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STUDIES ON THE EFFICACY OF HERBAL AND MEDICINAL USED FOR THE MANAGEMENT OF HEPATOTOXICITY

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Abstract

The liver is an organ that role in the metabolic process as well as the removal of foreign toxins from the body. Damage to, or functioning of the liver is a critical public health concern that presents challenges for all parties concerned, from medical professionals and nurses to pharmaceutical companies and government regulators. Toxic compounds, such as some antibiotics, thioacetamide (TAA), chemotherapeutic drugs, carbon tetrachloride (CCl4), and others, have been subjected to significant research for the purpose of determining the negative effects that they have on the liver. Unfortunately, the synthetic drugs that are now employed in this setting to treat liver problems are themselves detrimental to the liver. As a direct consequence of this, the utilization of herbal remedies is currently at an all-time high. Herbal treatments have been used for the treatment of liver conditions for a very long time. With the help of cutting-edge scientific methodology, a variety of herbal supplements are now available for purchase. This review compiles the findings from studies that investigated potential phytochemicals that are derived from medicinal plants and have been investigated in models of hepatotoxicity. The review's objective is to gather information regarding potential phytochemicals derived from medicinal plants.

Keywords: hepatoprotective, Alternative medicine, liver disease, herbal drugs, Phytoconstituents

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Introduction

The liver is the primary organ of the biliary system, and it also plays a key role in the regulation of a large number of other body activities. It plays a unique part in the functioning of the body's physiological systems. The digestion of food, including glucose, lipids, and proteins, the clotting of blood, and the immunomodulation of the immune system are the primary functions of the liver. One in three people will suffer from some kind of liver disease throughout their lifetime. Approximately over two billion and a half million people are currently living with hepatotoxicity. Hepatotoxicity is currently the most pressing health problem in the globe. According to Rajesh and Latha (2004), the capacity of a substance, drug, or environmental exposure to cause damage to the liver is referred to as hepatotoxicity. Depletion of tissue glutathione (GSH), a reduction in the amount of lipid peroxidation, and necrosis of liver cells are all telltale signs of liver damage. Problems ranging from mild to severe with the liver could be the result of any one of a number of distinct reasons. There are certain conditions that manifest themselves in people's livers as a direct result of their unconventional conduct. On the other hand, there are further forms of liver toxicity that are brought on by causes that cannot be avoided. Regardless of what caused the poisoning, the individual must endure a number of consequences throughout their system. Challenges that bring the main character so close to losing their life that it's almost inevitable. Taking care of one's liver is therefore necessary for maintaining one's overall health and wellbeing. However, the liver's constant exposure to environmental contaminants as well as the abuse of unhealthy drug alcohol, habits, prescription drugs, and over-the-counter medications can lead to the development of several diseases that affect the liver (Sharma et al., 1991; Subramonium and Pushpangadan 1999). Some of these diseases, such as cirrhosis and hepatitis, are caused by alcohol. Other diseases, such as hepatitis, are caused by hepatitis. Liver diseases are consistently ranked among the top causes of death on a global scale. This poses a huge risk to the health of populations all around the world. People who have issues with their liver frequently seek treatment from natural treatments derived from plants rather than artificial drugs (Karan et al., 1999; Chaterrjee, 2000). In India, the treatment of liver conditions with herbal medicines has a long tradition, and the country's leading pharmaceutical corporations have been very active in promoting the use of herbal medicines. Despite the broad acceptance of many of these therapies, there is still no method that has been approved for treating problems with the liver that involve herbal drugs. According to Dhiman and Chawla (2005), challenges such as inadequate standardization of herbal treatments, identification of active components, randomized controlled clinical trials (RCTs), and toxicological assessment all work against this goal. According to research conducted by Thyagarajan et al. (2002), traditional medical practices from all over the world, such as Ayurveda, Chinese medicine, European medicine,

and others, have for a very long time relied on natural remedies for the treatment of liver issues. There are several herbs and medications on the market today that make the claim that they can protect the liver. There are over 160 phytoconstituents that have been isolated from 101 different plants that have been shown to protect the liver. According to Handa et al.'s (1986) research, it is believed that there are 87 different plant species that are used in the creation of 33 different multi-plant ingredient compositions that are either patented or privately held in India. Even with all of the progress that has been made, the present treatment arsenal does not have any hepatoprotective drugs that are both effective and safe. As a consequence of this, there has been a significant amount of focus across the globe placed on the investigation and development of plant-based hepatoprotective drugs that are effective against a wide variety of liver diseases. The objective of this study is to assemble information regarding the potential phytochemicals and pharmacological properties of medicinal plants that have been evaluated for their hepatoprotective activity (Bhattacharyya *et al*., 2005; Sagar *et al.* 2014)

***Acacia mellifera* (Vahl.), Fabaceae:** Researchers looked at whether the ethanolic extract and fractions of A. mellifera leaves might protect liver cells in vitro from DCFH (dichlorofluorescein) and CCl4 (chloroform) (Arbab et al., 2015). Similar to dichlorofluorescein is DCFH. Chlorofluorocarbon CCl4 is a halofluorocarbon. Hepatocyte proliferation was increased by about 20% when cells poisoned with DCFH were given a crude extract of Apis mellifera (AM) at a concentration of 100 g/ml. Hepatoprotective activity was not seen in the hexane or dichloromethane fractions, but was present in the water and n-butanol fractions. After three weeks of oral administration of AM ethanolic extract in combination with CCl4 in liquid paraffin, IP levels of ALP, Bil, cholesterol, triglyceride, and lipoprotein were significantly normalized. Liver congestion in the central veins, substantial hepatocyte necrosis, and fatty changes were observed following a dose of 250 mg/kg of AM, as determined by histology. The analysis of the liver led to these conclusions. Both AM and silymarin, at a dose of 500 mg/kg, were effective in maintaining normal hepatocyte and central vein function in rats.

