Indian Medicinal Plants Used in Liver disease: A Short Review

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Abstract

Liver disease is one of the serious health problems. Herbal drugs play a major role in the treatment of hepatic disorders. In the absence of reliable liver hepatoprotective drugs in modern medicine, in India a number of medicinal plants and their formulations are used to cure hepatic disorders in traditional system of medicines In Himalayan region there are many plants which are use in liver diseases. In this review, Indian medicinal plants having hepatoprotective property are summarized in terms of their biological source, active constituents and biological activity.

Key words: Hepatoprotective, Herbal drugs.

Introduction

Medicinal plants have been a major source for the cure of human diseases since time immemorial. Today, one fourth of the world population depends on traditional medicines. Side effects of conventional medicine, efficiency of plant-derived drugs and growing interest in natural products has increased scientific interest in medicinal plants. There is no rational therapy available for liver disorder, and it is a still challenge to modern medicine. In olden times herbal products were used for medicinal purposes, both internally as well as externally. Herbal drugs were used as juice, latex or in dried powder form[1]. In India, about 40 polyherbal commercial formulations reputed to have hepatoprotective action are being used. It has been reported that 160 phyto-constituents from 101 plants have hepatoprotective activity[2].

Liver protective herbal drugs contain a variety of chemical constituents like phenols, coumarins, lignans, essential oils, monoterpenes, carotenoids, glycosides, flavonoids, organic acids, lipids, alkaloids and xanthines. Plant extracts of many crude drugs are also used for the treatment of liver disorders.

Extracts of different plants have been reported to cure liver disorders[3].

Different Herbs Used as Hepatoprotectives

Punarnava (Boerhaavia diffusa)

Punarnava (Boerhaavia diffusa, family-Nyctaginaceae) occurs as dried herb of abundantly as a weed throughout India, up to an altitude of 2,000 m in the Himalayas. It is also cultivated to some extent in West Bengal. The roots contain alkaloids , triacantanol hentriacontane, β-sitosterol, ursolic acid, flavone, and an unidentified ketone, rotenoid boeravinones A1, B1, C2, D, E and F besides the new dihydroisofurenoxanthin, borhavine and, punarnavoside. Two lignans, liiodendrin and syringaresinol mono-β-D-glucoside, have also been reported in the roots. The herb is used as a diuretic and an expectorant, stomachic and is prescribed in the treatment of jaundice. It is also given in the loss of digestive power, enlargement of spleen and for abdominal pains. The roots are used by a large number of tribes in India for the treatment of various hepatic disorders[4].

Arjuna (Terminalia arjuna Rob)

Arjuna (Terminalia arjuna Rob, family Combretaceae) consists of dried stem bark of the plant, it grows in most parts of India and is also planted in many parts for shade.
and ornament. Arjuna contains ß-sitosterol, ellagic acid, and arjunic acid. The bark is useful as an anti-ischemic and cardio protective agent in hypertension and ischemic heart diseases, especially in disturbed cardiac rhythm, angina or myocardial infarction. It apparently has a diuretic and a general tonic effect in cases of cirrhosis of the liver[9].

**kutki (Picrorhiza Kurrao)**

Kutki (Picrorhiza kurrao, Family- Scrophulariaceae) consists of dried rhizomes of the plant found in Himalayas, Jammu & Kashmir and Sikkim region. Root contains a glucoside called ‘Kutkin’, a glycosidal bitter principal, which is a mixture of two iridoid glycosides viz. Picroside I and kutkoside. The herb also contains other substances such as glucose, wax, cathartic acid etc. The plant is mainly used as therapy for liver and lung diseases. (Kutki) has focused on its hepatoprotective (liver protection), anticholestatic, antioxidant, and immune-modulating activity, improves the gall bladder secretions and helps in digestion and metabolism of fats. It is very useful in treating fatty liver and also regulates the fat metabolism in liver[9].

