International Journal of Pharmaceutical Archive-3(9), 2014, 505-509
Available online through www.ijpaonline.info ISSN 2319-7226

# A REVIEW ON HEPATOPROTECTIVE HERBS IN SIDDHA SYSTEM OF MEDICINE

**REVIEW ARTICLE**

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*(Received on: 03-09-14; Revised & Accepted on: 23-09-14)*

***ABSTRACT***

*Siddha system is one of the oldest systems practiced since 4000 years in India. Siddha system is not only a Traditional science but also an Art of Living. This article addressed in bringing out the Siddha medicinal herbs with hepatoprotective activity, which is already given in our Siddha literature. Here we have taken the vital and overwhelming organ, "Liver". Death due to liver diseases has been ranked as top tenth common cause across worldwide. About 3200 death per year due to alcoholic liver diseases and one death per day in India due to hepatic diseases. The above said statistics had emphasized the seriousness of liver diseases and its treatment. In our Siddha system we have enormous medicinal plants which are used for treating liver diseases. Many Siddha medicinal plants posses' effective hepato protector activity, but still needs more scientific evidence and research documentations. In this review article attempt has been made about hepatoprotective plants from Siddha system of medicine and may be useful to health professionals, scientists, scholar working in the field of pharmacology, therapeutics and pharmacognosy to widen data based Indian medicine to cure and carry out unusual kinds of liver ailments.*

***Keywords:*** *Liver tonics, Siddha herbs, Indian system of medicine, hepatotoxicity.*

## INTRODUCTION

The Siddha System of Medicine (Traditional Tamil System of medicine), which has been most prevalent in the ancient Tamil land, is the foremost of all other medical systems in the world [1]. The Siddha system of medicine is a peculiar science, and it cannot be compared with Ayurveda, Allopath or any other system of medicines. It is a medical science comprising with allkinds of Sciences as – Alchemy, Philosophy, Yoga and Astrology, etc. The internal evidence of this literature shows that they were all written and compose at a long time before the civilization of western Asia and Europe .In Siddha system Religions and Philosophy are go hand in hand just to direct the practitioners in the path of righteousness, justice and truth which are considered the corner stone's of Siddha medicine . Herbs are the main source of the siddha medicines and also used inorganic substance and animal products[2].Many drugs contain herbal ingredients and it has been said that 70-80 percentage of world population relies on some form of non-conventional medicine [3]. Siddha medicine has demonstrated path with record of 10000 years and forms part of the Health Service, existing alongside conventional medicine.The uses of traditional medicines are widely spread and plants represent a large source of natural chemicals that might serve as leads for the development of the novel drugs [4]. Although 7,000 different medicinal herbs and 95 species estimated 2, 50,000 flowering plants and their parts are utilized in western medicines[5]. Liver is an important organ actively involved in many metabolic functions and is the frequent target for a number of toxicants[6]. The liver is the key organ regulating homeostasis in the body. It is involved with almost all the biochemical pathways related to growth, fight against disease, nutrient supply, energy provision and reproduction [7]. Hepatotoxicity is the major health problem all over the world. Hepatotoxicity is the capacity of chemicals, drugs or other exposure to produce injury to the liver. Some of the inorganic or organic compounds produce hepatotoxicity. Inorganic compounds are arsenic, phosphorous, copper, and iron etc. Moreover, Organic compounds include naturally occurring plant toxins like mycotoxins, bacterial toxins and pyrrazolidine alkaloids. Drug and environmental toxicants enter the hepatic portal vein from the digestive system and liver function can be altering by the injury result from acute and chronic exposure to toxicants[8]. The use of natural remedies for the treatment of liver diseases has a long history and Medicinal plants and

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their derivatives are still used all over the world in one form or the other for this Purpose[9].Presently only a few hepatoprotective drugs and that too from natural sources (there is not a single effective allopathic medication), are available for the treatment of liver disorders. Siddha medicine in India has demonstrated path with record of 10000 years and forms part of the Health Service, existing alongside conventional medicine. The published national Siddha formulary of India lists more than 500 well Siddha for-mulations in Gunavagadam (Siddha pharmacology)[10]. In Siddha literature, Agathiyar gunavagadam had explained about liver diseases in the heading of "Kalleeral Noigal".

