ISSN-2230-7346

Journal of Global Trends in Pharmaceutical Sciences

A REVIEW ON HEPATOPROTECTIVE ACTIVITY OF SOME INDIAN MEDICINAL PLANTS

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ARTICLEINFO

Key Words

Phytomedicines, Liver diseases, Hepatitis, Hepato protection, Herbal drugs

Access this article online

Website: https://www.jgtps.com/

Quick Response Code:

ABSTRACT

An herbal approach to modern drug development can provide many invaluable drugs from traditional medicinal plants. Search for pure phytochemicals as drugs is time consuming and expensive. Numerous plants and polyherbal formulations are used for the treatment of liver diseases. However, in most of these vere cases, the treatments are not satisfactory. Although experimental evaluations were carried out on a good number of these plants and formulations, the studies were mostly incomplete and insufficient. The therapeutic values were tested against fewchemicals-induced subclinical levels of liver damages in rodents. Even common dietary antioxidants can provide such protection from liver damage caused by oxidative mechanisms of toxic chemicals. In thecase of severe liver damage, most of the liver cells dieorturninto fibrotic state. Inthis case, the treatment should include in addition to the therapeutic agents, agents which can stimulate liver cell proliferation. For developing satisfactory herbal combinations to treat severe liver diseases, plants have to be evaluated systematically for properties such as antiviral activity (Hepatitis B, Hepatitis C,etc.), antihepatotoxicity (antioxidantsandothers), stimulation of liver regeneration and choleretic activity. The plants with remark able activities for each of the above properties have to be identified. Single plant may not have all the desired activities. Acumination of different herbal extracts/fractions is likely to provide desired activities to cure severe liver diseases.

INTRODUCTION

Liver has a pivotal role in regulation of physiological processes. It is involved in several vital functions such as metabolism, secretion and storage. Furthermore, detoxification of a variety of drugs and xenobiotics occurs in liver. The bile secreted by the liver has, among other things, an important role in digestion. Liver diseases are among the most serious ailment. They may be classified as acute or chronic hepatitis (inflammatory liver diseases), hepatosis (non-inflammatory diseases) and cirrhosis (degenerative disorder resulting in fibrosis of the liver). Liver diseases are mainly caused by toxic chemicals chemotherapeutics, peroxidised oil, aflatoxin, carbon-tetrachloride, chlorinated hydrocarbons, etc.), excess consumption of alcohol, infections and autoimmune/disorder. Most of the hepatotoxic chemicals damage liver cells mainly by inducing lipid peroxidation and other oxidative damages in liver. Enhanced lipid peroxidation produced during the liver microsomal metabolism of ethanol may result in hepatitis and cirrhosis.Considering this it is very important to understand this complexity. It has been estimated that about 90% of the acute hepatitis is due to viruses. The major viral agents involved are Hepatitis B, A, C, D (delta

agents), E and G. Of these, Hepatitis B infection often results in chronic liver diseases and cirrhosis of liver. Primary liver cancer has also been shown to be produced by these viruses. It has been estimated that approximately 14- 16 million people are infected with this virus in South East Asia region and about 6% of the total population in the region are carriers of this virus.[3]A vaccine has become available for immunization against Hepatitis B virus. Hepatitis C and Hepatitis E infections are also common in countries of South East Asia region

Liver diseases and medicinal plants

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1. Berberisaristata is used in ayurvedic medicines from very long time. The plant is used traditionally in inflammation, wound healing, skin disease, menohrrhagia, diarrhea, jaundice and infection of eyes.

Botanical Description:

It is an erect spiny shrub, ranging between 2 and 3 meters in height wood, hard and yellow; bark, yellow to brown from outside and deep yellow from inside, removable in longitudinal strips by hand; spines (which, in fact, are modified leaves), three-branched and 1.5 cm long.

