Published online in http://ijam.co.in ISSN No: 0976-5921

International Journal of Ayurvedic Medicine, Vol 14 (2), 2023; 333-340

Hepatoprotective action of some Ayurvedic drugs: A review

Review Article

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Abstract

Liver (*Yakrut*) is involved in several physiological processes in the body, including metabolic activities, secretory, retention, purification, and elimination of foreign and endogenous materials. As a result, any impairment or degradation of its functionality leads to a wide range of liver problems. The principal hepatic illnesses that cause a high fatality rate include hepatotoxicity, jaundice and hepatitis. Liver problems are still a growing health problem around the world. The treatment of liver problems using folklore or synthetic medications is ineffective and can have major negative impact. Ayurvedic herbal medicines, on the other hand, have a variety of possible benefits in liver diseases, despite the absence of a proven hepatoprotective medication in modern medicine. A variety of hepatoprotective herbs have been identified. In this review paper, we have attempted to collect and consolidate information on hepatoprotective herbs that will be useful in the Indian medical system.

Key Words: Hepatoprotective plants, Liver, Indian systems of Medicine, *Yakrut*, Herbal drugs.

Introduction

Yakrut (Liver) is one among the most important organs in the human body in order to maintain homeostasis. It is engaged in metabolic processes such as xenobiotic metabolism and excretion, bile secretion, and vitamin storage. It is capable of detoxifying organisms' endogenous and exogenous contaminants. Excessive alcohol consumption, biological components (microbes, parasite, and worm), immunological diseases, or the side effects of chemicals, medicines, can all cause harm to the structures, processes, morphology, or activity of the liver. Liver disease is a major medical condition that has become more prevalent in coming period and it is among the most severe threats to human health. Liver disease accounts for approximately 2 million deaths per year worldwide, 1 million due to complications of cirrhosis and 1million due to viral hepatitis and hepatocellular carcinoma (1) *Yakrut vikara*" (Liver diseases) was first time mentioned by *Bhavmishra*.The origin of the *raktavaha Srotas* is described in ayurvedic literature as *yakrut* (liver) and *pleeha* (spleen)(2) *Aacharya Madhava* defines liver related diseases (*Yakrut roga*) thoroughly with its causes and symptoms. Overconsumption of *Vidahi annapanam* (regularly eating and drinking can make feel hot in body), *Madya sevana* (excessive intake of alcoholic beverages), food which having *Teekshna* quality causes *pitta* and *rakta dushti*, which further causes *rakta dushtijanya vikara*, and manifestation of diseases related to the liver and spleen.(3)

Although there are many more medications or therapies available to treat hepatic illnesses, there is still a need for new pharmacological research that can be helpful in numerous liver disease pathways. In ancient *samhitas*, it is mentioned that herbal medications play a significant part in the treatment of liver illnesses and have no side effects. A variety of medicinal plants and their preparations are utilized to treat liver diseases in ethnomedical practices and traditional medicine. Several ayurvedic texts highlight plants and herbs which are useful in liver related disorders .In the present work, authors had reviewed the articles of hepatoprotective activity of the medicinal plants. The main goal of the present review was to explore the hepatoprotective effect of ayurveda drugs as described in our *samhita* using modern scientific findings and classical ayurvedic references.

Hepatotoxicity

The hepatic veins, which carry toxic compounds substances to the liver, get a large amount of blood from the liver, which is closely related to the gastrointestinal system. The activation of toxins substances in the liver causes reactive

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metabolic species (RMS). By way of the oxidative stress route, the RMS destroys cellular macromolecules, proteins, and nucleic acids. (4)There are three types of hepatotoxicity: When SGOT or SGPT levels are increased, this is referred to as hepatocellular damage. Cholestatic damage occurs when the levels of ALP and bilirubin in the blood rises .When the levels of SGOT, SGPT in the blood rise along with ALP and bilirubin levels at the same time is referred as mixed injury.(5)

Aim and Objectives

To compile therapeutic activity of herbal medications as a hepatoprotective drug in liver-related illnesses.

Material and Methods

Available Ayurvedic literature, article, journal, research work, monograph were investigated. The Hepatoprotective Drugs, Antihepatic Herbal Medicine, Hepatic Diseases, *Yakritroga,* words were used to search in the Online Databases. Extracted data was analyzed to find the applicability of *ayurvedic drugs* in Hepatic diseases as Hepatoprotective actions.