**1**. ***Aegle marmelos***

Hepatoprotective activities of ethanolic and aqueous extracts of fruit pulp of *A. marmelos* were examined against CCl4 induced liver damage in mice at the dose levels of 500 and 600 mg/kg of BW. Enzyme activities of Serum Glutamate Oxaloacetate Transaminase (SGOT), Serum Glutamate Pyruvate Transaminase (SGPT) and Alkaline Phosphatase (ALP) were analyzed. Results indicated that ethanolic and aqueous fruit pulp extracts of *A. marmelos* had moderate to significant activity. The significant $P<0.01$ values indicated that ethanolic extracts of *A. marmelos* holds a potential hepatoprotective activity[11].

**2. *Andrographis paniculata***

Anti-hepatotoxic activity of the *Andrographis paniculata* (acanthaceae) methanolic extract (equivalent to 100 mg/kg of andrographolide) and 761.33 mg/kg ip, of the andrographolide-free methanolic extract (equivalent to 861.33 mg/kg of the methanolic extract) of the plant, was studied using CCl4-intoxicated rats. Biochemical parameters like serum transaminases--GOT and GPT, serum alkaline phosphatase, serum bilirubin and hepatic triglycerides were estimated to assess the liver function. It was finalized that the trial drug. The results also suggested that andrographolide is the major active principle component in *A. paniculata* [12].

**3**. ***Aloe vera***

The hepatoprotective activity of aqueous extract of *Aloe vera* in paracetamol induced hepatotoxicity was done in albino rats at the dose levels of 250 and 500mg/kg of BW. After the treatment period, the blood samples were collected to analyse the serum enzymes (AST), (ALT), (ALP). Single day treatment with the aqueous extract of Aloe vera in the dose of 250 and500mg/kg reduced the AST, and ALT levels significantly ($p<0.01$). 500mg /kg of the extract also reduced the ALP levels and restored the depleted liver thiol levels significantly ($p<0.01$).But there was no effect on alkaline phosphatase and liver thiols by Aloe vera in the dose of 250mg/kg. Seven day treatment with both the doses of Aloe vera significantly reduced the levels of AST, ALT and ALP significantly ($p<0.01$) and restored the depleted liver thiol levels significantly ($p<0.01$)[13].

**4. *Allium sativum***

*Allium sativum* showed hepatoprotective effect against anti-tubercular drugs induced Hepatotoxicity model in Wistar rats. In this study, the drug (INH) induced the hepatotoxic effect. The abnormal rise in the levels of serum ALT, AST, ALP and total bilirubin had been observed .The elevated levels of these biochemical markers in the serum are the indicators of Hepatotoxicity. The hepatoprotective effect of garlic and silymarin has been observed in the model animals in the dose level of 0.25 g/kg per day of garlic. In this study, it was finalized that INH induced hepatotoxicity was prevented by the use of garlic [14].

**5. *Azadirachta indica***

*Azadirachta indica* had the property of antibacterial, anti-inflammatory and hepatoprotective effect. A Hepatoprotective effect of A. indica leaf (Meliaceae) against paracetamol induced hepatotoxicity was studied in rats. Serum enzyme levels (glutamate oxaloacetate transaminase, glutamate pyruvate transaminase, acid phosphatase and alkaline phosphatase) were elevated by paracetamol induced liver injury in rats. The fresh juice of young stem bark extract of *A. indica* was good hepatotoxic agent at a dose level of 500mg/kg. The plant extract has decreased the enzyme level of SGOT, SGPT, ALP, and bilirubin by the dose of 500mg/kg and these result were statistically significant $P < 0.01$ when compared with $CCl_4$ group, while juice extract increased the proteins serum level too. The results are comparable to that of silymarin as a standard. The extract was protected in treated group from hepatic cell damage caused by paracetamol[15].

**6. *Cassia fistula***

Hepatoprotective activity of the n-heptane extract of Cassia fistula (Fabaceae) leaves was reported by inducing Hepatotoxicity with paracetamol in rats. The treatment extract at a dose of 400 mg/kg body wt. exhibited orally, it showed significant protective effect by lowering the serum levels of transaminases (SGOT and SGPT), bilirubin and alkaline phosphatase (ALP). The effects produced were comparable to that of a standard hepatoprotective agent [16].

