A REVIEW: HEPATO PROTECTIVE ACTIVITY

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Abstract- **Liver diseases are a primary international health trouble, with excessive endemicity in developing nations. They're especially caused by chemical substances and some pills whilst taken in very excessive doses. Despite advances in modern-day medication, there is no powerful drug available that stimulates liver feature, provide protection to the liver from harm or help to regenerate hepatic cells. There is pressing need, consequently, for powerful capsules to replace/complement the ones in contemporary use. The plant state is undoubtedly treasured as a supply of recent medicinal marketers. The present work constitutes a evaluation of the literature on plant extracts and chemically described molecules of natural starting place with hepatoprotective interest. This work intends to aid researchers within the take a look at of natural products useful in the treatment of liver diseases**

Keywords: **Hepatoprotective activity, Liver illness, Natural source, Liver.**

INTRODUCTION

The liver is the most crucial organ in the body. It plays a pivotal role in regulating numerous physiological strategies. It is also concerned with numerous important functions, which include metabolism, secretion, and the garage. It has awesome potential to detoxicate toxic materials and synthesize useful concepts. [1,2] It allows for the maintenance, overall performance, and regulation of homeostasis in the body. It's far more concerned with nearly all of the biochemical pathways to growth, combating sickness, nutrient supply, power provision, and replication.[3]

Liver diseases are some of the most severe illnesses. They will be classified as acute or continual hepatitis (inflammatory liver diseases), hepatiosis (non-inflammatory diseases), and cirrhosis (a degenerative disease ensuing in fibrosis of the liver). Liver diseases are especially caused by poisonous chemical substances (certain antibiotics, chemotherapeutics, peroxidized oil, aflatoxin, carbon tetrachloride, chlorinated hydrocarbons, and so on.), excess alcohol intake, infections, and autoimmune illnesses.[4]

The bile secreted with the aid of the liver, among other things, performs an essential position in digestion. Liver cell damage induced by a variety of toxicants, such as positive chemotherapeutic agents, carbon tetrachloride, thioacetamide, etc., continual alcohol consumption, and microbes is well studied. Enhanced lipid peroxidation all through the metabolism of ethanol can also end in improvement of hepatitis leading to cirrhosis. Since time immemorial, mankind has used plants to treat a number of ailments. The Indian traditional medicine systems like Ayurveda, Siddha, and Unani are predominantly based on the use of plant materials. Herbal capsules have gained significance and reputation in recent years due to their safety, efficacy, and cost effectiveness. In some cases, the affiliation of scientific flowers with other plant life in their habitat additionally influences their medicinal values. One of the necessary and well-documented uses of plant products is their use as hepatoprotective agents. Hence, there is an ever-growing need for a secure hepatoprotective agent.

Medicinal plant life plays a key role in human fitness care. Approximately 80% of the world's population relies on conventional medication that's predominantly based on plant substances. The term "traditional remedy refers to a vast variety of historic herbal fitness care practices, including folk and tribal practices as well as Ayurveda, Siddha, and Unani. Those medical practices originated from time immemorial and developed gradually, to a massive quantity, by relying on or primarily basing them on sensible studies without tremendous references to modern clinical concepts. [5]

TYPE OF ASSAY

Assay of liver glutathione and blood glutathione method[6]

Normal saline is used for washing the liver tissue and homogenates (1 g of wet tissue to 9 ml of 1.15% KCl) by using motor-driven Teflon-pestle and estimated the reduced glutathione by using 5,5'-dithio-bis (2-nitrobenzoic acid). The absorbance measured at 412nm.

A metaphosphoric acid-NaCI-E DTA filtrate of whole blood is reacted with a water soluble sulfhydryl reagent and the yellow color formed is measured at 412 nm. This technique provides a reliable method for measuring red cell reduced glutathione. The absorbance measured at 412nm.