Hepatoprotective Drugs

The important herbs like *Guduchi, Daruharidra, Punarnava, Pipali Kalmegha, Yashtimadhu, Dhataki, Gokshura, Kutaki, Bhuaamalaki* are used to treat Liver diseases, their detailed pharmacological properties are as follows.(6)

Table 1: Hepatoprotective drugs list

Sr.No	Herb name	Latin name	*Family*	*Rasa*	*Guna*	*Virya*	*Vipaka*	*Doshghanata*
1	*Guduchi*	*Tinospora cordifolia* Willd.	*Menispermaceae*	*Tikta Kashaya*	*Guru, Snigdha*	*Ushna*	*Madhura*	*Tridosh shamaka*
2	*Daruharidra*	*Berberis aristata DC*	*Berberidaceae*	*Tikta Kashaya*	*Laghu ushna*	*Ushna*	*Katu*	*Kaphapittahara*
3	*Punrnava*	*Boerrhavia diffusa* Linn.	*Nyctanginaceae*	*Madhua, Tikta, Kashaya*	*Laghu, Rukasha*	*Ushna*	*Madhura*	*Kahavatahara*
4	*Pipali*	*Piper longum* Linn.	*Piperaceae*	*Katu*	*Laghu, Snigdha, Tikshna*	*Ushna*	*Madhura*	*Vatakaphahara*
5	*Kalamegha*	*Andrographis paniculata* Nees.	*Acanthaceae*	*Tikta*	*Laghu Ruksha*	*Ushna*	*Sheeta*	*Kaphapittahara*
6	*Yashtimadhu*	*Glycyrrhiza glabra* Linn.	*Fabaceae.*	*Madhura*	*Guru, Snigdha*	*Sheeta*	*Madhura*	*Tridoshhara*
7	*Dhataki*	*Woodfordia. fruticosa* L.Kurz.	*Lythraceae.*	*Kashaya*	*Laghu, ruksha*	*Sheeta*	*Katu*	*Kaphapittahara*
8	*Gokshura*	*Tribulus terrestris*	*Zygophyllaceae*	*Madhua*	*Guru Snigdha*	*Sheeta*	*Madhura*	*Vatapittahara*
9	*Katuki*	*Picrorhiza kurroa* Royle ex Bentham.	*Scropulariaceae*	*Tikta*	*Ruksha Laghu*	*Sheeta*	*Katu*	*Kaphapittahara*
10	*Bhuamalaki*	*Phyllanthus niruri* Sensu Hook	*Euphorbiaceae*	*Tikta, Kashaya,Madhura*	*Laghu, Ruksha*	*Sheeta*	*Madhura*	*Kaphapittahara*

***Guduchi (Tinospora cordifolia* (Willd.) Miers.)**

This herb was given the name *'Amrita'* because of its capacity to provide its user youthfulness, energy, and longevity. *Guduchi* contains active chemical compounds such as tinosporine, tinosporon, tinosporic acid, tinosporol, berberine, giloin, and giloinisin. (7) It has antiseptic, antimicrobial, antipyretic, antiinflammatory, antiarthritic, antiallergic, hepatoprotective, and analgesic properties. The principle compound Tinosporin reverses immunosuppression caused by hepatic dysfunction. (8) The function of the Kupffer cells is a crucial factor of the outcome of hepatotoxicity. *Guduchi* extract (*Tinospora cordifolia*) impact in albino rats inebriated with ccl4, Kupffer cell activity was assessed by employing carbon clearance test as a parameter (CCl4). *Tinospora cordifolia* reduced fibrosis in rats generated by CCl4 and improved inhibited Kupffer cell function. (9) Various investigations have found that *Tinospora cordifolia* water extract (TCE) has protective effects against hepatic, gastrointestinal, and lead-induced toxicity (Sharma et al). *Tinospora cordifolia* extract significantly reduced the increased

levels of aspartate transaminase, alanine transaminase, gamma-glutamyl transferase, serum Triglyceride, Sr.Cholesterol, Sr. HDL, and Sr. LDL. Thus proves its effectiveness. (10) When *Tinospora cordifolia* extracts with lead were given, the liver morphology was preserved, and inflammation, congestion, and the infiltration of inflammatory cells were reduced. (11) *Satwa* of *T. cordifolia* and *T. sinensis*, administered at a dose of 200 mg/kg i.p., was reported to considerably lower the elevated activity of serum marker enzymes AST, ALT, ALP, and total bilirubin. The results of biochemical markers were also corroborated by histopathological observations. (12) Administration of *Satwa* from *T cordifolia* improved serum and liver lipid profiles and increased antioxidant enzyme levels. (13)

