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A COMPREHENSIVE REVIEW ON HEPATOPROTECTIVE PLANTS

P.Pandian

Department of Pharmacy, Annamalai University,
Annamalai Nagar – 608002,
Tamilnadu, India

Abstract

Hepatic diseases are a major worldwide health problem, with frequently found in developing countries. They are mainly caused by uses of high doses of chemicals and some drugs. There is no effective drug available that stimulates liver function, offer protection to the liver from damage or help to regenerate hepatic cells. Many herbs have been proven to be effectual as hepatoprotective agents while many more are claimed to be hepatoprotective but lack any such scientific evidence to support such claims. The available synthetic drugs to treat liver disorders in this condition also cause further damage to the liver. Hence, herbal drugs have become increasingly popular and their use is wide spread. Herbal medicines have been used in the treatment of liver diseases for a long time. A number of herbal preparations are available in the market. The hepatoprotective activity is probably due to the presence of flavonoids, phenolic compounds, polyphenols etc in all few herbal plants.The present review is aimed at compiling data on promising the evidential for medicinal plants against experimentally induced hepatotoxicity and its reveals.

Keywords: liver, hepatoprotective, Herbal medicines, Hepatic diseases

INTRODUCTION

The liver is one of the most important organs of the body. It performs a fundamental role in the regulation of diverse physiological processes, and its activity is related to different vital functions, such as metabolism, secretion, and storage. Its capacity to detoxify endogenous (waste metabolites) and/or exogenous (toxic compounds) substances of organisms, as well as for synthesize useful agents, has been analyzed since the 1970s by many researchers **(**[1, 2**]** The dictionary of Indian folk-medicine and ethno botany includes 2532 plants. India has about 45,000 plant species and many of them have been studied for their medicinal properties. About 2000 figures are available in the literature and commonly 500 species are used by indigenous systems.

Natural products are playing a vital role in health care for decades. Often different sources of natural products, plants have been a source of chemical substance, which serves as drugs in their own right or key ingredients in formulation containing synthetic drugs. 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**.[**3**]** Hepatic disease is a united term for an entire group of trouble that afflict the tissues, structures and cells of the human liver. Large number of important functions is performed by liver, so there are lots of opening for somewhat to go incorrect. One of the most common causes of liver disease is inflammation, which often results from abuse of alcohol, poor diet or even malnutrition.(Arias PS et al, 1989) Drug induced liver damage or liver dysfunction is the most important health crisis that challenges not only medical personnel but also the pharmaceutical field and drug control board. According to the United States Acute Liver Failure Study Group, drug induced liver injury accounts for more than 50% of acute liver failure, including hepatotoxicity caused by over dose of acetaminophen (39%) and idiosyncratic liver injury triggered by other drugs.Hepatic-cell injury caused by various toxic chemicals (certain antibiotic, chemotherapeutic agents, carbon tetrachloride (CCl_4), thioacetamide (TAA) etc.), excessive alcohol consumption and microbes.

Inspite of the tremendous advances made, no significant and safe hepatoprotective agents are available in modern therapeutics. Therefore, due importance has been given globally to develop plant-based hepatoprotective drugs effective against a variety of liver disorders. The present review is aimed at compiling data based on reported works on promising from medicinal plants that have been tested for their hepatoprotective activity.

Table 1- **HEPATOPROTECTIVE PLANTS:**

Botanical name	Family	Parts used	Solvent used	Chemical constituent	Hepatotoxicity inducing agents	Reference
Abelmoschus manihot	Malvaceae	Flower	Ethanol	Phenolic compound	Carbon tetrachloride	[4]
Abutilon indicum	Malvaceae	Leaves	Aqueous	Tannins, glycosides	Carbon tetrachloride ,paracetamol	[5]
Acacia confuse	Leguminosae	Bark	Ethanol	Gallic acid	Carbon tetrachloride	[6]
Acanthus ilicifolius	Acanthaceae	Leaves	Ethanol	Flavonoids, terpenoids	Carbon tetrachloride	[7]
Amaranthus spinosis	Amaranthaceae	Whole plant	Ethanol	Flavonoids phenolic	Carbon tetrachloride	[8]
Andrographis paniculata	Acanthaceae	Aerial part	Ethanol	Flavonoids, phenolic	Paracetamol	[9]
Baushinia variegate	Leguminosae	Bark	Methanol	Flavonoids	Paracetamol	[10]
Bridelia micrantha	Phyllanthaceae	Leaves	Ethyl acetate	Phenolic compound	Paracetamol	[11]
Butea monosperma	Fabaceae	Flower	Aqueous	Steroids, phenolic compound	Carbon tetrachloride	[12]
Butea monospermce	Fabaceae	Bark	Methanol	Flavonoids	Paracetamol	[10]
Camellia sinensis	Theaceae	Flower	Methanol	Polysaccharide		[13]
Cassia fistula	Leguminosae	Leaves	n-heptane	Carbohydrates, tannins	Paracetamol	[14]
Cineraria abyssinica	Asteraceae	Leaves	Aqueous,methanol	Carbohydrates,tannins	Carbon tetrachloride	[15]
Commiphora berryi	Burseraceae	Bark	Methanol	Phytosteriods,tannins, phenolic compound	Carbon tetrachloride	[16]
Coptidis rhizome	Ranunculaceae	Whole plant	Aqueous	glycosides	Carbon tetrachloride	[17]
Corchorus depressus	Tiliaceae	Whole plant	Ethanol	Phytosteriods, tannins	Carbon tetrachloride	[18]
Cordia maceodii	Boraginaceae	Leaves	Ethanol	Flavonoids, triterpenoids	Carbon tetrachloride	[19]
Coriandrum sativum	Apiaceae	Leaves	Ethanol	Flavonoids, phenolic	Carbon tetrachloride	[20]