Assay of Lipid Peroxidation[7]

Thiobarbituric acid and malondialdehyde combine in an acidic medium at 95°C for 30 minutes to produce thiobarbituric acid reactive product. The absorbance of the pink product produced by this reaction can be measured at 534 nm.

Assay of SGOT[8]

Blood was collected by heart puncture and the serum was separated and adds reagent mix well and measured at 340 nm

Assay of SGPT[8]

Blood was collected by heart puncture and the serum was separated and adds reagent mix well and measured at 340 nm

Assay of ALP[8]

Blood was collected by heart puncture and the serum was separated and adds reagent mix well and measured at 405 nm

Total protein[9]

Blood was collected by heart puncture and the serum was separated and adds Saline solution, Biuret reagent heat at 37°C for 10 min. After Violet color formation measured at 540 nm.

Total cholesterol[10]

By a sequence of linked processes that hydrolyze cholesteryl esters and oxidise the 3-OH group of cholesterol, cholesterol is measured enzymatically in blood or plasma. Among the responses H_2O_2 is quantified as a byproduct of a peroxidase-catalyzed process that yields a colour. At 500 nm, absorbance is measured. The intensity of the color is proportional to the level of cholesterol.

S.No	Botanical name	Family	Origin	Part used	Extract	Inducer of liver damage	Type of assay
1.	*Azadirachta indica* [6]	Meliaceae	Kolkata, India	Leaves	70 % Ethanol	Paracetamol	Liver glutathione and blood glutathione Na+K+-ATPase activity Thiobarbutiric acid reactive substances
2.	*Emblica officinalis* [7]	Euphorbiaceae	Thrissur, Kerala	Fruits	Water	Carbon tetrachloride	liver lipid peroxides, Glutamate-pyruvate transaminase, Alkaline phosphatase
3.	*Kalanchoe pinnata* Pers [8]	Crassulaceae	Madhya Pradesh,India	Leaves	Ethanol	Carbon tetrachloride	SGOT, SGPT, SALP and SBLN
4.	*Apium graeolens* Linn.[9] *Croton oblongifolius* Roxb.	Apiaceae Euphorbiaceae	Chandigarh, India	Seeds Aerial parts	Petroleum ether (60–80 °C), acetone and methanol	Carbon tetrachloride	SGOT and SGPT, Alkaline phosphatase, Total protein and Total albumin
5.	*Momordica dioica* Roxb [11]	Cucurbitaceae	Madhya Pradesh, India	Leaves	95% ethanol	Carbon tetrachloride	Aspartate aminotransferase , Serum glutamate pyruvate transam-inase , Serum alkaline phosphatase
6.	*Amaranthus spinosus*[12]	Amaranthaceae	India	Whole plant	50% ethanolic extract	Carbon tetrachloride	Serum glutamate oxaloacetate transaminase, Serum glutamate pyruvate transaminase, Serum alkaline phosphatase and total bilirubin
7.	*Boerhaavia diffusa* L.[13]	Nyctaginaceae	Lucknow, India	Roots	Aqueous	Thioacetamide	Serum glutamate oxaloacetate transaminase, glutamate pyruvate transaminase , acid phosphatase and alkaline phosphatase
8.	*Solanum* melon gena[14]	Solanaceae	Thailand	Fruit	Methanol	Tert-butyl hydroperoxide	MTT assay
9.	*Cassia fistula*[15]	Leguminosae	Tripura, India	Leaf	90% methanol	Carbon tetrachloride	Serum GOT ,GPT, serum bilirubin and serum alkaline phosphatase
10.	*Boerhavvia difusa*[16]	Nyctaginaceae	Jammu Tawi, India.	whole plant	50% ethanolic	Carbon tetrachloride	SGPT, SGOT
11.	*Cistanche deserticola*[17]	Orobanchaceae	China	Stem	Acteone-H_2O(9:1)	Carbon tetrachloride	AST,ALT,LDH