***Daruharidra (Berberis aristata* DC)**

It's high in Berberine, Palmatine, and Karachine (a protective alkaloid) which have properties like antioxidant, hepatoprotective antibacterial, reduce inflammation and lowers the cholesterol. *Daruharidra* has been shown protective and therapeutic properties in hepatic disorders. Liver cell damage induced due to ccl4 and paracetamol significantly lowered the level of increased liver enzymes such as Sr. ALT, Sr. AST, Sr. SOD by Berberine's extracts. It shows its hepatoprotective effects and positive action on the occurrence of hepatic lesions, hepatocellular augmentation, lymphocytes inflammatory reaction, and tissue damage by inhibition of microsomal drug metabolizing enzyme. (14) Berberine's efficacy in healing liver damage caused by toxins is supported by histopathological. (15)The rat liver cirrhosis caused by dimethylnitrosamine (DMN) is well-established and reproducible, and it closely resembles human liver cirrhosis. Ethanolic extract of Berberin (EEBA) and Alcoholic extract of Berberine (AEBA) therapy orally given in daily dose 3000 mg/kg of body wt. for 4 weeks shows cirrhotic rats had a favorable prognosis on day 28 as compared to vehicle-treated cirrhotic rats. (16).

***Punarnava (Boerhavia diffusa* Linn.)**

A perineal plant that regenerates itself every year during the rainy season or rejuvenates the body after illness. It is recommended most of the times by Indian tribes to heal a various liver problems as well as internal inflammation. *Boerhavia diffusa Linn* has also been shown to be useful in clinical trials. Primary liver cirrhosis and recurrent peritonitis can induce congestion and fluid in peritonium. [17] The herb contains a variety of phytochemicals, including flavonoids, alkaloids (punarnavine1 & 2), beta sitosterol, oxalic acid, Hentriaconatane, boeravinones A, B, Csteroids, triterpenoids, lipids, lignans, carbohydrates, proteins, and glycoproteins. (18) Extracts from the floral section and rhizome of this species protect hepatic cell damage induced by Carbon tetrachloride, Alchohol, thioacetamide, and acetaminophen.(19) The hepatoprotective effect was established by lowering levels of serum glutamate oxaloacetate transaminase (SGOT), Serum glutamate pyruvate transaminase (SGPT), and alkaline phosphatase (ALP) in the treated rats. (20) (21).

Pippali (Piper longum Linn.)

It's a common Indian food spice that's been demonstrated to have a variety of medicinal properties. Antiasthmatic, antiinflammatory, hepatoprotective, hypocholestremic, and immunomodulatory properties have been described for *Piper longum Linn*. It includes essential oil, as well as alkaloids such as piperine, piperlongumine, piperlonguminine, pipercide, and sesamin, which aid in hepatocyte regeneration. (22)

The study conducted to investigate the hepatoprotective properties of *Piper longum* milk extract. To create the chronic reversible type of liver necrosis, carbon tetrachloride (CCl4) was employed as a hepatotoxin at a dose of 0.5 ml/kg p.o. with olive oil (1:1) thrice a week for 21 days. A significant decrease in blood enzymes, total bilirubin, and direct bilirubin was found after treatment with *Piper longum* milk extract (200 mg/day p.o. for 21 days). *Piper longum* Linn was administered, according to histopathological observations. Milk extract protected hepatocytes from CCl4-induced damage, and modest fatty alterations in liver cellular structures which was supported the changes in liver enzymes. It also showed hepatic cells that were rebuilding. (23) Piperine's hepatoprotective efficacy against acetaminophen-induced liver injury in mice demonstrates reversal of elevated serum enzymes and lipid peroxidation, which could be attributed to its membrane stabilising and antioxidant activity, which prevents intracellular enzyme leakage. In Sprague-Dawley rats, Piper nigrum (Linn.) protects against hepatotoxicity produced by first-line antituberculous medicines like Ethionamide and para amino salicylic acid exhibiting its hepatoprotective properties. (24)