PHARMACOLOGICAL STUDIES

Hepatoprotective activity: Crude extract of B. aristata (Shoot and fruit) shows Paracetamol and CCl4 protection against induced liver toxicity and it also indicates that hepatoprotective action of extract is partially through inhibition of microsomal drug metabolizing enzyme. Butanolic extract of B. aristata shows effective action of hepatoprotection by selective inotropic activity.

2. Tinosporacordifolia[3]

It has a rich history in the Indian sub-continent where it has been used and written about for thousands of years. It is considered one of the best Rasayana and is unusual in its potent versatility. In recent years, significant progress has been attained regarding its biological activity and medicinal applications. It is a woody climbing shrub that is deciduous and perennial. Guduchi is one of the most highly valued and common herbs in Ayurvedic medicine. It has a rich history in the Indian sub-continent where it has been used and written about for thousands of years. It is considered one of the best Rasayana and is unusual in its potent versatility. In recent years, significant progress has been attained regarding its biological activity and medicinal applications.

Hepatoprotective: (Rejuvenation and protection of liver): Giloy helps in rejuvenation of liver. It helps to prevent fibrosis and stimulates regeneration of hepatic tissue. Usage of Giloy immensely helps in fatty liver. Persons, whose liver is taxed by consumption of alcohol and junk food, can be benefited by regular use of this herb. But withdrawing from alcohol and junk food consumption is absolutely necessary before consuming this herb.

3. BoerhaviaDiffusa[4] In this regard, we have chosen Punarnava (*BoerhaviaDiffusa*) for establishing its medicinal richness. *BoerhaviaDiffusa* L. (Nyctaginaceae), commonly known as 'Punarnava' in the Indian system of medicine, is a perennial creeping herb found throughout the waste land of India.

The various parts of the plant are used in the treatment of cancer, jaundice, dyspepsia, inflammation, ophthalmic, enlargement of spleen, abdominal pain and as an anti-stress agent**.** BoerhaviaDiffusais a perennial creeping weed, prostrate or ascending herb, up to 1 m long or more having spreading branches. The

plant grows profusely in the rainy season, and mature seeds are formed in October-November. Due to its sticky nature, the plant gets stuck on the clothes of human beings and on the legs of animals, which helps in its dispersal from one place to another. According to Rawat *et al*.,1997,Aqueous root extract of *B. Diffusa* (2ml/kg) possessed marked hepatoprotective activity against thioacetamide induced hepatotoxicity and marked protection against a majority of serum parameters like, GOT, GPT, ACP and ALP but not GLDH and bilirubin. Study also proved that aqueous form of drug (2ml/kg) administration has more hepato-protective activity than the powder form.

4. Picrorhizakurroa:[18] One of the plants mentioned in Ayurveda having important medicinal properties is 'Katuka'. Hindi derivative of 'katuka' is generally known as kutki. The name of Picrorhiza is derived from the bitter root, where "Picros" means bitter, while "rhiza" means root. The specific name kutki is derived from "Karu", the Punjabi name of the plant, which means bitter as well. 'Picrorhizae' consists of the dried rhizome with root of PicrorhizakurroaRoyle or of Neopicrorhizascrophularriflora Hong [Syn: Picrorhizascrophulariiflora Pennell] (Scrophulariaceae). The rhizomes of Neopicrorhizascrophulariiflora Hong [syn. Picrorhizascrophulariiflora Pennell] are taxonomically similar and have been used in traditional medicine for the same purposes and traded under the same vernacular names. Alcoholic extract of the plant and kutkin possess hepatoprotective activity. Plant is a potent immunostimulant of both cell mediated and hormonal immunity and exhibits choleretic activity in dogs. Picrorhizakurroa is also beneficial in the management of bronchialasthma. The hepato-protective effect of Picrorhizakurroa roots have been shown in diverse models of liver injury. The crude extract, and the isolated active principles of the roots have been shown to protect the liver from various types of drug-induced injury, isolated compounds from P. kurroa have also been shown to have hepatoprotective activity. Non-alcoholic fatty liver disease (NAFLD) in rats was cured by giving standard hydro-alcoholic extract of picrorhizakurroa. It reduced the lipid content of liver significantly at the dose of 400mg/k.