12.	*Acacia Catechu* [18]	Leguminosae	Tamilnadu,India	----------	95% ethanol	carbon tetrachloride	SGPT, SGOT, Serum alkaline phosphatase and Bilirubin content
13.	*P. amarus* [19] *Schumach.*, *P. urinaria* L., *P. debilis Klein* ex Willd, *P.tenellus* Roxb., *P. virgatus* G.Forst., *P. maderaspatensis* L., *P. reticulatus* Poir., *P. polyphyllus* Willd., *P. emblica* L., *P. indofischerii* Bennet. *P. acidus* (L.) Skeels	Phyllanthaceae	Southern India, Andaman and Nicobar Islands	Leaves and Stems	Methanol and Aqueous	Carbon tetrachloride , Galactosamine and ethanol	HepG2 cell line
14.	*Phaseolus radiates*[20] *Phaseolus aureus* *Glycine max* Phaseolus calcaratus	Leguminosae	Taiwan	Leguminous seed	Boiling water	Acetaminophen	SGOT, SGPT
15.	*Abutilon indicum* [21]	Malvaceae	Tamil Nadu	Leaves	Distilled water	Carbon tetrachloride, Paracetamol	Serum glutamic oxaloacetate transaminase, Serum glutamic pyruvate transaminase, Alkaline phosphate, Total bilirubin, direct bilirubin, Liver glutathione
16.	*Musa paradisiacal* [22]	Musaceae	Karnataka,India	Stem	Ethanol	Carbon tetrachloride-and paracetamol	SGOT and SGPT, Alkaline phosphatase, Direct bilirubin and Total bilirubin
17.	*Citrus limon* [23]	Rutaceae	Ahmedabad , India	Fruits	70% ethanol	Carbon tetrachloride	SGOT,SGPT,Aspartate aminotransferase, Alanine aminotransferase , Alkaline phosphatase, Total bilirubin, Direct bilirubin, Total protein and albumin
18.	*Solanum lyratum* [24]	Solanaceae	Korea	Aerial parts	80% MeOH	Carbon tetrachloride	Glutamic pyruvic transaminase, Sorbitol dehydrogenase, Glutathione, Malondialdehyde, Glutathione S-transferase, Superoxide dismutase and Catalase
19.	*Gundelia tourenfortii*[25]	Compositae	Southern Iran	Fresh edible stalk	70% Aqueous Ethanol	Carbon tetrachloride	Serum aminotransaminase, Alanine amino transferase and Alkaline phosphatase

20.	*Andrographis Paniculata* [26] *Swertia Chirayita*	Acanthaceae Gentianaceae	Kerala, India	Aerial parts	70% ethanol	Paracetamol	Glutamate oxaloacetate transaminase, Glutamate pyruvate transaminase , Alkaline phosphatase , Serum bilirubin
21.	*Daucus carota* L.[27]	Apiaceae	India	Fresh tuber roots	Distilled water	Carbon tetrachloride	Glutamate oxaloacetate transaminase, Glutamate pyruvate transaminase, Lactate dehydrogenase, Alkaline phosphatase, Sorbitol and Glutamate dehydrogenas
22.	*Casuarina equisetifolia* [28]	Casuarinaceae	Bangladesh	Leaf and bark	Methanol	Carbon tetrachloride	Alanine aminotransferase,Aspartate aminotransferase, Cholesterol, Bilirubin and Glucose
	Cajanus cajan	Fabaceae		Whole plant			
	Glycosmis pentaphylla	Rutaceae		Leaf and bark			
	Bixa orellana	Bixaceae		Seed			
	Argemone mexicana	Papaveraceae		Whole plant			
	Physalis minima	Solanaceae		Leaf and bark			
	Caesalpinia bonduc	Fabaceae		Leaf and bark			
23.	*Phyllanthus niruri* [29]	Phyllanthaceae	Gujarat	Leaves	Distilled water	Paracetamol	Alanine aminotransferase, Aspartate aminotransferase activities, alkaline phosphatase activity, Total bilirubin and Total albumin
	Maytenus emarginata	Celastraceae					
	Eclipta alba	Asteraceae					
	Aloe Vera	Asphodelaceae					
	Solanum indicum	Solanaceae					
	Aegle marmelos	Rutaceae					
24.	*Verbascum sinaiticum* Benth [30] *Justicia schimperiana* (Hochst. ex Nees)	Scrophulariaceae Acanthaceae	Ethiopia	Leaves	80% methanol, petroleum ether, chloroform, acetone	Carbon tetrachloride	ST, ALT, ALP, and LDH
25.	*Terminalia catappa* L. [31]	Combretaceae	South of China	Leaves	Ethanol	Carbon tetrachloride	Serum ALT and AST
26.	*Achyrocline satureioides* Lam D. C. [32]	Asteraceae	Argentina	Aerial part	Distilled water	Bromobenzene	Serum levels of alanine-aminotransferase, Aspartate transaminase , Thiobarbituric acid reacting substances and Glutathione level
27.	*Coccinia grandis* Linn [33]	Curcubitaceae	Chennai	Fruits	95% alcohol	carbon tetra chloride	SGOT, SGPT, and ALP) and Total bilirubin, Direct Total bilirubin
28.	*Sida rhomblfolla* L.[34]	Malvaceae	Lucknow	Aerial parts and roots	Methanol and water	Paracetamol, Rifampicin, Carbon tetrachloride	Serum glutamic oxalacetic transaminases , Serum glutamic pyruvic transaminase , Serum alkaline phosphatase, Serum

