, alcohol consumption, as well as repeated uses of medication like paracetamol, rifampicin and isoniazid. There is no accurate treatment for liver cirrhosis in allopathic medicine system, only palliative therapy and surgical procedure. However, due to lack of donors it becomes less chance in economical poor people. Hence herbal agents like flavonoids, phenols, are significant hepatoprotective effective in treatment of liver cirrhosis caused by harmful chemicals.

Despite, most plant extracts are used by people in rural areas in developing countries for various complications. Hence herbal medications should be recommended within the setting of more finely-conducted clinical trials better education of both patients and doctors about herbal products seems to be needed. Finally, to produce more effective plant based hepatoprotective drugs it will be necessary to carry out further studies on the structural modifications of the active principles derived from herbal extracts using computational chemistry techniques. Our current review is focused on herbal plants with high hepatoprotective activity including active ingredients, it could be useful for researcher who are working on the hepatoprotective activity of novel compounds.

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