Flavonoids, Alkaloids, sterols, polyphenolic tannins, and saponins were discovered through phytochemical analysis of the fractions. Antioxidant activity was greatest in dichloromethane and hexane extracts, lowest in water extracts, and greatest in ethyl acetate and n-butanol extracts. Several studies (Ai et al., 2013; Saboo et al., 2013; Tran et al., 2002; Wang et al., 2010) have suggested that the plant's phenolic compounds, flavonoids, and saponins are responsible for its hepatoprotective benefits. The potential of flavonoids to scavenge free radicals has been linked to their hepatoprotective effect, as reported by Saboo et al. (2013).

Adansonia digitata L. fruit pulp extract was studied for its hepatoprotective properties on rats with CCl4-induced hepatotoxicity at 100 and 200 mg/kg. Silimarin was given at a rate of 25 milligrams per kilogram. A. digitata was reported to have dose-dependent hepatoprotective effects in CCl4-exposed rats.

The fruit pulp of A. digitata L. contains triterpenoids (Ramadan et al., 1994), -sitosterol, - amyrin palmitate or/and -amyrin, and ursolic acid, all of which may be responsible for protecting against CCl4-induced liver damage and restoring biochemical values.

Argemone mexicana L. was evaluated for its potential to prevent liver damage caused by CCl4 in rats using extracts made from both its water and methanolic parts. Administering CCl4 occurred on day 3. Serum ALT, AST, and ALP were all considerably reduced by the methanol extract at 100 mg/kg, showing hepatoprotective effect (P 0.05). The 100 mg/kg dose of methanol extract shown to repair and regenerate liver parenchyma in histopathology. Similar results were seen when silymarin (70 mg/kg orally) was compared to this method. The mechanism through which *A. mexicana* provides hepatoprotection is unknown at this time (Adam *et al.,* 2011).

Anogeissus leiocarpus (DC) Wall is a member of the Combretaceae family. The hepatoprotective properties of an ethanolic extract of the bark of *Anogeissus leiocarpus* were investigated in rats exposed to carbon tetrachloride (Ahmed *et al.,* 2015). The rats were administered the plant extract at a 0 hour, 12 hour, and 24 hour interval. After a single injection of 1.25 ml/kg CCl4, the first dose of test extracts was given 30 minutes later. The rats were sacrificed after 36 hours, and samples of their blood and livers were obtained for histopathology, as well as haematological and biochemical analyses. flavonoids, saponins,Tannins, sterols, cumarins and triterpenoids are just some of the phytochemicals found in *A. leiocarpus* bark. When compared to the gold standard medicine silymarin histopathological, ethanolic extract of the plant at 200 mg/kg significantly (P 0.05) decreased liver biomarker levels (AST, ALT, and ALP) and kidney biomarker levels (urea, creatinine), and normalized haematological parameters.

The plant extract was found to be protective in studies involving liver and kidney tissues. Antioxidant activity and protective properties have been attributed to the extract (Latha et al., 2003; Victor and Grace, 2013; Arbab, 2014) due to the high content of tannins, flavonoids, triterpenes, and sterols in the extract.

***B. aegyptiaca (L.)* (Balanitaceae):** After exposing rats to 0.2 ml/kg carbon tetrachloride for 10 days, researchers examined the effects of *Balanites aegyptiaca* bark extracts on the animals' livers. Extracts were administered orally at 250-500 mg/kg in conjunction with CCl4 for a total of 10 days. The AST, ALT, and ALP activities, as well as bilirubin levels, and mild hepatocyte lesions, were all significantly reduced in the plant extract group compared to the CCl4 group (Elhag 2001). According to phytochemical analysis (Ojo et al., 2015),

***Cannabis sativa L.*, Cannabaceae**, was investigated for its potential to protect the liver from the damage caused by CCl4 in rats (Musa *et al.,* 2012). Daily oral doses of 1 and 0.5 ml/kg body weight of C. sativa L. oil were given to rats. Hepatotoxicity caused by 0.2 ml/kg subcutaneous injections of CCl4 in paraffin oil (1: 9 v/v) was reduced by concomitant oral treatment with 1 and 0.5 ml/kg of C. sativa oil. The decrease in serum levels of AST, ALP, ALT, and bilirubin demonstrates this. Liver changes were suppressed in the silymarin group, in contrast to the control rats. Carbon tetrachloride can cause damage to the liver, although the oil extracted from C. sativa plants has a hepatoprotective component (Musa *et al.,* 2012).

Capparaceae: Capparis decidua (Forsk.) *Capparis decidua* stem extracts were tested for their ability to protect against CCl4-induced hepatotoxicity in rats. In addition, when both extracts were given to rats with CC14 for 10 days, the hepatotoxic effects of CC14 were mitigated. Results were comparable to those seen with the hepatoprotective drug considered the gold standard, silymarin. The higher activity of the aqueous extract of *C. decidua* over the methanolic extract may be due to the higher concentration of polar phytoconstituents in the former (Ali *et al.,* 2011; Ali *et al.,* 2009) Powdered plant material was subjected to preliminary phytochemical screening, wherein a variety of active compounds were identified. The study discovered antioxidants such cyanogenic glycosides, flavonoids, and triterpenes, which may be responsible for the hepatoprotective impact (Evans *et al.,* 2002; Al-yahya 1986; Pattanayak and Pryashree 2008; Satyanarayana *et al.,* 2008).