 

**Some Hepatoprotective Herbs in Siddha system of Medicine**

| S. No | Botanical Name | Name in siddha medicine | Family | Part Used | Ref. No |
|---|---|---|---|---|---|
| 1 | ***Aegle marmelos*** | Vilvam | **Rutaceae** | Fruit pulp | 11 |
| 2 | ***Andrographis paniculata*** | Nilavembu | **Acanthaceae** | Whole plant | 12 |
| 3 | ***Aloe vera*** | Kumari | **Liliaceae** | Mucus gel | 13 |
| 4 | ***Allium sativum*** | Vellulli | **Liliaceae** | Root tuber | 14 |
| 5 | ***Azadirachta indica*** | Vembu | **Meliaceae** | Leaves | 15 |
| 6 | ***Cassia fistula*** | Aavarai | **Fabaceae** | Leaves | 16 |
| 7 | ***Cissus quadrangularis*** | Pirandai | **Vitaceae** | Stem | 17 |
| 8 | ***Commiphora mukul*** | Kungiliyam | **Burseraceae** | Pisin | 18 |
| 9 | ***Curcuma longa*** | Manjal | **Zingiberaceae** | Root tuber | 19 |
| 10 | ***Eclipta alba*** | Karisalai | **Asteraceae** | Whole plant | 20 |
| 11 | ***Hemidesmus indicus*** | Nannari | **Apocynaceae** | Root | 21 |
| 12 | ***Phyllanthus emblica*** | Nellikkai | **Euphorbiaceae** | Fruit | 22 |
| 13 | ***Solanum nigrum*** | Manaththakkali | **Solanaceae** | Whole plant | 23 |
| 14 | ***Terminalia arjuna*** | Marudhu | **Combretaceae** | Bark | 24 |
| 15 | ***Tinospora cordifolia*** | Seendhil | **Menispermaceae** | Stem | 25 |

**7. *Cissus quadrangularis***

Hepatoprotective activity of methanolic extract of *Cissus quadrangularis* against isoniazid induces hepatotoxicity in rats at the dose level of 500mg/kg of BW p.o. Protective effects of *cissus quadrangularis* by lowering the elevated level of Aspartate transaminase level, alanine transaminase, alkaline phosphtase and bilirubin. The major mechanisms responsible for the hepatoprotective effect of *cissus quadrangularis* which may be due to presence of phytochemical constituents and antioxidant Properties [17].

**8. *Commiphora mukul***

The study was done to know the effect of *Commiphora mukul* extract on liver injury induced by the administration of $CCl_4$ in rats at the dose levels of 250 and 500 mg/kg, orally. Liver functions were measured. The results revealed that a low dose of *Commiphora mukul* extract did not lead to any improvement; while a high dose of *Commiphora mukul* showed its potential to protect against $CCI_4$ induced hepatotoxicity by controlling the serum enzymes like ALT and AST levels, alkaline phosphatase (ALP) and also hepatic lobules regenerate to their normal architecture with proliferating bile ductules in the portal tract. It was concluded that, Higher doses of *Commiphora mukul* extract protects against CCl4-induced liver injury[18].

**9. *Curcuma longa***

The study was conducted to evaluate the hepatoprotective effect of *Curcuma longa* against lead induced liver toxicity at the dose of 500 mg/kg of BW. Oral administration of lead acetate for 28 days resulted in a significant increase in AST, ALT, ALP, significant increase of Lipid peroxidation (LPO) and decrease in Superoxide dismutase (SOD), reduced glutathione (GSH) and increase in lead accumulationin liver. Treatment with *Curcuma longa* at the dose of 500 mg/kg BW significantly ($P< 0.01$) decreased the elevated ALP, ($p< 0.05$) AST,ALT, LPO levels and increase in GSH levels and as compared to lead acetate treated group. The study was concluded that supplementation of *Curcuma longa* @ 500 mg/kg daily oral for 28 days has shown protection against lead induced hepatotoxicity[19].

