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A Comprehensive Review on Hepatoprotective Activity of Some Medicinal Plants

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ABSTRACT:
Hepatotoxicity is caused by various pollutants, OTC medicines, toxic food additives,etc. It is possible to treat hepatic disease and injury with some medicinal plants, that have the ability to protect the liver because herbal medications are safer and more readily available due to prevalence of many liver illness today. In this review paper,intraperitoneal administration of plant extracts is used to alleviate the hepatotoxicity caused by VPA, CCl_4 and paracetamol in mice and rats. The extracts from these plants contains various phytochemicals that have strong antioxidant and hepatoprotective activity which can alleviate and lower the levels of AST,ALP,SGOP, SGPTand ALT to avoid liver damage from toxic substances. These plant extracts are equivalent to silymarin,a popular drug used to treat liver disorders.

KEYWORDS: Plant extracts, Hepatoprotective, Drug- induced hepatotoxicity.

ABBREVIATIONS:VPA-Valproic acid;CCl_4-Carbaon tetrachloride;AST-Aspartate aminotransferase;ALT-Alanine aminotransferase;ALP,Alkaline phosphatase; SGOT-Serum glutamic oxaloacetic transaminase; SGPT-Serum glutamic pyuvic transaminase.

I. INTRODUCTION:

The liver is considered as one of the most important organ in the body and it plays a vital role in the metabolism and excretion of various xenobiotics and also some unbound therapeutic agents. By 2023,The total number of people with chronic liver disease will reach 447 million. The major responsible for global liver infections are pollutants,alcohols,free radicals and some medications which may lead to the development of hepatitis(A&B),cirrhosis, alcoholic liver disease, fatty liver[1] and drug induced liver injury, due to increasing incidences of xenobiotic or chemically induced hepatotoxicity, which kills more than 1million people a year. There is need for safe protective agents other than the synthetic chemical compounds. Therefore,there is particular interest in developing new drugs from plant source to treat various liver disease because, it may lead to the destruction of liver structure and liver nerve function [2]. According to the WHO, herbal drugs from various medicinalplants constitute a major part of the traditional medicine system.Recently, in developing countries the utilization of medicinal plants has gained prominence and popularitybecause of their safety, efficacy and cost effectiveness.

HEPATOPROTECTIVE PLANTS:

Some medicinal plants under this studycontainsactive ingredients with the potential to treat a wide range of ailments in liver. A variety of chemical substance including carotenoids, phenols, flavonoids, lignans,terpinoids, coumarins,organic acids,xanthins and alkaloids, glycosides in medicinal plants that offer defense against the hepatotoxic agents.There have been assertions that both plants and formulations have hepatoprotective properties.There is also a piece of evaluation provided. Several plants with hepatoprotective activity are listed below;Aeginetiaindica,Alhagicamelorum,Artemisia annua, Ceriopsdecandra, cordial rothii, Ipomoea cairica, Litseaglutinosa flos, Lonicerae japonica flos, Plectranthusamboinicus, Rhoicissus tridentateut.

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Aeginetiaindica:

Aeginetiaindica is a perennial herb from the Orobanchaceae family, generally grows as root parasite and widely distributed in the forest of south and asian countries. This also known as indian broomrape or forest ghost flower this plant not only used to prevent liver damageand also used for other pharmacological activities such as anti-diabetes, anti-tumor[4,5], arthritis and immunostimulant[6]. The methanol extract of A.indica were treatedagainst paracetamol induced hepatotoxicity in mouse model, it proves that A.indicacaused a significant reduction in the levels($p<0.001$) of liver enzymes,Alanine aminotransferase,Asparateaminotransferase and Alkaline phosphatase at a dose of 400mg/kg[3]. This plant has various phytochemicals like phenylpropanoid, glycosides and flavonoids[7].

Alhagicamelorum:

Alhagi camelorum isa traditional herb from the Leguminasae family,widely distributed in the Africa,Asia and Latin America. It is used to treat autoimmune disease,hepatic problems and digestive problems[8]. It also have anthelmentic,antipyretic,purgative and laxative properties.[9,10]. This herb has saponins, steroids, flavonoids and salicylic acid [11]. Ethanolic extract of A.camelorum stems and leaves are treated against acute hepatotoxicity, induced by valproic acid(VPA) in the Wister albino rats through intraperitoneal route at a dose of 500mg/kg[12,13]. This plant extracsS significantly improved the liver function by decreasing the body weight, ALP and AST levels in rats[14].

Artemisia annua:

Artemisia annua is a Chinese medicinal herb from the Asteraceae family, distributed in temperate Asia and North America[15,16]. A.annua used to treat intermittent fevers due to malaria,tuberculosis,lice wounds,dysentery,pain and swelling around tooth, haemorrhoids[17-19].Pharmacological activities of A.annuaincludesantitumor, antiviral and antioxidant[20].Ethanolic extract of A.annua leaves are treated against hepatocytes, induced by CCl_4 in healthy adults swiss albino mice through intraperitoneal route at a final concentration of dose 0.1mg/ml.In A.annua, the qualitative analysis confirms the presence of flavonoids[21],which used to reduce the primary hepatocytes in mice,effectively protects liver cells without cytotoxic effect.

