Review

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HEPATOPROTECTIVE POTENTIAL OF SOME SELECTED MEDICINAL PLANTS

Abdul Hamid Khan[1*], Misbah Firdos[2], Uzma Bashir[2], Jawad Zaheer[3]

Abstract: Liver is declared as a vital organ of human body as it is responsible for most of the metabolic and detoxification activities inside the human body. In various countries of the world, a high number of deaths arises from liver disorders because of the absence of basic health services. Phytotherapy is proved to be very effective in preventing diseases and in the treatment of infections. Almost about80% of the worldwide population currently uses phytotherapy as an essential source to maintain healthy conditions because of the marked side effects, no availability, and costly nature of allopathic treatment. The literature review of some medicinal plants mentioned in this review reports that some medicinal plants can be used as safe and effective source of treatment and management liver for disorders.

1. Department of Eastern Medicine, University of Poonch, Rawalakot
2. College of Conventional Medicine,Islamia University, Bahawalpur
3. Department of Pharmacy, University of Poonch, Rawalakot

*Corresponding Author Email: haamidkhaan@gmail.com

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INTRODUCTION

In numerous countries of the world, the mortality rate is arising alarmingly from diseases because of the absence of basic health services. Phytotherapy has an important role in the prevention of diseases and treatment of infections. Almost 80% of the worldwide population currently use phytotherapy as a first line of action to maintain healthy conditions due to the marked side effects, non-availability, and costly nature of allopathic treatment (1).

Human societies have been in close relation with their environment since their evolvement. Humans utilized the elements of the earth to get food as well as medication. The use of herbs to get food and medication has been acknowledged through experimentation. Information about therapeutic herbs has for some time been shifted gradually, from generation to generation and human knowledge has become complete with the development of community establishments and the preparation of more facilities. Medicinal herbs have been utilized as a clinical asset practically in almost whole societies. Making sure the safety, value and efficacy of healing herbs and home remedies became the main problem in developed societies. Manufacturing and evaluating active compounds derived from plants can help the healthcare system to treat human diseases in future (2).

Nowadays most researchers work on the pharmacological properties of various medicinal plants and discover new drugs from them. These studies confirm that medicinal plants have great potential to cure diseases. However, phytotherapy can be improved by regular clinical practice (3).

The plant kingdom contains a high number of species, which produce a number of bioactive particles with numerous chemical constituents. Over hundreds of years, the utilization of therapeutic plants has become a significant piece of everyday life withstanding the advancement in the present-day clinical and pharmaceutical industry. The plants are being progressively used as beauty products, food products, teas, and alternative medicines at present. The developing interest in plants and their ability to deal with conservative practices is a green indication for development of economic aspects of the developed countries as well. This development depends on the conviction that the plants have a huge potential for their utilization as a curative medicine (4).

There is no life without existence of plants. Plants are a fundamental part of

medication. Some significant medications that are still being used today are taken from conventional therapeutic herbs. The trial for new drugs has drawn ethno botany and ethno pharmacology another course as another significant source of information, which leads toward various sources and classes of compounds. Currently, studies on structure, functions, relations and their effect on the plan of new medications have rendered them very important and huge achievements of pharmacochemistry, a progressive constituent in the gathering of pharmaceutical sciences (5).

Almost three-quarters of the total world population uses plants materials and plant extracts for their health system. The sale of plants material is more than $62 billion in the world. This information shows the importance of medicinal herbs in health care and economic status (6,7).

As indicated by WHO (2003) developing countries' population (about 80% of individuals) can't bear the cost of modern healing techniques and still depends on the traditional medicines taken from homegrown sources. Use of medicinal herbs to treat human illnesses is proven from the history. Over time the modern advanced techniques were involved. The use of plant extracts by local communities for the cure and prevention of various diseases has a long history. Most of these medicinal plant extracts have useful activities. These extracts have many biologically active constituents which treat various diseases (8).