By adjusting the levels of superoxide dismutase and catalase, *C. decidua* was also found to reduce oxidative stress. Iron and vitamin C, two of the plant's abundant minerals and vitamins, may also play a role in the extract's hepatoprotective effects (Duhan *et al.,* 1992).

Combretaceae, Combretum as a genus: Researchers looked at whether or not a methanolic extract of Combretum hartmannianum leaves could mitigate the harmful effects of CC14 and paracetamol on the liver. This research compared the effects of the hepatoprotective drug silymarin to the standard of care. C. hartmannianum leaf extract was found to be hepatoprotective against CC14-induced hepatotoxicity, as evidenced by an increase in serum total protein and albumin and a decrease in AST, ALT, and bilirubin. C. hartmannianum leveas, a methanolic extract of C. hartmannianum leaves, significantly decreased AST and ALT in rats when administered intraperitoneally (Mohammed 2008). There were no cumarins, alkaloids, or triterpenoids discovered in the methanolic extract of C. hartmannianum leaves (Mohammed 2008), but there were flavonoids, tannins, saponins, and unsaturated sterols. Possible explanations for the plant's hepatoprotective effect include its high antioxidant activity in the DPPH free radical scavenging assay and its high flavonoid content (Hassan *et al*., 2014).

Dobera glabra (Forsk.), Salvadoraceae: *Dobera glabra* leaf extracts, were tested for their ability to protect the livers of rats exposed to CCl4 through a process known as hepatotoxicity. Injecting 0.2 ml•kg1 of CC14 in paraffin oil for 10 days. Leaf extracts were given orally at 200 and 400 mg•kg1 b.w. for 10 consecutive days. The plant extract groups had considerably greater levels of ALT, AST, and bilirubin than the CC14 group or the traditional medication silymarin. Necrotic lesions with a diffuse centrilobular pattern formed in hepatocytes following 10 days of treatment with both extracts and CC14(Ali, 2011). Tannins, Alkaloids, sterols, flavonoids, cyanogenic glycosides, saponins, and cumarins are just some of the important components found in the powdered plant, as demonstrated by preliminary phytochernical screening (Ali, 2011).

Khaya senegalensis (Desr.), Meliaceae, had its hepatoprotective activity against CCl4-induced liver damage in rats evaluated using an aqueous extract of its bark. The bark extract was orally administered at 250 and 500 mg/kg on days 4 and 5, following a subcutaneous injection of CCl4 (3 ml/kg body weight/rat) on day 3. Regular dosing of silymarin (at 50 mg/kg) was also performed. Liver tissue histopathology results were consistent with a hepatoprotective effect (Ali, 2011). In comparison to the silymarin group, the AST, ALT, ALP, and bilirubin levels were significantly higher in the extract group. Because of its historical usage in treating jaundice, the hepatoprotective benefits of a methanolic extract of the bark of the Sudanese shrub *Khaya senegalensis* have been investigated. Well-known hepatoprotective medication silymarin was used as a comparison in this study.

K. senegalensis as indicated by a significant decrease in ALT, ALP, and alanine aminotransferase (AAT), bark methanolic extract protected the liver from CCl4- and paracetamol-induced damage. Furthermore, there was no decrease in ALT or AST activity, showing that neither the dichloromethane nor the petroleum ether extracts although paracetamol is damaging to the liver, studies have found that extracts preserved in chloroform and ethyl acetate considerably reduce this toxicity. K. had some mild histopathological lesions. Groups treated with P. senegalensis bark extract compared to paracetamol groups revealed a preventative effect (Elagib *et al.,* 2014; Elagib *et al.,* 2014).

Kigelia africana (Lam.), a member of the Bignoniaceae family, was studied for its capacity to protect the livers of male Wistar rats from CCl4-induced damage using both aqueous and methanolic extracts. Subcutaneous injections of CCl4 (1:1 dilution with olive oil) at a dose of 3 ml/kg were performed on day 3 of the trial. Oral silymarin (50 mg/kg) was taken for five days. The methanolic extract doses were 100, 200, and 400 mg/kg/day, while the aqueous extract dose was 400 mg/kg/day for 5 days. Both aqueous and methanol extracts of the plant seeds were revealed to have harmful effects, as evidenced by changes in haematological indices (Hb, WBCs MCH, MCHC, and granulocytes) and AST, ALT, and ALP activities. The kidneys and liver also showed histopathological abnormalities (Shama *et al.,* 2013).

Hepatoprotective properties of the methanolic extract of Lawsonia inermis leaves against CCl4-induced hepatotoxicity in rats were investigated. The L. vegetation's leaves Participants were administered a methanolic extract of inermis that had been prepared through maceration.

Two doses of oral 100 mg/kg and 200 mg/kg are available. In this analysis, the hepatoprotective drug silymarin (25 mg/kg) served as the gold standard. Histological liver sections were enhanced, and serum levels of alanine aminotransferase (ALT), aspartate aminotransferase (ALP), and bilirubin were decreased in CCl4-only treated mice. Antioxidant properties of this plant material may have a hepatoprotective effect, as indicated by the findings (Mohamed et al., 2016). By neutralizing potentially dangerous free radicals such superoxide anions, peroxynitrite, peroxyl, and hydroxyl, the flavonoid content of the plant extract has been shown to have hepatoprotective effect (Sanni *et al.,* 2010).

