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Review Article

Hepatoprotective medicinal plants of Siddha – A review

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ABSTRACT

Siddha medicine one among the traditional medicine have become increasingly popular and their use is wide spread. Siddha medicines are the first line of treatment in liver diseases for a long time. A number of herbal prescriptions are available in the market. The present review is aimed at compiling data on promising phytochemicals from medicinal plants that have been tested in hepatotoxicity models using modern scientific system. Excessive drug therapy, environmental pollutants, hepatic cancer and alcoholic intoxicants are the main causes of liver disorders. More efforts are to be directed towards methodological scientific evaluation for their safety and efficacy by subjecting to vigorous preclinical studies followed by clinical trials to unravel the mysteries hidden in plants. This review article is attempted to compile reported hepatoprotective plants in Siddha system of medicine and the Siddha formulations employed to cure liver disorders.

Key words: Siddha medicine, Hepato protectives, Hepatitis, Liver disorders, Herbal medicines.

INTRODUCTION

Siddha drugs are therapeutically used for liver disorders in India for a long time and herbal preparations are being prescribed world over by leading physicians. Medicinal plants play a key role in the human health care. About 80% of the world population rely on the use of traditional medicine, in that siddha medicine which is predominantly based on plant materials [1].Despite the significant popularity of siddha medicines, and for liver diseases in particular, they are still unacceptable treatment modalities due to several limitations. The limiting factors that contribute to this eventuality are (i) Lack of standardization of the herbal drugs; (ii) Lack of identification of active ingredient(s)/principle(s); (iii) Lack of randomized controlled clinical trials (RCTs) and (iv) Lack of toxicological evaluation [2].

The present review is aimed at compiling data based on reported works on promising phytochemicals from medicinal plants. Although herbal medicines are effective in the treatment of various ailments very often these drugs are unscientifically exploited and/or improperly used. Therefore, these plant drugs deserve detailed studies in the light of modern science. It is estimated that about 7,500 plants are used in local health traditions in, mostly, rural and tribal villages of India. Out of these, the real medicinal value of over 4,000 plants is either little known or hitherto unknown to the mainstream population. The classical systems of medicine such as Siddha, Ayurveda, Amchi, Unani and Tibetan use about 1,200 plants [3].

Liver is one of the vital organs in human body and principal site for enhanced metabolism and excretion. So it has a superior role in maintenance, performing and regulating homeostasis of the body. It involves in almost all biochemical pathways to growth, fight against disease, nutrient supply, energy production and reproduction [4]. Hepatitis – Inflammation of the liver – can be a serious illness, but fortunately many people recover completely. Hepatitis is a highly infectious viral disease involving inflammation of the liver. The virus is transmitted in blood, faeces or saliva. It is a disease that affects people of all ages but tends to occur more in the young and among those whose work involves handling contaminated material. When the liver becomes inflamed by hepatitis, its size increases greatly. Very often the victim feels unwell for some time before hand rejecting food and losing any desire to smoke (if formerly a smoker). Pain is felt high in the abdomen on the right side, other may be arthritic type pain in the

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joints, and also a rash, while the Jaundice is most marked, the patient feel sick and frequently vomit. The Jaundice dose not usually last for more than two weeks and recovery takes place within six weeks or so. 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 [5].

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. After having a hepatitis A infection, the antibodies made against it can be detected in the blood. Hepatitis B is more complex and therefore more difficult to detect. During infection a portion of the virus called surface antigen is found in the blood. When the patient has overcome the infection, antibodies to this virus antigen appear. If no antibody is made, it indicates that the patient is still carrying the virus.

The present review is aimed at compiling the data on promising siddha drug from plant that have been tested in toxicity model and preliminary studies using modern scientific system.

Name of the Plant	Animal model	Extract	Nontoxic dosage
Keezhanelli (Phyllanthus niruri)	Albino rats and mice	Aqueous extract	10000mg/kg BW[6]
Karisalai (Eclipta alba)	Albino rats and mice	Aqueous extract	10000mg/kg BW[6]
Caster leaves (Ricinus communis)	Albino rats and mice	Aqueous extract	6000mg/kg BW[6]
Kovai(Coccinia indica Vav)	Albino rats and mice	Plant extract	50Ml /kg BW[6]
Kadugurohini (Piccorrhiz kurrooa)	Albino rats and mice	Aqueous extract	10000mg/kg BW[6]
Athimathuram (Glycyrrhiza glabra)	Albino rats and mice	Aqueous extract	10000mg/kg BW[6]
Pidangunari (Premna tomentosa)	Albino rats and mice	Aqueous extract	10000mg/kgBW[6]
Avuri (indigofera tinctoria)	Albino rats and mice	Aqueous extract	5000mg/kg BW[6]
Avuri (indigofera tinctoria)	Albino rats and mice	Alcoholic extract	1000mg/kg BW[6]
Avuri (indigofera tinctoria)	Albino rats and mice	Chloroform extract	5000mg/kg BW[6]

TULASI (Ocimum sanctum)[6]: The leaves on steam distillation field a bright yellow volatile oil possessing a pleasant odour. The yield of oil varies with season and place of origin of the plant. A sample of oil from attached gave on analysis the following compounds.