***Kalamegha (Andrographis paniculata* Nees.)**

Kalamegha is known as the Bitter King. It can be used for a variety of medical and pharmacological purposes. Andrographolide, neoandrographolide, and dehydroandrographolide are the most prominent bioprotectants among multiple active chemical components. Antispasmodic, antidiabetic, anticarcinogenic, antipyretic, hepatoprotective, and nematocidal are some of its properties.Oxidative stress are naturally formed as a byproduct of aerobic oxygen metabolism and play an important role in cell signalling and homeostasis. Reactive oxygen species (ROS) that andrographolide can scavenge includes oxidative stress, peroxyl radicals, superoxide radical, reactive nitrogen species, and nitric oxide. Andrographolides inhibit iNOS, COX-2, mRNA, protein, and enzyme activity, implying anti-inflammatory effects. Lipids, haemoglobin, and red blood cells are all protected against lipid peroxidation by *Kalamegha* extract. It protects DNA from oxidative damage and prevents hazardous metabolites from attaching to it. (25) Andrographolide has been demonstrated to be effective in decreasing the effects of carbon tetrachloride on the liver cells in experimental models rat and mice. Liver

protective - Androgrpholide activity against paracetamol or galactsamine-induced liver damage (Handa and Sharma, 1990), and has a higher capacity for decreasing paracetamol-induced bile production decreases than the conventional antioxidant silymarin (26). Andrographolide was discovered to be a potent inducer of bile duct function in conscious rats and anesthetized guinea pigs, causing a considerable increase in bile flow, bile salt, and bile acid. The majority of infective hepatitis patients improved significantly after continuing treatment with *Andrographis paniculata* including enhanced hunger and hepatic screening tests, regular cure from jaundice, and a reduction in temperature (27). The plant extract *Andrographis paniculata* has a choleretic effect, meaning it reduces cholestasis, decreases retention, and boosts the liver's capacity to remove harmful toxic metabolites. It also improved the immune system ability to fight inflammatory response, thanks to immunomodulators' synthesis of cytokinin. (28)

Yashtimadhu (Glycyrrhiza glabra)

Glycyrrhizin is significant bioactive components in *Glycyrrhiza glabra*. There are also glycyrrhetic acid, hydroxycoumarins, and sterols. Flavonoids are still the most significant, as they are essentially the outcome of biological action. Glycyrrhizin, 18glycyrrhetinic acid, glabrin A and B, and isoflavones are phytochemicals that have anti - oxidant properties, antimicrobial, bactericidal, chemotherapeutic, and anti - inflammatory properties as well as hepatoprotective characteristics. (29) Glycyrrhizin is transformed in the liver and excreted through the bile duct, where it is then processed by intestine bacteria into glycyrrhetinic acid. Antioxidant, anti-inflammatory, and immuno-suppressive effects are all found in glycyrrhizin. Pretreatment with glycyrrhizic acid reduced alanine elevated SGOT, SGPT, and alkaline phosphatase, as well as liver damage histology, cytotoxic marker, and cellular damage in hepatocytes. (30) Licorice extract exhibits hepatoprotective effects against diclofenac-induced, CCL4 induced, and paracetamol induced hepatotoxicity, based to in vivo experiments. (31) Its action mainly by suppressing the generation of reactive oxygen species and fatty peroxidation. (32)

Dhataki (Woodfordia. fruticosa (L.) Kurz)

Dhataki is important ingredient in *Arishtas* and *Asavas*. The major chemical constituents are Hecogenin, inositol, kaemperol-3-glucoside, naringenin 7-7 glucoside, tannins, woodferdins A, B,C lawsone, betuline etc. They can aid in leprosy, skin conditions, skin irritations, haemorrhages, haemorrhoids, uterine bleeding, White discharge, epistaxis, erysipelas, gastroenteritis. A *Woodfordia fruticosa* methanol (WFM) extract significantly reduced elevated serum ALT, AST, ALP, and BUN levels. According to histological testing, WFM appears to lessen the degree of hepatocellular cirrhosis caused by diclofenac sodium in rats. (33) To test the hepatoprotective effects of *Woodfordia fruticosa* Aqueous extract, albino Wistar rats were given CCl4 (Carbon tetrachloride). Hepatic enzymes all elevated as a result of this. Aqueous extract of *Woodfordia fruticosa* was provided to these rats. The extract reduced lipid peroxidation and controlled glucose-6phosphate and GSH levels in the liver. The extract considerably reduced the increase in triglycerides caused by CCl4, showing that it has preventive and therapeutic properties against fatty liver disease. The same result can be seen in histopathological activity. The increase in bromsulphthalein levels demonstrates the damage of liver cells (Chandan et al., 2008). The administration of various doses of extract of *woodfordia fruticosa* has been shown to reverse the high levels of bromsulphthalein in studies and promotes choleretic activity, implying that it has an effect on liver function. (34).