							total bilirubin and Serumdirect bilirubin
29.	*Talinum triangulare*[35]	Portulacaceae	China	Whole plant	Distilled water	Carbon tetrachloride	AST ,ALT, MDA and GSH level
30.	*Solidago microglossa* [36]	Asteraceae	Brazil	Leaves	ethanol	Paracetamol	SGPT, SGOT, CAT activity
31.	*Calotropis procera* [37]	Apocynaceae	Harapanahalli	Flowers	Hydro-ethanolic extract (70%)	Paracetamol	SGPT, SGOT, ALP, bilirubin, cholesterol, HDL and tissue GSH
32.	*Zanthoxylum armatum*[38]	Rutaceae	Ahmedabad	Bark	Ethanol	Carbon tetrachloride	Alanine aminotransferase, Aspartate aminotransferase, Alkaline phosphatase , Direct bilirubin , Total bilirubin and Total protein
33.	*Moringa oleifera* [39]	Moringaceae	Tamil Nadu, India	Leaves	Ethanol (95%)	Isoniazid, Rifampicin ,and Pyrazinamide	Glutamic oxaloacetic transaminase, Glutamic pyruvic transaminase, Alkaline phosphatase, and bilirubin in the serum; lipids, and lipid peroxidation levels in liver.
34.	*Mimosa pudica* [40]	Mimosaceae	Tamilnadu, India	Leaves	Methanol	Carbontetra chloride	Serum glutamic oxaloacetate transaminase, Serum glutamic pyruvates transaminase, Alkaline phospatase , Total bilirubin , Total cholesterol and by increasing the levels of total protein and albumin
35.	*Luffa echinata*[41]	Cucurbitaceae	Chandigarh, India	Fruits	Petroleum ether (60– 80°C), Acetone and Methanol	Carbontetra chloride	Serum glutamic oxalacetic transaminase, Serum glutamic pyruvate transaminase, Alkaline phosphatase ,Total protein and Total albumin
36.	*Anoectochilus roxburghii*[42]	Orchidaceae	China	Leaves	95% ethanol	Carbontetra chloride	Serum ALT and AST
37.	*Beta vulgaris*[43]	Chenopodiacea e	Merrut	Roots	95% ethanol	Carbontetra chloride	Serum cholesterol , triglycerides , alanine amino and alkaline phosphatase
38.	*Centaurium erythraea* [44]	Gentianaceae	Lebanon	Leaves	Methanol	Acetaminophen	Serum glutamate oxaloacetate transaminase, Serum glutamate pyruvate transaminase and lactate dehydrogenase
39.	*Cassia occidentalis* [45]	Caesalpiniacea	New Delhi	Fresh leaves	Aqueous ethanol (50%, v/v)	Paracetamol, Ethyl alcohol	Aspartate amino transferase and serum alanine amino transferase, Alkaline posphatase, Serum cholesterol, Serum total lipids