Lepidium sativum **(L.)** (Brassicaceae) has protective properties. A methanolic extract of the seeds was tested for its ability to prevent CCl4-induced liver damage in rats. The extracts were administered together with 0.2 ml/kg of CCl4 that had been dissolved in paraffin oil (1: 9 v/v) for 10 days. Serum levels of a variety of enzymes were significantly reduced in L-treated rats. Extract from the sativum plant. Rats given CCl4 in the liver revealed significant fatty

changes, although they were considerably reduced in animals given plants. The hepatoprotective properties of the plant may stem from an unproven mechanism involving an inhibition of lipid peroxidation in the liver. L has a wide variety of bioactive substances. sativum is able to shield the liver since it impedes the production of free radicals. Flavonoids, triterpenes, and tannins are all examples of antioxidant chemicals that act as free radical generation inhibitors (Abuelgasim *et al.,* 2008).

Rats were subjected to CCl4-induced liver injury, and the hepatoprotective effects of an aqueous extract of *Moringa oleifera* leaves were investigated. Daily administration of 0.2 mg•kg1 CCl4 in paraffin oil (1: 9 v/v) caused hepatocellular damage in rats for 10 days. M. 400 mg•kg1 oleifera extract orally CCl4 was given at the same time. After 10 days of treatment with the aqueous extract with CCl4, serum levels of alanine aminotransferase (ALT), alanine aminopeptidase (ALP), and bilirubin were all reduced. Liver fatty change was also reduced in the intoxicated control rats, especially at the 200 mg•kg1 dose. Degenerative modifications were observed in the precentral areas of the livers of M-treated rats, including cytoplasmic rarefication and acidophilic cytoplasm with pycknotic nuclei 400 milligrams per kilogram of Olea oleifera leaf water extract. According to the results of this investigation, an aqueous M. even lesser dosages, oleifera leaves may offer substantial protection against CCl4-induced liver injury in mice (Ali *et al.,* 2010) It was also discovered in the preliminary phytochemical research (Ali *et al.,* 2010) that the plant included alkaloids, saponins, flavonoids, tannins, sterols, glycosides, and cumarins. The liver benefits from phytoconstituents such flavonoids, triterpenoids, and sterols that have antioxidant properties. Because of the presence of these substances in M. possible protective effect of Olea oleifera (Gupta *et al.,* 2004; Manjunatha *et al.,* 2008) against CCl4-induced liver injury in rats. Several studies have corroborated the fact that M. oleifera is a good source of antioxidants due to its high levels of total phenolics, vitamin A, and vitamin E (Diallo *et al.,* 2009; Anwar *et al.,* 2007).

All groups, excluding APAP, showed improved hepatic histology (Adam *et al.,* 2016). N. benefits of phosphite's healing properties. sativa seed extract's capacity to prevent oxidative stress, lipid peroxidation, and reactive oxygen species (ROS) in rats may explain why it was particularly effective in preventing APAP-induced hepatotoxicity and metabolic abnormalities. N. Extract of nivalis in water. Seeds of *Cannabis sativa* for their potential to shield the livers of CCl4-exposed rats. Both 250 and 500 mg/kg of plant extract were given orally over the course of 5 days. On day 3, CCl4 (3 ml/kg) was injected subcutaneously. Comparative reference was the hepatoprotective drug silymarin (50 mg/kg). Scarification of the rats occurred after 5 days. Treatment with extract (250 and 500 mg/kg) significantly decreased serum alanine aminotransferase (ALT), alanine aminopeptidase (ALP), and total protein (TP) levels in comparison to CCl4 treatment. The biochemical results were verified by histopathological investigation of rat liver slices (Ali, 2011). On the other hand, N. Cannabis sativa seed methanol extract was tested for its ability to reverse CCl4-induced liver damage in rats. CCl4 (0.2 ml•kg1 diluted in liquid paraffin 1:9) and iodine intraperitoneal (IP) injections

N. nivalis methanolic extract. The dosages of sativa used were 250 and 500 mg•kg. mixed sativa and indica

Dimethylsulfoxide- The rats were scarified after 10 days. The levels of ALT, AST, and ALP were significantly elevated in CCl4- and N. Those in the N-treated groups. sativa had a lower increase than the controls. Methanolic extract of the sativa plant. On histology, the livers of the CCl4 group showed severe centrilobular vacuolation and congestion, but the livers of the 250 mg•kg1 and 500 mg•kg1 groups did not. b. weight-wise, the changes were very somewhat noticeable (Abuelgasim *et al.,* 2008).

Ocimum basilicum L., Lamiaceae has been shown to have hepatoprotective effects. Whole-plant ethanol extract's efficacy was investigated. Oral administration of an extract from We administered a hepatoprotective dosage of 200 mg/kg 0 hours before CCl4 injection, and then again 12 and 24 hours later. Mice and rats received an A+. basilicum extract at a time zero, 12 hours after the first dose, and 24 hours after the first dose, with a single injection of 1.25 ml/kg CCl4 given 30 minutes prior to the first administration of test extracts. A blood sample was collected after 36 hours for Histopathology, hematology, and biochemistry were all performed on liver samples taken from the rats prior to their deaths. *O. Basilicum* ethanol extract at 200 mg/kg significantly (P 0.05) attenuated the elevations in serum AST, ALT, and ALP caused by CCl4. This result was on par with that achieved by the gold standard drug silymarin. Haematological indicators and the silymarin group were found to share similarities. These biochemical findings were supported by histopathological examination of the liver, demonstrating the plant extract's protective impact on the organ. There was evidence for *O. Basilicum* ethanolic extract has hepatoprotective potential against CCl4-induced hepatotoxicity in rats (Ahmed *et al.,* 2015).

Phytoconstituent extraction from onion (O. The total basilicum plant ethanolic extract contained flavonoids, alkaloids, tannins, saponins, triterpenes, sterols, and cumarins. Superoxide radical and nitric oxide radical scavenging abilities (Meera *et al.,* 2009; Mushtaq and Ahmad, 2013; Marzouk *et al.,* 2011) and a high concentration of flavonoids, saponin, tannins, sterols, and triterpenes suggest that the extract has an antioxidant quality that adds to its protective effect.