**10. *Eclipta alba***

The study was done to know the effect of *Eclipta alba* extract on liver injury induced by the administration of paracetamol in rats, at the dose levels of 500 mg/kg, orally. Liver functions were measured. There is significant reduction in the serum enzyme markers like AST, ALT, and ALP, LDH and cholesterol, triglycerides also. And it was considered to be significant in p value ($p<0.05$).Finally it was decided that *eclipta alba* has significant hepatoprotective activity against paracetamol induced rats[20].

**11. *Hemidesmus indicus***

Methanolic extract of root of *Hemisdesmus indicus* (Asclepiadacea) was evaluated against carbon tetrachloride and paracetamol induced hepatotoxicity in rats. Maximum protection by methanolic extract of *H. indicus* against $ccl_4$ induce hepatic damage was possesed at the dose 250mg/kg. The effects produce comparable with standard drug silymarin[21].

 

**12. *Phyllanthus emblica***

The efficacy of the medicinal plant *Phyllanthus emblica* to prevent paracetamol induced hepatotoxicity in rats was examined by the histopathological study of liver cells. Aqueous extracts of 100 and 200 mg/kg/day, p.o of *Phyllanthus emblica* were administered to the animals for 14 days. The total blood cell count in each group of animal was also calculated *Phyllanthus emblica* (100-200mg/kg) increased cell viability of rat hepatocytes being treated with paracetamol treatment. Pretreatment of rats with *Phyllanthus emblica* at oral doses of 100-200mg/kg, 4 hrs before paracetamol administration lowered the hepatotoxicity. Treatment with aqueous extract of fruits of *Phyllanthus emblica* showed the hepatoprotective effect of this medicinal plant[22].

**13. *Solanum nigrum***

Aromatic water extracted from the drug is widely prescribed by herbal vendors for liver disorders. The study was done to know the effect extract *Solanum nigrum* on liver injury induced by the administration of $CCl_4$ in rats at the dose levels of 250 mg/kg, orally. Estimation of serum enzymes, GSH, SOD, LPO were done to evaluate the efficacy. There was significant reduction in the levels of serum enzymes and markers. So, it was decided that the *Solanum nigrum* extract has very good hepatoprotective effect on tested animals[23].

**14. *Terminalia arjuna***

The aqueous extract of *Terminalia arjuna* bark was investigated for its hepatoprotective effect against Isoniazid induced acute liver damage on albino rats. Isoniazid (100mg/kg) significantly elevated the serum levels of biochemical markers like SGPT, SGOT, ALP, ACP, Bilirubin, and Protein, depleted antioxidant enzymes GSH and SOD upon administration of Isoniazid (100mg/kg) to albino rats. This indicated that there the aqueous extract of bark of *Terminalia arjuna* at 200mg/kg dose significantly reduced the elevated levels of biochemical markers. The extract also increased the level of SOD and GSH. These results suggested that aqueous extract of *Terminalia arjuna* have the potential therapeutic value in the treatment of Isoniazid induced hepatic damage and some liver diseases[24].

**15. *Tinospora cordifolia***

The hepatoprotective activity of *Tinospora cordifolia* against carbon tetrachloride induced hepatic damage in rats was studied. The extract of pet ether, ethanol and aqueous extracts of various parts of the plants such as leaf, stem and root were tested at the dose of 200mg/kg body weight orally using wistar albino rats and silymarin was given as reference standard drugs which showed significant hepatoprotective effect by reduction in serum enzymes ALT, AST, ALP, and total bilirubin. Finally it was concluded that the *T.cordifolia* had the potential hepatoprotective activity[25].

## CONCLUSION

A phytotherapeutic approach to modern drug discovery and development can provide many valuable drugs from Siddha medicinal plants. Search for pure phytochemicals as drugs is very good time consuming and expensive one. Numerous plants and polyherbal formulations are used for the treatment of liver diseases. The therapeutic values were tested against a few chemical-induced subclinical levels of liver damages in rodents. Development of such medicines with standards of safety and efficacy can revitalize the Siddha treatment of liver disorders. By doing such preclinical and clinical research in Siddha system, we can uplift our system to global standard.

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**Source of support: Nil, Conflict of interest: None Declared**