Hepatoprotective Potential

The preventive activities increase the quality of an individual's health status by decreasing chronic conditions and avoiding complications. Hepatic disorders were the oldest health problems all over the world. It was the ninth leading cause of death including liver cirrhosis and drug-induced hepatic disorder in developing countries of the world. The medicinal plants have great hepatoprotective action by various mechanisms. The medicinal plants enhance antioxidant actions and decrease hepatic fibrosis by removal of collagen deposits and dominant-inflammatory activities (9).

Hepatoprotective Activity of medicinal plants

The root extract of *Asparagus racemosus* has demonstrated an amazing hepato-defensive action. The study was conducted on animals treated with the aqueous root extract of *A.racemosus* found that the animals were prevented from hepatocarcinogenesis (10).

The methanolic extract of *Asparagus racemosus* roots have hepatoprotective activities that protected rats from Lipopolysaccharide-induced liver injury. It decreased the liver enzyme ALT, AST, and bilirubin in lipopolysaccharide toxic rats. The possible mechanism of action may be the reduction of oxidative stress which changed the levels of antioxidant enzymes in rats (11).

The *Asparagus racemosus* extract havehepatoprotective effects on induced hepatic injury by frequent paracetamol dosing in fishes. Repeated doses of paracetamol caused a high increase in the serum alkaline phosphatase level as demonstrated by the high qualities in the treated group of fishes in correlation with the control group. Histopathological study showed altered liver architecture with swollen apoptotic hepatocytes with coarse granular cytoplasm and packed sinusoids. In *Asparagus* treated group liver architecture and alkaline phosphatase level were in the normal range. While the paracetamol infected group was treated with *Asparagus* there was a remarkable decrease in raised ALP level. This indicates that plant extract of *Asparagus* has hepatoprotective activity (12).

The ethanolic root extract of *Asparagus racemosus* was found to create hepatoprotective activity in isoniazid initiated hepatotoxicity in rats. The plant extract of *A. racemosus* shows improved cell support impacts on the mitochondria layer of rat liver incited by making free

radicals induced by gamma radiation under in vitro conditions. It improves the GPX and GSH substance development and prevents the protein and lipid peroxidation (13)

Hydroalcoholic *Anacyclus pyrethrum* root have hepatoprotective action as it displayed a defensive impact against INH in addition to RIF-prompted hepatotoxicity in rats (14).

The ethanolic extract of *Prunus armeniaca* and *mucuna pruriens* seed also have hepatoprotective functions. The experiment was performed on nicotine-induced toxic rats. Both plant extracts decreased the elevated liver markers and normalized hepatocytes altered texture in nicotinic toxic rats. These medicinal plants have antioxidant agents which capture the free radicals and reduce hepatotoxicity (15).

Tribulus terrestris fruit extract have hepatoprotective and defensive effects against non-alcoholic fatty liver. It decrease the biomarkers of hepatic tissue, and serum lipid profiles and normalize the irregular histopathological architecture of liver cells (16).

The hydroethanolic extract of *Mucuna pruriens* leaves have liver-protective action because it increase anti-oxidants. The anti-oxidants have hepatoprotective action.

M. pruriens have the phytochemicals that can help in bilirubin clearance from the serum. These phytochemicals like in a manner have hepatoprotective properties which are capable of protecting liver against oxidative stress (17).

The root extract of *Anacyclus pyrethrum* have various polyphenolic constituents. The phenolic parts have significant ability to reduce oxidative stress in rats. These polyphenolic compounds perform important functions including hepatoprotective, anti-thrombotic and antiviral activities. Root extracts of *Anacyclus pyrethrum* also have anticancer,vasodilatory and cardioprotective activities. The root of *Anacyclus pyrethrum* is also used as an appetizer, aphrodisiac and as a general tonic (18).

The methanolic extract of *M. pruriens* seeds showed important improvement in memory and learning. Treatment with *M. pruriens* increase the number of surviving neurons in the CA1 (cornuAmmonis)and CA3 regions in hippocampus. Its long term use also decrease the level of serum ALT, serum urea, and serum creatinine in arsenic intoxicated rats(19).