40.	*Daucus carota* [46]	Apiaceae	T amilnadu	Seeds	Methanol	Thioacetamide	Serum glutamic pyruvic transaminase , Serum glutamate oxaloacetate transaminase and Alkaline phosphatase
41.	*Trianthema portulacastrum* L.[47]	Aizoaceae	Tamilnadu, India.	Leaves	Ethanol	Paracetamol and Thioacetamide	Serum glutamate oxaloacetate transaminase, Serum glutamate pyruvate transaminase,Alkaline phosphatase, Bilirubin, and Total protein
42.	*Terminalia catappa* L[48]	Combretaceae	Taiwan	Leaves		Carbon tetrachloride	Serum glutamate-oxalate-transaminase and glutamate-pyruvate-trans-aminase
43.	*Mangifera indica* [49]	Anacardiaceae	Thailand	Fruit	Ethanol	Carbon tetrachloride	Serum alanine aminotransferase, serum aspartate aminotransferase
44.	*Carum copticum* [50]	Apiaceae	Karachi	Seed	70% Aqueous methanol	Paracetamol and Carbon tetrachloride	ALP, AST and ALT
45.	*Cynara scolymus* [51]	Compositae				Carbon tetrachloride	SGOT,SGPT
46.	*Barleria Prionitis* Linn [52]	Acanthaceae	India	Leaves and stems	50% ethanol	Carbon tetrachloride, Galactosamine and Paracetamol	ALT, AST, Bilirubin, Alkaline phosphatase, Triglycerides, GSH
47.	*Artemisia vulgaris* [53]	Compositae	Karachi	Aerial parts	70% aqueous-methanol	D-galactosamine and Lipopolysaccharide	ALT and AST.
48.	*Apium graveolens* [54] *Hygrophila auriculata*	Apiaceae Acanthacea	Chandigarh	Seed	Methanol	Paracetamol and thioacetamide	SGOT,SGPT, SALP, Sorbitol dehydrogenase, Glutamate dehydrogenase and serum bilirubin
49.	*Ricinus communis* [55]	Euphorbiaceae	Lucknow	Leaves	Ethanol	Paracetamol	SGOT, SGPT, ACP,ALP, GIDH
50.	*Tephrosia purpurea* L [56] *Tecomella undulate*	Fabaceae Bignoniaceae	Delhi, India	Aerial parts Stem bark	60% (v/v) of ethanol Ethanol	Thioacetamide	Serum AST, ALT, GGT, ALP, total bilirubin
51.	*Phyllanthus amarus Schum.* et. Thonn. [57]	Euphorbiaceae	Thailand	Aerial part	Aqueous	Ethanol	MTT assay, AST and ALT, serum triglyceride, Hepatic triglyceride, serum TNF-α and IL-1β
52.	*Fumaria indica* [58]	Fumariceae	Gujarat, India	Whole plant	Petroleum ether, Aqueous, Methanol	Paracetamol and Carbon tetrachloride, Rifampicin	SGOT, SGPT, ALP, Total bilirubin, Direct bilirubin
53.	*Lactuca indica* L.[59]	Compositae	Republic of Korea	Aerial parts	80% Methanol	Hepatitis B virus production	HBV-transfected liver cell line HepG2.2.15
54.	*Ocimum sanctum* [60]	Lamiaceae	Nortdh Bengal	Leaf	90% ethyl alcohol	Paracetamol	Total serum protein, Albuminglobulin ratio,