Gokshur (Tribulus Terrestris)

The annual plant *Tribulus terrestris* is used in ethnomedicine to treat a variety of ailments. The main active phytochemicals of this plant are flavonoids, alkaloids, saponins, lignin, amides, and glycosides. It has hypotensive, CNS stimulant, spasmogenic, analgesic, antibacterial, antimicrobial, insecticidal, cytotoxic activity against FL-cells, hepatoprotective, cytoprotective, and anticonvulsant properties. The potential benefits of *Tribulus terrestris* to have exceptional hepatoprotective and antioxidant effects. In acetaminophen-induced hepatotoxicity in Oreochromis mossambicus, the levels of all of elevated liver enzymes, which are remarkabely normalize by the administration of extract of tribulus terrestris at the dose of 250mg/kg .The liver, gallbladder, and muscle tissues all show significant histopathological alterations. (35) *Tribulus terrestris* extract protects against non-alcoholic liver fibrosis by activating hepatic cells markers, serum lipid levels, and hepatocyte histopathological abnormalities.(36) Flavonoids found in *Tribulus terrestris* extract have anti diabetic insulin-like properties as well as an antagonistic effect on the lipogenase enzyme. Flavonoids improved cell viability and reduced AST and ALT leakage in hepatocytes. (37) In adipose and muscle tissue, flavonoids have also been shown to improve impaired glucose tolerance and insulin requirements. (38)Aside from flavonoids, the plant includes hypolipidemic alkaloids, glycosides, steroids, and saponin. Carbohydrate uptake and metabolism are slowed by alkaloids. As a result, this extract component may limit fructose absorption while also interfering with fructose metabolization to lipids. (39)

Katuki (Picrorhiza kurroa)

It is a small annual plant found in area of India's north-east. It is an important herb used to treat problems related to liver and respiratory system. *Picrorhiza kurroa* bioactive component is Kutkin. Kutkoside and iridoid glycosides such as picrosides I, II, and III constitutes it. In various vitro studies it is demonstrated that picroliv had considerable protective effects on hepatocytes. Administration of Picroliv extracts were

efficiently reduced the elevated levels of liver enzymes markers such as SGOT, SGPT, Sr. Alkaline Phosphatase, Sr. Bilirubin levels, lipoprotein X (LPX). Picroliv helped superoxide dismutase and glycogen regeneration by lowering the levels of lipid peroxides and hydroperoxides in the liver. (40) On isolated hepatocytes, Picroliv showed dose-dependent protective effect. It improved hepatocyte vitality and restored normal enzyme values in both the isolated hepatocyte suspension and the serum. Picroliv, hepatoprotective chemical, was found to be more efficacious than silymarin which is used commonly as hepatoprotective drug. (41) Picrorhiza has also been shown to protect the liver from toxins such as carbon tetrachloride, d-galactosamine, paracetamol, and thioacetamide in animal models of toxicity. Monocrotaline *and oxytetracyline* have all been studied in vitro and in vivo. *Picrorhiza* was discovered to be a potent immuno-modulator rather than an antiviral medication in numerous studies, with anticholestatic and choleretic actions, as well as anti-viral effects in viral hepatitis. P. kurroa components, including silymarin, may help with liver regeneration. Picrorhiza also has choleretic action that is dose-dependent.

Bhumyamalaki (Phyllanthus niruri)

Phyllanthus niruri found in India are highly prized for its effectiveness in hepatic disorders and diseases related to kidney. Phyllanthin, hypophyllanthin, niranthin, nirtetralin, phyltetralin, lintetralin, phyllnirurin, and nirphylin are the key chemical ingredients.