Eugenol	-	71%
Eugenol methyl ether	-	20%
Carvacrol	-	3%

The oil obtained from the plant growing in Philippines contained methyl chavicol, cinole and linalod.

The seeds of the plant gave a greenish yellow fixed oil (17.5% yield) with following characteristics.

Sp. gravity	-	0.9063
D 30°	-	1.4789
Acid value	-	2.0
Saponification value	-	181.6
Iodine value	-	173.0
Thio-cyanogen value	-	104.6
Acetate value	-	12.1
R.M. value	-	1.2
Un saponifiable matter	-	2.3%

The fatty acid composition of the oil is as follows.

Palmitic acid	-	6.9%
Steanic acid	-	2.1%
Oleic acid	-	9.0%
Linoleic acid	-	66.1%
Linolenic acid	-	15.7%

The seeds contain a mucilage which has hexaronic acid (27.2%), pentose's (38.9%) and ash (0.2%). The mucilage on hydrolysis yielded xylose and an acid polysaccharide. The latter composed of xylose and glucunomic acid in 2.1 molar ratio.

The essential oil was studied by GC and the following compounds identified: Nerol, Caryophyllene,Terpinen-4-ol, Declalachyde, r – selinene, β-pinene, Camphere, x-pinene, cadinene,1,8 – cineole, limonene, β elemene and methylchavicol.

The leaves afforded β-carotene, unsolic acid 4-allyl-1-0- β-D-glucopynanosys-z-hydroxy-benzene, 4-allyl-1-0-B-D-glucopyranosyl-2-methoxy benzene, vicenin-2, apigenin-6,8-C-diglucosie, luteolin-5-0-glucoside, rosmarimic acid, cirsilineol, gallic acid, its methyl and ethyl esters, Procatechnic acid, vanillic acid, caffeic acid, chlorogenic acid, 4-hydroxybenzoic acid, vanillin, 4-hydroxybenzaldehyde

Keezha Nelli (Phyllanthus fraterma)[6]: The dried leaves contain 0.4%of a toxic bitter Principle, Phyllanthin and about 5% of colourless wax. The wax had a melting point of 80˚C, acid value, 17.0; saponification value, 92.0 and made up of mostly esters of long chain fatty acids and alcohols, free fatty acids and hydrocarbons.The leaves are rich in potassium (0.83%) which is responsible for their powerful diuretic effect. Stems contain saponin. Three new lignans – niranthin, nirtetralin and phyltetralin from leaves, estradiol, Kaempferol-4'-rhammopyranoside, eriodictyol-7-rhamnopyranoside, lup-2029-en-3ß-ol and its acetate were isolated from roots. Further studies led to the isolation of a new lignan-lintetralin, a new alkaloid 4 – methoxysecurinine, ent-norsecuinine, a new secolignan-seco-4-hydroxy lintetralin, two new hydroxylignans – secoisolaricine-sinol trimethyl ether, hydroxyninathin, dibenzylbityrolactone, 2,3-desmethoxy-seco-isolintetralin;2,3-desmethoxy-seco-isolintetralin diacetate, linnanthin, dimethylenedioxy-niranthin, phyllanthusis-D, amarulone, amariin, geramin, corilagin; 1,6-digalloyl-ß-D-glucoside,mutin and querection-3-0-glucoside.

PIDANGUNAARI (Premna tomentosa)[6]: On steam distillation, the leaves yielded light yellow essential oil with pleasing odour and during test (Yield: 0.07%). The oil had the following characteristics.

Specific gravity	-	0.87
Refractive index	-	1.48
Ester value	-	89.0
Acetate value	-	14.9

The oil contained d-and all – limonene: e (57.8%), β – caryophyleine (17.2%), a sesquitespene (7.8%), a sesquiterpene tertiony alcohol (5.6%) and a diterpene (5.5%). From the heartwood of the plant contains vicenin-3, a flavone-c-glycoside. From the leaves myricetin-3',4',7 –trimethyl ether has been reported.

A novel diterpnoid-bharangin, pygmaeo-cin a, 5,6-didehydropygmaeocin-A, pygmaeocin-E, pygma-eoherin, sirtekkone, isobharangin, pygmaeocins B and C-and pygmacone were also isolated from this plant.