		stem		compound		
Fagonia schweinfurethii	Zygophyllaceae	Whole plant	Ethanol	Flavonoids	Carbon tetrachloride	[21]
Gentiana asclepiadea	Gentiananceae	Leaves and root	Methanol	Glycosides	Carbon tetrachloride	[22]
Halenia elliptica	Gentianaceae	Whole plant	Methanol	Phenolic, xanthones	Carbon tetrachloride	[23]
Hovenia dulics	Rhamnaceae	leaves	aqueous	Polysaccharide	alcohol	[24]
Huangshan maofeng	Theaceae	Leaves	Ethanol	Polysaccharide, flavonoids, polyphenolic compound	Carbon tetrachloride	[25]
Hybanthus enneaspermus	Violaceae	Whole plant	Aqueous	Flavonoids, tannins	Carbon tetrachloride	[26]
Hygrophila auriculata	Acanthaceae	Root	Aqueous extract	Flavonoids,tannins, steriods,saponins, triterpenes	Carbon tetrachloride	[27]
Ilex latifolia	Aquifoliaceae	Leaves	Hot water	Glycosides	Carbon tetrachloride	[28]
Kyllinga nemoralis	Cyperaceae	Rhizome	petroleum ether, ethanol	Phenolic compound	Carbon tetrachloride	[29]
Lagenaria sicerasia	Cucurbitacea	Aerial part	Methanol	Phenolic compound	Carbon tetrachloride	[30]
Meconopsis integrifolia	Papaveraceae	Whole plant	Ehanol	Flavonoids	Carbon tetrachloride	[31]
Mentba arvenis	Lamiaceae	Leaves	Ethanol, chloroform, aqueous	Flavonoids,steroids, triterpeniod,alkaloid, glycoside	Carbon tetrachloride	[32]
Momordica dioica	Cucurbitaceae	Leaves	Ethanol, aqueous	Flavonoids	Carbon tetrachloride	[33]
Nelumbo nucifera	Nelumbonaceae	Leaves	Ethanol	Flavonoids,phenolic compound	Carbon tetrachloride	[34]
Ocimum gratissimum	Lamiaceae	Leaves	Methanol	Flavonoids	paracetamol	[10]
Orthosiphon diffuses	Lamiaceae	Aerial part	Hexane,methanol,ethyl acetate	Tannins, glycosides	Carbon tetrachloride	[35]

Phobota dinghuensis	Strophaciaceae	Flower	ethanol	Alkaloids, phenolic compound	Carbon tetrachloride	[36]
Phyllanthus niruri	Euphorbiaceae	Leaves,fruits	Methanol, aqueous	Flavonoids,tannins,phenolic compound	Carbon tetrachloride	[37]
Podophyllum lexandrum	Berberidaceae	Rhizome	Hexane	Polysaccharide, flavonoids	Carbon tetrachloride	[38]
Premna esculenta	Verbenaceae	Leaves	Ethanol	Phenolic compound	Carbon tetrachloride	[39]
Punica granatum	Amaranthaceae	Whole plant	Ethanol	Flavoniods,phenolic compound	Trichloro acetic acid	[40]
Rubus aleaefolius	Rosaceae	Root	Ethanol, ethyl acetate	Oleanolic acid	Carbon tetrachloride	[41]
Schisandra chinensis		Flower	ethanol	Flavonoids,phenolic compound	Carbon tetrachloride	[42]
Solidago microglossa	Asteraceae	leaves	ethanol	Polyphenolic compound	Paracetamol	[43]
Strychinos potatorum	Loganiaceae	Seed	Hot water	Alkaloids,triterpenes	Carbon tetrachloride	[44]
Swertia chirayita	Gentianaceae	Aerial part	Ethanol	Alkaloids,triterpenes	Paracetamol	[9]
Talinum triangulare	Portulacaceae	Whole plant	Ethanol	Polysaccharide	Carbon tetrachloride	[45]
Tamarindus indica	Fabaceae	Leaves	ethanol	Polysaccharide	Thio-acetamide	[46]
Vernonia amygdalina	Astereaceae	Leaves	Methanol	Carbohydrates saponins,cardiac glycosides	Carbon tetrachloride	[47]
Vitis vinifera	Vitaceae	Leaves	Ethanol	Flavonoid, tannins	Carbon tetrachloride	[48]
Zanthoxylum armatum	Rutaceae	Bark	Ethanol	Isoquinoline, phenolic compound	Carbon tetrachloride	[49]
Zizyphus jujube	Rhamnaceae	Fruit	Water	Polysaccharide	Carbon tetrachloride	[50]

DISCUSSION

In this review article, effort has been taken to collect and compile the details regarding a few hepatoprotective natural products, which will be useful to the society to venture in to a field of alternative systems of medicine. Chronic hepatic diseases stand as one of the foremost health troubles worldwide, with liver cirrhosis and drug induced liver injury accounting ninth leading cause of death in western and developing countries. Therapies developed along the principles of western medicine are often limited in efficacy, carry the risk of adverse effects, and are often too costly, especially for the developing world. Therefore, treating liver diseases with plant-derived compounds which are accessible and do not require laborious pharmaceutical synthesis seems highly attractive.

It is clear that the medicinal plants play a significant role against on various diseases. Different medicinal herbs and plants extracts have potent hepatoprotective activity in various animal models. The hepatoprotective activity is probably due to the presence of flavonoids, phenolic compounds, polyphenols etc in all few herbal plants. The results of this study indicate that extracts of leaves and plants extracts of some medicinal plant have good potentials for use in hepatic disease. The present review study gives evidential for medicinal plants against experimentally induced hepatotoxicity and its reveals.

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