In primary cultured rat hepatocytes, phyllanthin and hypophyllanthin have been shown to be hepatoprotective properties against hepatotoxicity induced by carbon tetrachloride. The liver injury markers, were considerably reduced by these two compounds.[42] *Phyllanthus niruri* has been shown to be an antiviral medication in human patients with Hepatitis B. In a pilot investigation, Hepatitis-B virus suff *niruri* erers were given a 200 mg plant preparation to take for 1 month. When examined approximately 20 days after the end of treatment, twenty two patients out of the Thirty seven i.e approximately 59% of treated patients had shed Hepatitis-B surface antigen, comparing to only one out of twenty three (4%) placebo treated subjects. In the Hepatitis–B virus, it has been demonstrated to disrupt DNA polymerase, which is responsible for virus replication. In vitro, it demonstrated a high immune-inactivating ability against HBs Ag. At temperature of 37°C, an extract from the *Phyllanthus niruri Linn*. Plant reduces hepatitis B virus endogenous Reverse transcriptase and reacts to the virus surface antigen, according to clinical testing. (43)Other phytochemicals found in this plant, such as protocatechuic acid, niruriflavone, and pectolinarin, have been shown to have hepatoprotective properties. P. niruri has the potential to be a useful hepatoprotective agent. It has been demonstrated to be beneficial in the treatment of infective hepatitis jaundice. Its efficacy can be linked to the phenolic components' powerful antioxidant and anti-inflammatory properties. (44) *Phyllanthus niruri Linn* extract was used as a pre - treatment. As evaluated by the decrease in SGOT levels, in paracetamol-induced acute liver injury in rats. In an in- vitro study, it lowered the release of SGOT and SGPT in rat primary cultured hepatocellular damage treated with ethanol. (45)

Discussion

The liver (Yakrut) function is explained in terms of *Dosha* (vital biological forces - humour), *Dhatu* (body tissue), *Mamsa* (muscular tissue), and *Mala* (disease) (excreta).*Yakrut* is main seat for formation of *rakta dhatu* according to sushruta. The origin of the *raktavaha Srotas* is described in ayurvedic literature as *Yakrut* and *Pleeha* (liver & spleen). Liver diseases and its treatment are described in Ayurveda in scattered form. *Yakrut Vikara* (Liver diseases) was first time mentioned by Bhavmishra. (46)In parishista prakarana of madhavanidana samhita written by aacharya Madhava defines *yakrut roga* (hepatic illness) thoroughly with its causes and symptoms. In that he explains the etiological factors for *yakruta vikara* clearly. Overconsumption of *Vidahi annapanam*, *Madya sevana, Ati Teekshn padartha sevan* leads *pitta dushti* and *rakta dushti*, and causes *Rakta dushtijanya vikara* which further manifested the diseases related to liver, spleen.(47)Various disorders are mentioned in ayurveda classics depending on their size, structures, and shape, Such as *Yakrut Vrudhi* (Hepatomegaly), *Yakrut dalludara*, *Yakrutodra, Yakrut Kshaya* (Liver Cirrhosis), *Yakrut Vidradhi* (Liver Abscess), *Yakrut granthi* (hepatic cyst). Whereas diseases like *Kamala, Halimaka, Kumbhakamala, Panaki*, described as types of *Kamala vyadhi*, In the light of modern medicine, the involvement of *tridosa, Meda, Krimi, Madhya, and asatmya* in the pathogenesis of *yakrut vikara* is enumerated and classified according to aetiology. Ayurveda treats all hepatic ailments by focusing on the correcting the *pitta dosha* instead of the organs individually. For all forms of liver illnesses, drugs and diets that normalize *pitta,* have *Deepana- Pachana karma* (digestive stimulant and carminative), *Agni vardhaka* properties i.e act on *Jatharagni* and *Dhatwagni* (correcting digestive fire and fire lying in tissues) are often recommended. The majority of the hepatocyte protective medications discussed include *kaphapittahara* property (normalize *pitta* and *kapha*), as well as *Katu Tikta rasa, laghu ruksha guna,* and *Ushna virya*. As a result, it aids in the increase of metabolism (particularly catabolism), as well as the elimination of metabolic toxic products accumulated in the body as a result of disturbed metabolism.