Albino rats were used to examine pollen grain powder extracted from the Sudanese dates palm (*Phoenix dactylifera* Linn., Palmae) for its hepatoprotective properties. Hepatotoxicity was induced using a subcutaneous injection of CCl4 (3 ml/kg diluted in olive oil 1: 1) on day 3. Date palm pollen grains at 250 and 500 mg/kg were given orally over the course of five days. As a comparison, silymarin (50 mg/kg orally, once day, for 5 days) was utilized as a control medicine. Hepatoprotective impact was established by significant (P 0.05) reductions in alanine aminotransferase (ALT), aspartate aminotransferase (ALP), and alanine aminoketone (ALP) levels in the treatment groups compared to the CCl4 group. Centrilobular necrosis with moderate congestion was confirmed histopathologically, corroborating the findings. The mechanism by which the extract of date palm fruit exerts its hepatoprotective action is unknown. *P. dactylifera* L. contains a compound called -sitosterol, which may be to blame. This may help explain why hepatotoxicity hasn't been observed (El-mougy *et al.,* 1991). *P. dactylifera* L. contains flavonoids. Possible cancer-preventing properties could be partially explained by the fact that it inhibits

cytochrome P-450 aromatase (Kowalska *et al.*, 1990). The high vitamin C content of date palm pollen grains is hypothesized to be responsible for their hepatoprotective properties (Abuowf and Abuowf, 2009).

Raphanus sativus *L.* is a member of the Cruciferae family of plants. Water and methanolic extracts were tested for their potential to preserve the livers of rats exposed to carbon tetrachloride. Both 200 and 400 mg•kg1 of CCl4 methanolic and aqueous extracts (0.2 ml/kg in paraffin oil 1: 9 v/v) were administered IP. The animals were allowed to mature for 10 days before being slaughtered. Biochemical indicators of CC14-induced hepatotoxicity, such as serum alanine aminotransferase (ALT), alanine aminopeptidase (ALP), and bilirubin concentrations, and histological changes, were all reduced in those who consumed the plant. Phytochemistry (Mohammed et al., 2008) showed that the plant samples included triterpenes, alkaloids, flavanoids, tannins, saponin, and cournarin, but lacked cyanogenic glycosides and anthraquinone glycosides.

Solanum nigrum L., Solanaceae, was analyzed for its hepatoprotective effects in rats given 0.2 ml/kg CCl4 intraperitoneally over the course of 10 days. For multiple days, every day. *S. Nigrum* extracts between 250 and 500 mg/kg were orally administered to individuals for 10 days. Hepatoprotective effects of the extracts against CCl4-induced liver injury in rats were demonstrated by a reduction in blood AST, ALT, and ALP activity and bilirubin levels, as well as minimal histological abnormalities. Water extract may be better at preserving the liver than methanolic one since it contains more polar phytoconstituents (El-hag and El-Badwai, 2011).

In albino rats with carbon tetrachloride (CCl4)-induced liver injury, ethanolic and ethyl acetate extracts of stem bark were investigated for their hepatoprotective activity. Ten days of therapy with 0.2 ml/kg CCl4 led to hepatotoxicity. The same as the letter S. Doses of 200 and 400 mg/kg of Setigera stem bark were given orally. ande extracts significantly lowered serum levels of ALT, AST, ALP, total protein, albumin, and bilirubin, showing a substantial protective effect. The hepatoprotective effect of the traditional medication Silymarin was compared to the CCl4-induced liver abnormalities in rats, and it was found that the plant extracts effectively masked the CCl4-induced alterations. However, plant extracts prepared from ethanol and ethyl acetate were able to reduce the severity of necrotic lesions in the liver caused by CCl4 (Abdel Rahman, 2016).

Tamarindus indica (L., Caesalpinaceae) fruit pulp was extracted using ethanol and examined for its potential to protect against CCl4-induced liver damage. The T. alcohol-soaked rex root. For 5 days, subjects were administered an indica dosage of 150 mg/kg. We used silymarin (50 mg/kg) as the drug standard. After 5 days of oral saline administration, on days 2 and 3, subcutaneous administration of 0.2 ml/kg of CCl4 diluted (1: 9) in liquid paraffin was performed. The results led researchers to conclude that a T. The livers of the indica group displayed a better histological image compared to the livers of the CCl4 group, showing that the plant had successfully alleviated the damage induced by CCl4. From what we can tell, T. The ethanolic extract of indica has been shown to have hepatoprotective effects (El-Badwi *et al.*, 2013). The T. reesei ethanol extract is a. Fruit pulp has low levels of flavonoids and saponin and moderate levels of tannins and alkaloids. The membrane-stabilizing characteristics of indica (Daniyan and Muhammad, 2008) suggest its probable inclusion.

Conclusion

By examining the effects of several medicinal plants on in vivo and in vitro models, this research sheds light on the significance of some plant species as protective agents against the toxic effects of chemical exposure. Because traditional drugs used to treat liver illnesses are expensive and ineffectual, herbal medications serve an important role in basic health care. Herbal medications are an important part of basic health care because of this. According to the United Nations International Drug Organization from the year 1996, ninety percent of the population relies on medicinal herbs to treat the symptoms of illness. It's possible that the antioxidants and anti-inflammatory characteristics of these plants, in addition to the phytoconstituents that they contain, are what cause them to have therapeutic effects. More research is required to demonstrate the efficacy of these plants in treating liver diseases, as well as their safety and the specific mechanism of action before they can be considered a viable choice in the treatment of liver diseases. It is required to discover, isolate, and purify the active components of hepatoprotective plants using state-of-the-art processes and technology so that their efficacy and safety can be evaluated and controlled clinical studies can be carried out. This can only be accomplished if the active components are first isolated.