Ceriopsdecandra(Griff):

Ceriops decandra is a Mangrove plant from theRhizophoraceae family,In folklore medicine, the bark and leaf parts of C.decandra are used tocure ulcer and hepatitis[22]. It also have antiviral,antoxidant ,anti-inflammatory,antidiabetic,larvicidal properties[23-25]. The ethanolic extract of C.decandraleaf,bark and flower are given to the wister albino rats at a dose of 100mg/ kgat low and 400mg/ kg at high through intraperitoneal to prevent the liver damage induced by CCl_4.C.decandra that protects the liver by various chemical constituents like flavonoids,polyphenols and alkaloids[26] which control the levels of SGPT, SGOT and ALP.

Cordia rothii:

Cordia rothii is a tropical plant from the Boraginaceae family. This species extend from south Africa,Madagascar and middle east to the Indian subcontinent,C.rothii used as an antimalarial,astringent,antidiabetic,anthelmentic,anti-inflammatory, diuretic and wound healing[27],appetite enhancer,cough suppressant and hepatoprotective[28]. Methanolic extract C.rothii leaves at a dose 2ml/kg in adult albino rats. Significantly increased the hepatic cell viability against CCl_4 induced acute hepatotoxicity by reduced the level of AST, ALT,ALP andtotal bilirubin[30]. This extracthas various phytochemicals like coumaranic acid,pentylcyclohexane,flavonoids and free radicals with strong antioxidant and hepatoprotective activity[29].

Ipomoea cairica:

I.cairica is a perennial plantfromthe Convolvulaceae family. This plant generally known as morning glowery. It distributed throughout tropical Africa, Asia to Taiwan.I.cairica have high larvicidal activity,antimicrobial activity and anticancer activity. It has phytochemicals in high content of alkaloids,flavonoids and saponins which able to decrease the toxic effect of CCl_4 in albino rats by treating leaf extract of I.cairicaby orally at a dose of 250mg/kg significantly reducing the levels of SGPT, AST,ALP ($p<0.05$) as standard drug silymarin[31].

Litseaglutinosa:

L.glutinosa fromLauraceae family, generally grows in india, southern china, Malaysia. They are traditionally used to treat hepatitis and liver injury by Bangladeshi folks. It have

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antioxidant, anti-inflammatory,antimicrobial,antipyretic,analgesic and wound healing activity. Methanol extract of L.glutinosa significantly ($p<0.0001$)increased the cell viability in the hepatoblastoma cells compared as silymarin drug treated in rats by docing.In L.glutinosa have phytochemicals like flavonoids, diterpenes, proteins, phenols and alkaloids [32].

Lonicerae japonica flos:

L.japonica flos is a species of honeysuckle from Caprifoliaceaefamily. This widly distributed in Eastern asia, North America, Europe, China and japan. Its commonly known as honeysuckle plant. Pharmacological activities of L.japonica flos are antioxidant,antimicrobial,anti-inflammatory,protecting liver and gallbladder,hypolipidemic and immune regulation[33-40].Phytochemicals are present in L.japonica flos like flavonoids,saponins,iridoidsand organic acids[41-45].Methanol extract of L.japonica flos plant is used to treat against the liver fibrosis in swiss mice caused by $CCl_4$and determine the effects by using molecular docking in levels of AST and ALT are by far the most widely used to reflect liver cell damage [46].

Plectranthus amboinicus lour:

P.amboinicus lour is a species of semi succulent perennial plant from lamiaceae family, it has distributed and cultivated pantrotopically and possibly from Africa and india. It is commonly known as karpooravalli in tamil. It has been found to be effective against respiratory, cardiovascular,oral and skin diseases. Its pharmacological activities are antitumor, anti epileptic, antimicrobial and hepatoprotective activity. The ethanolic extract of P.amboinicus lour leaves on liver histology for drug induced liver damage were evaluated in wister albino rats.Administerd orally 20mg/kg body weight, at the end of treatment the blood samples were collected and investigated the levels of total parameters like SGOP, ALP and AST. It shows significant reduction of ALP,AST and SGOP levels in controlled group [47].

Rhoicissus tridentatel:

R.tridentatel is a traditional zulu medicinal plants from Vitaceae family it is also known as tuberous rootstock used for infertility,bladder complaints[48] and dysmenorrhea. It is widely distributed in eastern cape, north west,South Africa.Its pharmacological activities included anti microbial,anti oxidant [49] and hepatoprotective.Aqueous extract of R.tridentatel roots are treated on group of Sprague –dawley rats against of CCl_4 induced acute liver injury. After administration of R.tridentatel root extracts it significantly reduced at ($p<0.05$)concentration of ALTand AST effects[50][51].

II. CONCLUSION:

We came to the conclusion that the medicinal plants covered in this review have the potential to treat and prevent various liver disease and illness condition as well as used to treat other diseases and disorders.

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