The hepatoprotective action differs from herb to herb, according to current pharmacology. The majority of research has found that countering oxidative stress, which destroys the liver, is the main hepatoprotective mechanism. Several phytomedicines or polyherbal preparations are still being utilized to prevent and cure a variety of liver diseases Herbal medicines contain a number of compounds that have significant anti - oxidant properties. Flavonoids , alkaloids, saponins,

vitamins (A, C, E, K), carotenoids, minerals (selenium, copper, manganese, zinc, chromium, iodine are Antioxidant may be used to treat a variety of diseases by shielding cells from damage caused by 'free radicals,' which are extremely reactive oxygen molecules. *Tinospora cordifolia* (*Guduchi*) improves inhibited Kupffer cell function, which is involved in the synthesis of chemicals such as interleukins and tumour necrosis factors.It act as antibiotic effect that activate the body's immune system and act as immunomodulators.It regulates the increased levels of gamma-glutamyl transferase, aspartate transaminase, alanine transaminase, Triglyceride, Cholesterol, HDL and LDL. It stimulates liver regeneration & is capable of scavenging free radical generation. *Satwa* from *T. cordifolia* had a specific action in maintaining the lipid profile (total cholesterol, high-density lipoprotein, low-density lipoprotein, and very low-density lipoprotein.). *Daruharidra* (*Berberis*) and *Punarnava* (*Boerhavia diffusa*) remarkably reduced the level of SGOT, SGPT, liver lipid peroxides levels, reduced incidence of liver lesions, hepatocyte swelling, leukocyte infiltrations and necrosis.The heptoprotective activities are both preventive and curative. *Punarnava (Boerhavia diffusa)* prevented the animal from hepatotoxic activity by lowering blood SGPT levels, Sr. Cholesterol, Sr. Lipids levels and total lipid levels resulting in a significant reduction in fatty tissue deposition in hepatocytes. *Pipali* (*Piper longum* Linn.) possesses various alkaloids compounds that aid in hepatic cells rejuvenation, liver enzymes reduction, and total and direct bilirubin reduction. *Kalamegha* (*Andrographis paniculata* Nees) acts as a powerful activator of gall bladder functioning, by increasing bile flow, bile salt, and bile acid levels more effectively than the traditional drug silymarin. It also enhances metabolism and hepatic activity tests, as well as protecting DNA from oxidative stress and preventing dangerous compounds from binding to it. According to safety tests, *Kalamegha* is quite well sustained even at larger concentrations without creating any side effects. *Yashtimadhu* (*Glycyrrhiza glabra.*) acts by inhibiting free radicals and lipid peroxidation, lowering the increased levels of liver biomarkers and reducing liver damage and oxidative stress in hepatic tissue. *Dhataki* (*Woodfordia fruticosa*) successfully lowered high serum levels of liver enzymes and reduce the degree of liver cirrhosis. It suggests that it has both preventative and therapeutic properties for fatty liver disease. It stimulates the activity of the choleretic system. The active phytoconstituents of plant *Gokshura* (*Tribullus terrestris*) are flavonoids, alkaloids, saponins, lignin, amides, and glycosides.It acts as hypolipidemic properties by regulating lipid metabolism it controls hypercholesterolemia and hypertriglyceridemia. *Kutaja* (*Picrorhiza kuroo*) act as hydrocholeretic effects, anti-necrotic effect, reduces fatty infiltration and lipid deposits, inhibition of lipid peroxidation antiviral effects on vaccinia viruses anti-inflammatory effects.(48) *Bhumyamalaki* (*Phyllanthus species*) has been shown to be an antiviral medication in humans with Hepatitis B. Its powerful antioxidant and anti-inflammatory effects of its phenolic components greatly lowered liver damage indicators.

Conclusion

Herbal drugs have the enormous capacity for the treatment of liver diseases. It is noteworthy that herbal medicines have a wide range of antioxidant, immunomodulatory and hepatoprotective actions, suggesting that they may be effective in the treatment of liver illnesses thus it plays a significant part in the rebuilding of hepatic normal functions. There is no single medicine that can treat all types of severe hepatic disease. A symbiotic impact of multiple medicinal herbs is likely to cure serious liver illnesses as expected. The introduction of these drugs with considering efficacy and safety perspective can aid in the management of liver diseases as well as their hepatoprotective properties.

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