Reference

Rajesh MG, Latha MS (2004), Preliminary evaluation of the antihepatotoxic activity of Kamilari, a polyherbal formulation. J Ethnopharmacol; 91(1): 99-104.

Sharma A, Chakraborti KK, Handa SS. (1991), Anti-hepatotoxic activity of some Indian herbal formulations as compared to silymarin. Fitoterapia; 62: 229-35.

Subramonium A, Pushpangadan P. (1999), Development of phytomedicines for liver diseases. Indian J Pharmacol; 31: 166-75.

Karan M, Vasisht K, Handa SS. (1999), antihepatotoxic activity of Swertia chirata on carbon tetrachloride induced hepatotoxicity in rats. Phytother Res; 13(1): 24-30.

Chaterrjee TK. (2000) Medicinal plants with hepatoprotective properties. Herbal Options. Calcutta: Books and Applied Allied (P) Ltd.; p. 143.

Dhiman RK, Chawla YK. (2005), Herbal medicines for liver diseases. Dig Dis Sci; 50: 1807-12.

Thyagarajan SP, Jayaram S, Gopalakrishnan V, Hari R, Jeyakumar P, Sripathi MS. (2002), Herbal medicines for liver diseases in India. J Gastroenterol Hepatol; 17: S370-6.

Handa SS, Sharma A, Chakraborti KK. (1986), Natural products and plants as liver protecting drugs. Fitoterapia; 57: 307-52.

Bhattacharyya D, Pandit S, Jana U, Sen S, Sur TK (2005), Hepatoprotective activity of Adhatoda vasica aqueous leaf extract on D-galactosamine-induced liver damage in rates. Fitoterapia; 76: 223-5.

Sagar R, Bhaiji A, Toppo FA, Rath B, Sahoo HB (2014), A comprehensive review on herbal drugs for hepatoprotection of 21st Century. Int J Nutr Pharmacol Neurol Dis; 4: 191-7.

Arbab A. H., M. K. Parvez, M. S. Al-Dosari (2015), "Hepatoprotective and antiviral efficacy of Acacia mellifera leaves fractions against hepatitis B virus," BioMed Research International, vol., Article ID 929131, 10 pages.

Liu G. Ai, Q., W. Hua, Z. Huang, and D. Wang (2013) "Hepatoprotective evaluation of the total flavonoids extracted from flowers of Abelmoschus manihot (L.) Medic: in vitro and in vivo studies," Journal of Ethnopharmacology, vol. 146, no. 3, pp. 794–802.

S. S. Saboo, G. Tapadiya, I. A. Farooqui, and S.S. Khadabadi (2013) "Free radical scavenging, in vivo antioxidant and hepatoprotective activity of folk medicine Trichodesma sedgwickianum," Bangladesh Journal of Pharmacology, vol. 8, no. 1, pp. 58–64.

Tran Q. L., I. K. Adnyana, Y. Tezuka (2002), "Hepatoprotective effect of majonoside R2, the major saponin from Vietnamese ginseng (Panax vietnamensis)," Planta Medica, vol. 68, no. 5, pp. 402–406.

Wang Y., Z. Lou, Q.-B. Wu, and M.-L. Guo (2010), "A novel hepatoprotective saponin from Celosia cristata L.," Fitoterapia, vol. 81, no. 8, pp. 1246–1252.

Ramadan A., F. Harraz, and S. El-Mougy (1994), "Anti-inflammatory, analgesic and antipyretic effects of the fruit pulp of Adansonia digitata," Fitoterapia, vol. 65, p. 418.

Qarawi A. A. Al-, M. A. Al-Damegh, and S. A. El-Mougy (2003), "Hepatoprotective influence of Adansonia digitata Pulp," Journal of Herbs, Spices and Medicinal Plants, vol. 10, no. 3, pp. 1– 6.

Adam S., I. A. Idris, E. H. Abdelgadir, R. H. Ahmed, and E. E. Kamal (2011), "Evaluation of hepatoprotective activity of Argemone mexicana aerial Part Extracts on CCl4 induced liver damage in wistar rats," British Journal of Pharmacology and Toxicology, vol. 2, no. 5, pp. 251–256.

Ahmed B. A., A. H. Mohamed, S. A. Ali, and A. I. Abuelgasim (2015), "Hepatoprotective activity of ethanol extract of Ocimmum basillicum against CCl4–induced hepatotoxicity in albino rats," Journal of Natural and Medical Sciences, vol. 16, no. 2, pp. 11–18.

Latha P., S. R. Suja, A. Abraham, S. Rajasekharan, and K. R. Pannikar (2003), "Hepatoprotective effects of Ixora coccinea flower extract on rats," Journal of Tropical Medicinal Plants, vol. 4, no. 1, pp. 33–38.

Victor B. and A. Grace (2013) "Phytochemical studies, in-vitro antibacterial activities and antioxidant properties of the methanolic and ethyl acetate extracts of the leaves of Anogeissus leiocarpus," International Journal of Biochemistry Research and Review, vol. 3, no. 2, pp. 137–145,.

Arbab A. H. (2014) "Review on Anogeissus leiocarpus a potent African traditional drug," International Journal of Research in Pharmaceutical Sciences, vol. 4, no. 3, pp. 496–500.

Elhag R. A. M. (2001), "Hepatoproteative activity of two Sudanese plants on experimental liver damage," M.Sc. thesis, Faculty of Veterinary Science, Sudan.