							Alkaline phosphatase , Aspartate aminotransferase and Alanine aminotransferase
55.	*Rhus coriaria* L.[61]	Anacardiaceae	Iran.	Fruits	Aqueous	Cumene hydroperoxide	----------
56.	*Silybum marianum Cichorium intybus*[62]	Asteraceae	Iran	Seed	Ethanol	Thioacetamide	SGOT and SGPT, Alkaline phosphatase, Bilirubin
57.	*Capparis spinosa*[63]	Capparidaceae	Iran	Bark	Ethanol (80% v/v in water)	Carbon tetrachloride	Alanine aminotransferase and asparate aminotransferase
58.	*Vitex negundo*[64]	Verbenaceae	Jammu	Leaf	Ethanol	Isoniazid , Rifampin and Pyrazinamide	AST, ALT and ALP
59.	*Cupressus sempervirens* L.[65]	Cupressaceae	Egypt	Leaves	$CHCl_3$, EtOAc, and MeOH	Carbon tetrachloride	Glutamate oxaloacetate transaminase, Glutamate pyruvate transaminase, Total protein, Cholesterol, and Triglycerides
60.	*Cleome viscosa* L.[66]	Cleomaceae	Viet Nam	leaves	95% Ethanol	Carbon tetrachloride	HepG2 cells-mitochodrial succinate dehydrogenase activity,MTT Assay
61.	*Holothuria atra*[67]	Holothuriidae	Suez and Aqaba Gulfs	Body wall of animal	10 vol of a mixture of acetonitrile and 0.1% trifluoroacetic acid	Thioacetamide	ALT and AST, ALP
62.	*Thunbergia laurifolia* Linn[68]	Acanthaceae	Thailand	Leaves	Aqueous	Ethanol	ALT and AST
63.	*Kyllinga nemoralis*[69]	Cyperaceae	Chennai,Tamilnadu	Rhizomes	Petroleum ether and ethanol	Carbon tetrachloride	Total bilirubin,Serum glutamate pyruvate transaminase,Serum glutamate oxaloacetate transaminase,Serum phosphatases
64.	*Elephantopus scaber*[70]	Asteraceae	Malaysia	Leaves	Ethanol	Alcohol	ALT, ASP, ALP, Total bilirubin, Total glycerides
65.	Wedelia calendulacea L.[71]	Asteraceae	Tamilnadu	Leaves	Ethyl alcohol	Carbon tetrachloride	ALT, AST and ALP
66.	*Solanum fastigiatum*[72]	Solanaceae	Brazil	Leaves	Aqueous	Paracetamol	Serum glutamate pyruvate transaminase,Serum glutamate oxaloacetate transaminase, Catalase activity,
67.	*Citrus grandis* (L.)Osbeck[73]	Rutaceae	China	Dried fruits	70% EtOH	Hepatic LO2 cell	MTT method
68.	*F. densiflora* DC.,[74] F. *kralikii Jordan* F. *parviflora Lam.*	Fumariaceae	Turkey	Whole plant	Ethanol	Carbon tetrachloride	AST ,ALT, Total bilirubin,Direct bilirubin , Indirect bilirubin.