AVURI (Indigofera tinctoria)[6]: This plant is the main source of the dye, indigo. It also contains aindoxyl, indigotin, indirubin and indican. From various parts of the plant flavonoids, such as kaempferol, luteolin and quareotin and rotenoids such as tephrosin, deguelin, dehydrodeguelin and sumatrol are reported.

A galactomannan composed of galactose and mannose in the ratio of 1:1:52 isolated from the seeds. In addition, apigenin, kaempferal,. luteeeeosin and quercetin were also isolated from this plant.

KARISALAI (Eclipta prostrata)[6]: The plant contains nicotine (0.078%), sixteen closely related thiophenes, desmethyl-wedelolactone-7-0-glucoside, β- amyrin, Wedeolactone, luteolin-7-0-glucoside, hentriacontanol, 14-meptacosanol, stigmasterol, 5'-isovaleryloxy methylene-2-(4-isovalerylloxy but-3-yruse)-dithiophene, 5'-senecioyloxymathylene-2-(4-iso-valeryloxybut-3-ynyl)-disthiophene, 5'-atigloyloxymethylene-2-(4-isovaleryloxy-but-3-ynyl)-dithiophene, ecliptal, dithienyl-acetylene ester and eclaba saponins I-IV.

Aamanakku (Ricinus communis)[6]: The analysis of the whole seed gave the following data

Moisture	-	5.1 – 5.6%
Protein	-	12.6 – 16.0%
Oil	-	45.0 – 50.6%
Crude Fiber	-	23.1 – 27.2%
Ash	-	2.0-2.2%
Globulins	-	60% of proteins
Phosphorus	-	90%
Phospholipids	-	0.12%
Citric acid	-	6.0 mg/100gm
Hydrogenic acid	-	7.0 ppm(as cyanide)

The seed nut contains minerals, a bitter substance, resin, pigments, alkaloid nicinine and a viseous dark green oil.Castorseeds contain enzymes such as lipase. nalyse, invertese, maltase. endotrypesin, glycolic acid oxidase, ribonuclear, zymogen. From the germinating seeds catalse, peroaidase and reductase are reported. Toxic principles ricin and ricinine are also present.

Castor oil obtained by crushing the seeds has been reported to have the following characteristics.

Specific gravity	-	0.958-0.968
Iodine value	-	82-90
Saponification value	-	177-187
Acetate value	-	143-150
R.M. value	-	0.2 – 0.3
Viscosity	-	1,160 – 1190
Unsaponifiable Matter	-	0.3 – 0.7%

Castor oil consists mainly of ricinoleic acid which occurs to the extent of about 90% steanic,oleic, linoleic and dihydroxystearic acids are also present in small amounts. Theunsaponifiable matter contains β-sitosterol. Squalene (38 mg/100gm) and tocopherols (45μ/100gms) are present in the oil.

The glyceride composition of the castor oil is as follows:

Triricinolein	-	68.2%
Dihydroxystearo diricinolein	-	4.9%
Oleo-didricinolein	-	7.5%
Linoleo-diricinolein	-	8.3%
Other diricinoleins	-	7.3%
Monoricinoleins	-	2.9%
Non-ricinoleo glycarides	-	0.9%

Kovai (Coccinia indica)[6]: The analysis of tender fruit gave the following information:

Moisture	-	93.1%	Phosphorus	-	0.03%
Protein	-	1.2%	Iron	-	1.4 mg/100 gm.
			Vitamin A	-	260 IU/100gm.
Fat	-	0.1%	Vitamin C	-	28 mg/100 gm.
Fibre	-1.6%				
Carbohydrates	-	3.5%			
Mineral matter	-	0.5%			
Calcium	-	0.04%			

The pressed juice of the plant contains an alkaloid, a hormone and an enzyme amylase. An orally effective hypoglycemic Principle and stigmastra-7-en-3-one from the roots; β-amyrin, lupeol and a bitter glycoside containing cubitaci-B from the fruits; cephalandrol, tritriacontane, β-sitosterol, cepholandrine B from aerial parts were isolated.

Further work led to the isolation of taraxerol, β-carotene, lecopene, cryptoxanthin and apo-6'-lypopenal from the fruits; palmitric, oleic and linoleic acids from the fat. The fruits were also reported to contain teraxerone, taraxerol and 24(R)-24 – ethylcholest-5-en-3β-ol glucoside.

CONCLUSION

In this review article, effort has been taken to collect and compile the details regarding a few hepatoprotective siddha drugs, which will be useful to the society to venture in to a field of Siddha systems of Medicine. A more thorough review on various herbal products available in India. This will give a lead as a hepato protectant in near future.

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