Ojo O. O., O. Ladeji, L. Olayaki, and C. C. Jide-Ojo (2015), "Hepatoprotective and antioxidant efficacy of aqueous stem bark extracts of Balanites aegyptiaca (Linn.) Del. against acetaminophen induced liver injury in rats," Journal of Medicinal Herbs and Ethnomedicine, vol. 1, no. 1, pp. 89–96.

Suky T. M. G., B. Parthipan, C. Kingston, V. R. Mohan, and P. Tresina Soris (2011), "Hepatoprotective and antioxidant effect of Balanites aegyptiaca (L.) Del against CCL4 induced hepatotoxicity in rats," International Journal of Pharmaceutical Sciences and Research, vol. 2, no. 4, p. 887.

Musa, E. E. L. Badwi, E. A. Osman, and M. M. Dahab (2012), "Hepatoprotective and toxicity assessment of Cannabis sativa seed oil in Albino rat," International Journal of Clinical and Biological Sciences, vol. 1, pp. 69–76.

Ali S. A., A. A. Gameel, A. H. Mohamed, and T. Hassan (2011), "Hepatoprotective activity of Capparis decidua aqueous and methanolic stems extracts against carbon tetrachloride induced liver histological damage in rats," Journal of Pharmacology and Toxicology, vol. 6, no. 1, pp. 62–68.

Ali S. A., T. H. Al-Amin, A. H. Mohamed, and A. A. Gameel (2009), "Hepatoprotective activity of aqueous and methanolic extracts of Capparis decidua stems against carbon tetrachloride induced liver damage in rats," Journal of Pharmacology and Toxicology, vol. 4, no. 4, pp. 167–172.

Evans W., Trease and Evans (2002), Pharmacognocy. Fifteenth Internationa Edition, WB Saunders, Philadelphia, PA, USA.

Yahya M. Al- (1986), "Phytochemical studies of the plants used in traditional medicine of Saudi Arabia," Fitoterapia, vol. 57, no. 3, pp. 179–182.

Pattanayak S. and S. Priyashree (2008), "Hepatoprotective activity of the leaf extracts from Dendrophthoe falcata (Lf) Ettingsh against carbon tetrachloride-induced toxicity in wistar albino rats," Pharmacognosy Magazine, vol. 4, no. 15, pp. 218–222.

Satyanarayana T., A. Anjana, and P. Vijetha (2008), "PHCOG REV.: plant review phytochemical and pharmacological review of some Indian Capparis species," Pharmacognosy Reviews [Phcog Rev.]-Supplement, vol. 2, no. 4, pp. 36–45.

Duhan A., B. M. Chauhan, and D. Punia (1992), "Nutritional value of some non-conventional plant foods of India," Plant Foods for Human Nutrition, vol. 42, no. 3, pp. 193–200.

Mohammed H. M. E. (2008), "Pharmacological studies of selected plants with putative hepatoprotective activities," thesis, Faculty of Pharmacy, Khartoum University, Khartoum, Sudan.

Hassan L. E. A., M. B. Ahamed, A. S. Majid (2014), "Correlation of antiangiogenic, antioxidant and cytotoxic activities of some Sudanese medicinal plants with phenolic and flavonoid contents," BMC

Complementary and Alternative Medicine, vol. 14, no. 1, p. 406.

Ali S. A. M. (2011), "Hepatoprotective activity of aqueous extracts of Nigella sativa seeds and Khaya senegalensis bark in rats," thesis, Faculty of Veterinary Medicine. Khartoum University, Khartoum, Sudan.

Elagib H. M., S. A. Shadad, A. E. Muddathir, Y. O. Mohammed, and S. M. Elagib (2014), "Hepatoprotective activity of the methanolic extract of the bark of Khaya senegalensis in rats against carbon tetrachloride (CCl4) -induced hepatotoxicity in a dose of (800 mg/kg I.P)," International Journal of Science and Research, vol. 3, no. 3, pp. 1–9.

Elagib H. M., S. A. Shadad, A. E. Muddathir, Y. O. Mohammed, and S. M. Elagib (2014), "Hepatoprotective activity of the methanolic extract of the bark of Khaya senegalensis in rats against paracetamol— induced hepatotoxicity," International Journal of Science and Research, vol. 3, no. 3, pp. 127–134.

Ali S., S. M. A. Elbadwi, T. M. Idris, and K. M. Osman (2011), "Hepatoprotective activity of aqueous extract of Khaya senegalensis bark in rats," Journal of Medicinal Plants Research, vol. 5, no. 24, pp. 5863–5866.

Ahmed B. A. (2015), Hepatoprotective, antioxidant and antibacterial effects of Ocimum basilicum, Anogeissus leiocarpus, Khaya senegalensis and Capparis decidua against CCl4 induced hepatotoxicity in rats, PhD. thesis, Sudan Academy of Sciences (SAS), Council of Bioscience, Advanced Technology and Environment, Sudan.

Shama S., I. Y. Adam, M. Marwa, and I. A. Alhameed (2013), "Kigelia africana fruits' extracts anti hepato-toxic effects on male wistar rats liver destruction induced by CCL4," Asian Journal of Medical Sciences, vol. 5, no. 1, pp. 26–32.

Mohamed M., I. Eldin, A. Mohammed, and H. Hassan (2016), "Effects of Lawsonia inermis L. (Henna) leaves' methanolic extract on CCl4-induced hepatotoxicity in rats," Journal of Intercultural Ethnopharmacology, vol. 5, no. 1, p. 22.

Sanni S., I. Thilza, M. Ahmed, Muhammed Talle, and G. O. Okwor (2010), "ande effect of aqueous leaves extract of henna (Lawsoniainermis) in carbon tetrachloride induced hepatotoxicity in swiss albino mice," Academia Arena, vol. 2, no. 6, pp. 87–89.