Themethanolic extract of *Mucuna pruriens* beans have antioxidant actiondue to the presence of some non-protein amino acids like,dihydroxyphenylalanine(Ldopa),tetrahydroisoquinoline and hydroxytryptophan (5HTP). These compounds have hydrogen donating capability so act as an antioxidant (20).

Hydro-alcoholic extract of *Anacyclus pyrethrum* roots have hepatoprotective action as it showed the defensive impact against INH in addition to RIF-prompted hepatotoxicity in rats *Anacyclus pyrethrum* contains different bio-active constituents which are used for different useful purposes.The roots are used for the treatment of different diseases in man for exampleto cure diabetes Mellitus, immunomodulating impact, antiepilepsy action, memory booster activity, enhanced libido, antimicrobial action, soothing effect andto kill insects (14).

Different experiments have done on *Tribulus terrestris* and results showed that the plant have anti-urolithiatic, antimicrobial, anti-helminthic, cardiotonic, hypolipidemic, immunomodulatory, antispasmodic, analgesic, aphrodisiac, anti-diabetic, anti-tumor, hepatoprotective, anticancer, anti-oxidant and CNS modulator properties (21).

Abdel-Kader *et al* (22) explained that the extract of *Tribulus terrestris* have significant nephroprotective properties. The different extracts of *Tribulus terrestris* also have excellent nephroprotective action.

The herbal mixture of Satavar, Punarnava, Licorice, Sarsaparilla, Gale of wind, Kurroa, Castor bean and Giloy (ambervel) have hepatoprotective action against carbon tetrachloride-induced liver toxicity in Swiss albino rats. A polyherbal hepatoprotective drug available in the market by the trade

name Liv.52 was used as standard drug. It was observed that both Liv.52 and the herbal mixture reduced the liver enzymes AST and AST. The herbal mixture also enhanced glutathione. So it protected the liver by its antioxidant action and regeneration of hepatocytes. It is also observed that the herbal mixture has fewer side effects than Liv 52 (23).