69.	*Clerodendrum inerme* [75]	Lamiaceae	Tamilnadu, India	Leaves	50% aq. EtOH	Carbon tetrachloride	Alanine amino transferase, Aspartate amino transferase, Alkaline phosphatase , Triglycerides and cholesterol
70.	*Woodfordia fruticosa* Kurz[76]	Lythraceae	Jammu,India	Flowers	Petroleum ether, Chloroform , 95% Ethyl alcohol and distilled water	Carbon tetrachloride	Alanine aminotransferase. Aspartate aminotransferase, LDH, Bilirubin,triglycerides
71.	*Cyathea gigantean* [77]	Cyatheaceae	Andhra Pradesh, India	Leaves	(70:30) methanol: water	Paracetamol	Serum glutamic-oxaloacetic transaminase, Serum glutamic pyruvic transaminase, Alkaline phosphatase,Total bilirubin and Total protein
72.	*Ocimum basilicum* Linn.[78] *Trigonella foenum-graecum* Linn.	Lamiaceae	Tamilnadu, India	Leaves	Ethanol	H_2 O_2 or CCl_4	Aspartate aminotransferase, Alanine aminotransferase, Alkaline phosphatase and gammaglutamyl transpeptidase
73.	*Adansonia digitata* [79]	Malvaceae	Saudi Arabia	Fruits	Methanol	Acetaminophen	Total protein, total bilirubin, ALP, ALT, and AST
74.	*Ficus racemosa* [80]	Moraceae	West Bengal, India	Leaf	Petroleum ether	Carbon Tetrachloride	SGOT, SGPT, Serum bilirubin and Alkaline phosphatase
75.	*Adhatoda vasica* [81]	Acanthaceae	Calcutta, India	Leaf	Aqueous	D-galactosamine	SGOT, SGPT
76.	*Moringa oleifera* Lam [82]	Moringaceae	Jaipur,India	Leaves	Alcohol (95% v/v)	Carbon Tetrachloride	SGOT, SGPT, GGT, LDH, ALP, ACP, Total bilirubin, Total protein and Albumin
77.	*Tribulus terrestris* [83]	Zygophyllaceae	Tiruchirappalli, Tamilnadu	Fresh plant	Distilled water	Acetaminophen	GOT, GPT, ALP, ACP, G6PHD and LDH
78.	*Marrubium vulgare* L [84]	Lamiaceae	Jammu and Kashmir, India	Whole plant	Methanol	Paracetamol	Alanine amino transferase, Aspartate amino transferase, Alkaline phosphatase, Albumin, triglycerides and serum bilirubin
79.	*Glycosmis pentaphylla* [85]	Rutaceae	Orissa, India	Leaves	Methanol and Petroleum ether	Paracetamol	Alanine aminotransferase, Aspartate aminotransferase, Alkaline phosphatase, Total bilirubin and Total protein
80.	*Dodonaea viscose* [86]	Sapindaceae	Khoshab, Pakistan.	Leaves	Aqueous, aqueous:methanol (70:30, 50:50, 30:70) and methanol	----------	ALT,AST
81.	*Rosmarinus officinalis* L.[87]	Lamiaceae	Romania	Fresh young shoots	90% v/v ethanol	Carbon tetrachloride	Alanine aminotransaminase,