5. Andrographis paniculate[19] Andrographis paniculata (Burm. F.) Wall. Ex Nees (AP) also called Kalmegh or "King of Bitters" belongs to family Acanthaceae. AP is an annual, branched, herbaceous plant erecting to a height of 30-110 cm in moist shady places with stem acutely quadrangular, much branched, easily broken fragile texture stem. Leaves are simple, opposite, lanceolate, glabrous, 2–12cm long; 1–3cm wide with margin acute and entire or slightly undulated and upper leaves often bractiform with short petiole. Andrographis paniculata (Kalmegh) is used extensively in the Indian traditional system of medicine as a hepatoprotective and hepatostimulative agent. The aqueous extract of the leaves of this plant has traditionally been used for treatment of various liver disorders and jaundice. The aqueous extract of the leaves of this plant has traditionally been used for treatment of various liver disorders and jaundice.

6. Cichoriumintybus[20] Cichoriumintybus L also known as "Kasni" is a member of the family Asteraceae It is an as an important medicinal herb has been used Ayurveda, Unani and Siddha system of medicine for diseases of hepatobiliary system and renal system. Roots are fleshy, tapering, stem 1-3 long angled and grooved, branches rigid spreading, leaf nerves, beneath, hispid leaves oblong lanceolate, upper cordate amplexical. Head 1-1/2" diameter, peduncles thickened in the middle, involucre bracts herbaceous, ligules bright blue, rarely white or pink. CCl4 was used as the hepatotoxic agent as it is commonly used by research workers to study the hepato-protective action of plants 7,8,9.Carbon tetrachloride by homolytic cleavage is converted to trichloromethyl free radical (CCl3-), which reacts with oxygen, and even more reactive specie trichloromethyl peroxy free radical (Cl3 COO-) is formed which is cytochrome P450 oxygnase dependent. Compounds such as Chlorophenothane, alcohol and phenobarbitone, which induce such enzymes, enhance hepatotoxic effects. Injury to Hepatocytes are severe and rapid in onset (within 30 minutes) and degradation of hepatocytes leading to release of enzymes in plasma within 2 hours mitochondrial injury also occur.

7. Phyllanthus niruri Linn.[22] Bhumyamalaki is a drug which belongs to the Euphorbiacae family. Phyllanthus niruri Linn, Phyllanthus amarus Schum and Thonn., Phyllanthus fraternus web. It is a weed that grows around 2feet tall and has small leaves. The flowers of the plant are small monaceiuos and are found in pairs. It bears herbaceous branches and the light green bark is smooth to touch. The plant is found all over Coastal India and in temperate climate. It is a proved antiviral drug in Hepatitis-B in human subjects. In the preliminary study, carriers of Hepatitis-B virus were treated with a preparation of the plant 200 mg for 30 days. 22 of the 37(59%) treated patients had lost Hepatitis-B surface antigen, when tested 15– 20days after the end of the treatment, compared with only 1 out of 23 (4%) placebo treated controls. It has exhibited an inhibition of DNA polymerase on Hepatitis–B virus which is responsible for the replication of virus. The challenge that modern medical system face with liver disorders is that such drugs would have to be metabolized in the liver. Since the liver itself is in disorder, the problem is how to ensure effective metabolism of the drugs that have been prescribed. In this context, Ayurveda sages have used their genius, to formulate such herbal formulations that can be metabolized even by a sluggish liver. The logic on which such formulations work is that they first heal and reinvigorate the liver and thus contribute to the restoration of its normal functions. Preserving health of the liver means adding healthier years to one's life. Be polite to your liver & Keep it Living and Lively!!

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