**Amla (Emblica officinalis)**

Amla (Emblica officinalis, family-Euphorbiaceae) is deciduous tree widely found in India at the height of 350 m. It is often cultivated at commercial level in Uttar Pradesh, Gujarat, Maharashtra and Rajasthan. Amla contains 5-6% of tannins such as gallic acid, ellagic acid and phyllembelin. Fresh fruit is refrigerant, diuretic and laxative, carminative and stomachic. The herb is also aphrodisiac, haemostatic, nutritive tonic and rejuvenative. It increases red blood cell count. A very recent study with alloxan-induced diabetic rats given an aqueous amla fruit extract has shown significant decrease of the blood glucose as well as triglyceridemic levels and an improvement of the liver function caused by a normalization of the liver-specific enzyme alanine transaminase (ALT) activity[7].

**Shatavari (Asparagus racemosus)**

Shatavari (Asparagus racemosus family- Liliaceae) consists of dried roots and leaves found throughout tropical Africa, Java, Australia, India, Sri Lanka and southern parts of China. In India it is found in plains to 4,000 ft high, in tropical, sub-tropical, dry and deciduous forests and in the Himalayas. Shatavari contains saponins, alkaloids, proteins, starch, tannin, mucilage and diosgenin. The plant contains triterpene saponins - Shatavarin I - IV, which are phytoestrogen compounds. The roots have oleaginous, cooling, antispasmodic, indigestible, appetizer, alliterative, stomach, tonic, aphrodisiac, galactagogue, astringent, anti diarrhoeatic, laxative properties and is useful in tumors, inflammations, diseases of blood and eye, throat complaints, tuberculosis, leprosy, epilepsy, night blindness and kidney troubles. A. racemosus has also been used successfully by some Ayurvedic practitioners for nervous disorders, inflammation, liver diseases and certain infectious diseases[9].

**Chirata (Swertia chirayita)**

Chirata (Swertia chirayita, family- Gentianaceae) is the entire herb found in the temperate Himalayas at altitudes of 1,200-3,000 m. from Kashmir to Bhutan, and in the Khasi hills in Meghalaya at 1,200-1,500 m. Chiratta is reported to contain a yellow bitter acid, ophelic acid, two bitter glycosides, chiratin and amarogentin, gentiopicrin, two yellow crystalline phenols, a neutral, yellow crystalline compound, and a new xanthone, swerehirin. Amarogentin is one of the bitterest substances known According to Ayurveda, this herb is a bitter tonic, stomachic. It is useful in liver disorders, eyes, heart remedy for a weak stomach, especially when this gives rise to nausea, indigestion and bloating and it has also been shown to protect the liver[9].

**Milk thistle (Silybum marianum L.)**

*Silybum marianum* (L.) family Asteraceae Gaerth is found in Western Himalayas at 1800 and Kashmir at 2400 m also grow in gardens. The active ingredient that protects the liver in milk thistle is known as silymarin. Silymarin is actually a group of flavonoids (silibinin, silidianin, and silicristin), which help in repairing liver cells damaged by alcohol and other toxic substances. Silymarin also keeps new liver cells from being destroyed by these same toxins. Silymarin have multiple mechanism of action that may be hepatoprotective, including anti-oxidant activity, toxin blockade, enhanced protein synthesis, and anti-fibrotic activity[19].

**Dandelion (Taraxacum officinale)**

Dandelion (Taraxacum officinale family- Asteraceae) is a herbaceous perennial plant found growing in temperate regions of the world, in lawns, on road sides, on disturbed banks and shores of water ways, and other areas with moist soils. Dandelion root is a registered drug in Canada, sold principally as a diuretic. A leaf decoction can be drunk to “purify the blood”, for the treatment of anemia, jaundice and also for nervousness. Drunk before meals, dandelion root coffee is claimed to stimulate digestive functions and function as a liver tonic[19].

**Saffron (Crocus sativus)**

Saffron (Crocus sativus Linn. Family- Iridaceae) consists of the dried stigmas and upper parts of styles of plant; cultivation in India is mostly confined to the table-land of
Pampur (5,300 ft. above sea level) in Jammu & Kashmir. Saffron contains glycosides crocin and picrocrocin together with lycopene, β-carotene, γ-carotene. The essential oil of saffron deposits, on standing, stearoptene, probably a tertiary alcohol. It is used as a nerve sedative and emmenagogue. It is used in fevers, melancholia and enlargement of the liver. It also has stimulant and stomachic properties and is considered to be a remedy for catarrhal affections of children. The stigmas in overdoses are narcotic.[12]

Nettle (Urtica parviflora)

Nettle (Urtica parviflora, family- Urticaceae) is a perennial shrub used in traditional medicine in Sikkim, Darjeeling and in North Bengal. The roots are employed for the treatment of fractures of bone and dislocations of joints. The leaves are used in dysentery, joint pain and liver disorders[13].