							Aspartate aminotransaminase
82.	*Sonchus asper* [88]	Pakistan	Rawalpindi, Pakistan	Whole plant	methanol	Carbon Tetrachloride	Alanine aminotransferase, Aspartate aminotransferase, Alkaline phosphatase, Lactate dehydrogenase
83.	*Eclipta alba* [89] *Piper longum*	Asteraceae Piperaceae	Chennai, India	Leaves seeds	90% (v/v) ethanol	Carbontetrachloride	Glutamate oxaloacetate transaminase, Glutamate pyruvate transaminase, Alkaline phosphatase, Acid phosphatase , Actate dehydrogenase
84.	*Cucurbita Maxima* [90]	cucurbitaceae	West Bengal, India	Aerial parts	Methanol	Carbontetrachloride	Serum glutamic pyruvate transaminase, Serum glutamic oxaloacetic transaminase and alkaline phosphatase
85.	*Alysicarpus vaginalis* [91]	Fabaceae	Tamil Nadu India	Aerial part	Ethanol	Nitrobenzene	Alanine transam-inase, Aspartate transaminase, Alkaline phosphatase
86.	*Salix subserrata* [92]	Salicaceae	Egypt	Flowers	Ethanol	Carbon-tetrachloride	Serum ALT, AST , ALP, Albumin, Total bilirubin , Triglycerides , Urea , Creatinine, Total cholesterol , Lipid peroxides,GSH content
87.	*Curcuma xanthorrhiza* Roxb [93]	Zingiberaceae	Malaysia.	Rhizome	Ethanol	Ethanol	ALT, AST, ALP and total protein
88.	*Terminalia paniculata* [94]	Combretaceae	Udupi	Bark	95 % ethanol	Paracetamol	AST, ALT, ALP and lipid peroxide
89.	Nigella sativa oil [95]	Ranunculaceae	Saudi Arabia	----------	----------	Carbontetrachloride	AST, ALT, ALP
90.	*Astraeus Hygrometricus* (Pers.) Morg [96]	Diplocystaceae	West Bengal, India	Fresh mushrooms	Ethanol	Carbontetrachloride	SGOT,SGPT, Total bilirubin, Direct bilirubin
91.	*Eugenia jambolana* Lam [97]	Myrtaceae	Rajasthan,India	Seed	Methanol	Carbon tetrachloride	SGOT,SGPT, ALP, ACP, Total bilirubin, Direct bilirubin
92.	Date palm fruit [98]	Arecaceae	South of Tunisia	Fruit	Aqueous	Dichloroacetic acid	AST, ALT, LDH and GGT, nd conjugated bilirubin
93.	*Tephrosia purpurea* [99]	Fabaceae	Ranchi, India	Aerial parts	Hydro-alcoholic solution (40% distilled water + 60% ethanol)	Sodium arsenite	AST, ALT, ALP, Serum total protein
94.	*Morus nigra* [100]	Moraceae	Faisalabad	Leaves	Aque-ous methanol (70:30)	Paracetamol	ALT, AST, ALP and total bilirubin
95.	*Bacopa monnieri* Linn [101]	Schrophulariaceae	Orissa, India	Aerial parts	Ethanol	Paracetamol	SGOT, SGPT,ALP, bilirubin (Direct and Total)
96.	*Chenopodium Album* Linn [102]	Chenopodiacea e	Hamirpur, India	Aerial parts	Alcohol and distilled water	Paracetamol	Asparate aminotransferase, Alanine aminotransferase , Alkaline phosphatase, albumin, Total protein, Total bilirubin

97.	*Cirsium setidens* Nakai [103]	Compositae	South Korea	Roots and leaves	EtOH andwater	Carbon Tetrachloride	SGOT, SGPT
98.	*Morus alba* Linn. [104]	Moraceae	Maharashtra , India	Leaves	Petroleum ether, chloroform, alcohol (90%) and distilled water	Carbon tetrachloride	SGOT, SGPT,ALP, Serum bilirubin
99.	*Amorphophallus Campanulatus* Roxb. [105]	Araceae	Madhya Pradesh, India	Tubers	Ethanol and water	Carbon tetrachloride	Aspartate aminotransferase , Serum glutamate pyruvate transaminase ,Serum alkaline phosphatase

DISCUSSION

The most precise evidence for the hepatoprotective effects of some fruits and plants, a natural resin, and one of the main polysaccharides in the cellular wall of yeasts, algae, and cereals against various toxic compounds that damage the liver was compiled in this study. In the same way, the studies that were presented proved that fruits and plants are used in common medicine to treat hepatic damage, which is one of the chronic degenerative diseases. The described fruits, plants, and compounds may provide novel alternatives to the few available treatments for liver diseases: Consequently, these foods ought to be taken into account in future research. In general, this article identified and demonstrated some phytochemicals with hepatoprotective activity. The primary mechanisms of action of these phytochemicals were related to their antioxidant potential, which should encourage the search for effective protective agents. However, their safety and chemopreventive capacity must be evaluated later in pre-clinical and clinical assays.

CONCLUSION

The prevailing take a look at well-known indicates plant extracts with hepatoprotective residences toward poisonous chemical substances that reason liver harm, seeming to validate their use in people remedy. Those flora can also moreover provide new alternatives to the restricted healing options that exist at present within the remedy of liver sicknesses or their signs, and that they should be considered for future studies

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