REFERENCES

1. Abdel-Kader MS, Al-Qutaym A, Saeedan AS, Hamad AM, Alkharfy KM. Nephroprotective and hepatoprotective effects of Tribulus terrestris L. growing in Saudi Arabia. Journal of Pharmacy & Pharmacognosy Research. 2016;4(4):144-52.
2. Jamshidi-Kia F, Lorigooini Z, Amini-Khoei H. Medicinal plants: Past history and future perspective. Journal of Herbmed Pharmacology. 2018;7(1):15-23.
3. Colalto C. What phytotherapy needs: Evidence-based guidelines for better clinical practice. Phytotherapy Research. 2018;32(3):413-25.
4. Naghdibadi H, Abdollahi M, Mehrafarin A, Ghorbanpour M, Tolyat M, Qaderi A. An overview on two valuable natural and bioactive compounds, thymol and carvacrol, in medicinal plants. Journal of Medicinal Plants. 20171;16(63):1-32.
5. Aslam MS, Ahmad MS. Worldwide importance of medicinal plants: Current and historical perspectives. Recent Advances in Biology & Medicine. 2016;2(2016):909.
6. Riaz M, Mahmood Z, Shahid M, Saeed MU, Tahir IM, Shah SA, Munir N, El-Ghorab A. Impact of reactive oxygen species on antioxidant capacity of male reproductive system. International Journal of Immunopathology and Pharmacology. 2016 Sep;29(3):421-5.
7. Cordell GA. Sustainable medicines and global health care. Planta Medica. 2011;77(11):1129-38..
8. Mahmood HK, Barkat MQ, Zeeshan U, Kamran Q. Phytochemical and Antioxid ant Screening of Anacylus Pyrethrum, Apium Graveolens, BoerhaaviaDiffusa, Cinnamomum Cassia Blume, Cuscumis Melo Linn, Cuscum is Sativus Linn, Daucus Sativus, Foeniculum Vulgare, TrachyspermumAmmii and Theit effect on various Human Ailments. Matrix Science Pharma. 2018;2(2):06-14.
9. Al-Snafi AE. Traditional uses of Iraqi medicinal plants. IOSR Journal of Pharmacy. 2018;8(8):32-96..
10. Karuna DS, Dey P, Das S, Kundu A, Bhakta T. In vitro antioxidant activities of root extract of Asparagus racemosus Linn. Journal of Traditional and Complementary Medicine. 2018 Jan 1;8(1):60-5.
11. Acharya SR, Acharya NS, Bhangale JO, Shah SK, Pandya SS. Antioxidant and hepatoprotective action of Asparagus racemosus Willd. root extracts.
12. Ahmad MP, Hussain A, Siddiqui HH, Wahab S, Adak M. Effect of methanolic extract of Asparagus racemosus Willd. on lipopolysaccharide induced-oxidative stress in rats. Pakistan Jounal of Pharmaceutical Science. 2015 Mar 1;28(2):509-13.
13. Palanisamy N, Manian S. Protective effects of Asparagus racemosus on oxidative damage in isoniazid-induced hepatotoxic rats: an in vivo study. Toxicology and Industrial Health. 2012 Apr;28(3):238-44.
14. Usmani A, Mujahid MD, Khushtar M, Siddiqui HH, Rahman MA. Hepatoprotective effect of Anacycluspyrethrum Linn. against antitubercular drug-induced hepatotoxicity in SD rats. Journal of Complementary and Integrative Medicine. 2016;13(3):295-300.
15. Altemimi A, Lakhssassi N, Baharlouei A, Watson DG, Lightfoot DA. Phytochemicals: Extraction, isolation, and identification of bioactive compounds from plant extracts. Plants.

2017;6(4):42-48
16. Almasi F, Khazaei M, Ghanbari A. Hepatoprotective Effects of Tribulus terrestris Hydro-Alcholic Extract on Non-Alcoholic Fatty Liver-Induced Rats. International Journal of Morphology. 2017;35(1):12-18.
17. Obogwu MB, Akindele AJ, Adeyemi OO. Hepatoprotective and in vivo antioxidant activities of the hydroethanolic leaf extract of Mucuna pruriens (Fabaceae) in antitubercular drugs and alcohol models. Chinese Journal of Natural Medicines. 2014;12(4):273-83..
18. Selles C, Dib ME, Allali H, Tabti B. Evaluation of antimicrobial and antioxidant activities of solvent extracts of Anacyclus pyrethrum L., from Algeria. Mediterranean Journal of Chemistry. 2012 Nov 1;2(2):408-15..
19. Divya BJ, Suman B, Venkataswamy M, ThyagaRaju K. The traditional uses and pharmacological activities of Mucuna pruriens (L) DC: a comprehensive review. Indo American Journal of Pharmaceutical Research. 2017;7(01):7516-25.
20. Siddhuraju P, Becker K. Antioxidant properties of various solvent extracts of total phenolic constituents from three different agroclimatic origins of drumstick tree (Moringa oleifera Lam.) leaves. Journal of Agricultural and Food Chemistry. 2003;51(8):2144-55..
21. Bhandari B, Chopra D, Kohli SK. Pharmacological effects of Tribulus terrestris: A review. International Journal of Contemporary Medicine. 2013;1(1):71-78.
22. Abdel-Kader MS, Hazazi AM, Elmakki OA, Alqasoumi SI. A survey on traditional plants used in Al Khobah village. Saudi Pharmaceutical Journal. 2018 Sep 1;26(6):817-21..
23. Lal AA, Murthy PB, Pillai KS. Screening of hepatoprotective effect of a herbal mixture against CCl. Journal of Environmental Biology. 2007 Apr;28(2):201-7.