Abuelgasim A. I., H. Nuha, and A. Mohammed (2008) "Hepatoprotective effect of Lepidium sativum against carbon tetrachloride induced damage in rats," Research Journal of Animal and Veterinary Sciences, vol. 3, pp. 20–23.

Ali S., A. H. Mohamed, A. A. Gameel, and T. Hassan (2010), Protective Effect of Moringa Oleifera Leaves Aqueous Extract against Carbon Tetrachloride Induced Hepatotoxicity in Rats, Science Congress Faculty of Veterinary Medicine, Assiut, Egypt.

Gupta M., U. K. Mazumder, T. S. Kumar, P. Gomathi, and R. S. Kumar (2004), "Antioxidant and hepatoprotective effects of Bauhinia racemosa against paracetamol and carbon tetrachloride induced liver damage in rats," Iranian Journal of Pharmacology and Gerapeutics, vol. 3, no. 1, pp. 12–20.

Manjunatha B., K. L. Mankani, S. M. Vidya, V. Krishna, and Y. N. Manohara (2008), "Hepatoprotective activity of Butea superba against carbon tetrachloride induced hepatic damage in rodents," Pharmacognosy Magazine, vol. 4, pp. S41–S45.

Diallo A., K. Eklu-Gadeg, T. Mobio (2009), "Protective effect of Moringa oleifera Lam. and Lannea kerstingii extracts against cadmium and ethanol-induced lipid peroxidation," Journal of Pharmacology and Toxicology, vol. 4, no. 4, pp. 160–166.

Anwar F., S. Latif, M. Ashraf, and A. H. Gilani (2007), "Moringa oleifera: a food plant with multiple medicinal uses," Phytotherapy Research, vol. 21, no. 1, pp. 17–25.

Adam G. O., M. M. Rahman, S.-J. Lee (2016), "Hepatoprotective effects of Nigella sativa seed extract against acetaminophen induced oxidative stress," Asian Pacific Journal of Tropical Medicine, vol. 9, no. 3, pp. 221–227.

Abuelgasim A. I., E. A. Omer, and B. Elmahdi (2008), "The effectiveness of Nigella sativa against liver damage in rats," Research Journal of Medicinal Plants, vol. 2, no. 1, pp. 43–47.

Ahmed B. A., A. H. Mohamed, S. A. Ali, and A. I. Abuelgasim (2015), "Hepatoprotective activity of ethanol extract of Ocimmum basillicum against CCl4–induced hepatotoxicity in albino rats," Journal of Natural and Medical Sciences, vol. 16, no. 2, pp. 11–18,

Meera R., P. Devi, B. Kameswari, B. Madhumitha, and N. J. Merlin (2009) "Antioxidant and hepatoprotective Activities of Ocimum basilicum Linn. and Trigonella foenum-graecum Linn. against H2O2 and CCl4 induced hepatotoxicity in goat liver," Indian Journal of Experimental Biology, vol. 47, no. 7, pp. 584–590.

Mushtaq A. and M. Ahmad (2013), "Hepatoprotective activity of aqueous-ethanolic extract of Solanum nigrum against nimesulide intoxicated albino rats," European Journal of Zoological Research, vol. 2, no. 2, pp. 19–25,

Marzouk M., A. A. Sayed, and A. M. Soliman, "Hepatoprotective and antioxidant effects of Cichorium endivia L. leaves extract against acetaminophen toxicity on rats," Journal of Medicine and Medical Sciences, vol. 2, no. 12, pp. 1273–1279.

Abuowf I. A. A. and A. Abuowf (2009), Hepatoprotective Activity of Date Palm (Phoenix dactylifera) Pollen Grains in Rats, University of Khartoum, Khartoum, Sudan.

El-Mougy S. A., S. A. Abed Aziz, M. Al-Shanawany, and A. Omar (1991), "The gonadotropic activity of Palmae in mature male rats," Alexandria Journal of Pharmaceutical Sciences, vol. 5, pp. 156–159.

Kowalska,M. M. Brandt, and D. Puett (1990), "Inhibition of cytochrome P-450 aromatase activity by plant extracts," Planta Medica, vol. 56, no. 6, p. 675.

Mohammed N. H. S. H., A. I. Abelgasim, and A. H. Mohammed (2008), "Protective effect of Raphanus sativus against carbon tetrachloride induced hepatotoxicity in wistar albino rats," Journal of Pharmacology and Toxicology, vol. 3, no. 4, pp. 272–278.

Elhag R. A. M. and S. M. A. El-Badwi (2011), "Hepatoprotective activity of Solanum nigrum extracts on chemically induced liver damage in rats," Journal of Veterinary Medicine and Animal Health, vol. 3, no. 4, pp. 45–50.

Abdelrahman T. H. (2016), "Hepatoprotective activity of ethanolic and ethyl acetate extracts of Sterculia Setigera against carbon tetrachloride induced hepatotoxicity in albino rats," Mediterranean Journal of Biosciences, vol. 1, no. 3, pp. 114–119.

El-Badwi S. M. A., N. M. El Bagir, and A. E. Amin (2013), "Protective effect of ethanolic extract of Tamarindus indica against CCl4 induced liver damage in rats," Australian Journal of Basic and Applied Sciences, vol. 7, no. 2, pp. 813–818

Daniyan S. and H. Muhammad (2008). "Evaluation of the antimicrobial activities and phytochemical properties of extracts of Tamaridus indica against some diseases causing bacteria," African Journal of Biotechnology, vol. 7, no. 14.

UNIDO (1996), Project for the Government of Sudan Prepared by UNIDO Industrial Utilization of Medicinal and AromaticPlants in Sudan, UNIDO, Vienna, Austria.

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