Fire flame bush (Woodfordia Fruticosa)

Fire flame bush (Woodfordia Fruticosa, family Lythraceae) is found throughout India but abundantly found in north India up to 1600 m. The chemical constituents like Woodfordins A, B, C, D, E, F, G, H, I and were identified from the flowers. The flowers are acrid, astringent, styptic, depurative, uterine sedative, constipating and antibacterial. They are useful in the conditions diarrhea, dysentery, fever, headache, hemorrhoids, herpes, internal hemorrhage, leucorrhea, liver disorders. Juice of leaves is used in bilious sickness[14].

Daruharidra (Berberis aristata)

Daruharidra (Berberis aristata, family Berberidaceae) the plant is native of the whole range of Himalaya Mountains at an elevation 2000 to 3500 metres. It also occurs in Nilagiri range in Southern India. The bark contains alkaloids like berberine, berbamine, aromoline, karachine, palmatine, oxyacanthine and oxyberberine. The roots possess antibacterial and anti-inflammatory activities. The drug is regarded as a bitter tonic and is apparently used as a cholagogue, stomachic, laxative, diuretic, antipyretic and antisepctic[15].

Himalayan May Apple (Podophyllum hexandrum)

Himalayan May apple (Podophyllum hexandrum, family- Berberidaceae) is a perennial herb, 15-40 cm tall, native to the Himalayas. The active principle of podophyllin is contained in the resinous mixture known as podophyllin. The other constituent of the root is podophyllotoxin. The rhizomes yield podophyllol, a sticky resin, quercetin and podophyllotoxin. The principal use of Podophyllum is in liver infections, primarily, it induces a large flow of bile. It is indicated in torpid or chronically congested liver, when diarrhea is present[16].

Jatamansi (Nardostachys jatamansi)

Jatamansi (Nardostachys jatamansi, family- Valerianaceae) consist of dried rhizomes of plant grown alpine Himalayas from Punjab to Sikkim and Bhutan, at altitudes of between 3,000 and 5,000 m. The Chemical constituents found are Jatamansone, Jatamanshic acid, Virolin and its diastereomers. Traditionally the drug has been used in the treatment of epilepsy, hysteria, and convulsions. The oil possesses anti-arrhythmic activity with possible therapeutic usefulness in cases of auricular flutter[17].

Kapur Kachri (Hedychium spicatum)

Kapur Kachri (Hedychium spicatum, family- Zingiberaceae) grows in sub tropical regions of Himalayas. It contains α-Pinene, β-pinene, limonene, 1, 8-cineole, 2-alkanones, linalool, camphor, linalyl acetate, ethyl-p-methoxy cinnamate, ethyl cinnamate, D-sabinene and sesquiterpene-cadinene etc. It is used in nausea, bronchial asthma, halitosis and vomiting, in diminished appetite, hiccups, local inflammation, in the treatment of liver complaints/ in the treatment of indigestion and poor circulation due to thickening of the blood[18].

Saussurea costus

It consists of dried roots of Saussurea costus, family- Compositae. Different pharmacological experiments in a number of in vitro and in vivo models have convincingly demonstrated the ability of Saussurea costus to exhibit anti-inflammatory, anti-ulcer, anticancer and hepatoprotective activities. Roots are tonic, stomachic, stimulant, carminative, diuretic, antiseptic, anthelmintic in nature[19].

Berberry (Berberis lyceum)

Berberry (Berberis lyceum, family-Berberidaceae) found from Kashmir to Garhwal on the outer Northern Western Himalayas on clearances and along road side between 800 to 2500 m. In Himachal Pradesh it is present in Chamba, Kangra, Kinnaur, Kullu, Shimla, Sirmour. Berberry contains Berberine and Umbellitine as the main alkaloids. The fruit contains tartaric, citric acids and tannins.Barberry's roots are used as remedy for swollen and sore eyes, broken bones, wounds, gonorrhea, curative piles and ulcer. Leaves are given in treatment of jaundice[20].

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