

A REVIEW ON HEPATOPROTECTIVE ACTIVITY OF MEDICINAL PLANTS

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ABSTRACT

Liver diseases are a major worldwide health problem, with high endemicity in developing countries. They are mainly caused by chemicals and some drugs when taken in very high doses. Despite advances in modern medicine, there is no effective drug available that stimulates liver function, offer protection in the liver from damage or help to regenerate hepatic cells. There is urgent need, therefore, for effective drugs to replace/supplement those in current use. The plant kingdom is undoubtedly valuable as a source of new medicinal agents. The present work constitutes a review of the literature on plant extracts and chemically defined molecules of natural origin with hepatoprotective activity. The review shows various medicinal plant, their families, geographical source, chemical compound, chemical structure, plants part utilized, and inducer of liver damage. This work intends to aid researchers in the study of medicinal plant useful in the treatment of liver diseases.

KEYWORDS: Liver, liver disease, hepatoprotective activity, medicinal plants.**INTRODUCTION**

Medicinal plants have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agents for the prevention of disease and ailments. Nature has bestowed our country with an enormous wealth of medicinal plants; therefore India has often been referred to as the Medicinal Garden of the world. Countries with ancient civilizations such as China, India, South America, Egypt, etc. are still using several plants remedies for various conditions. In this regard India has unique position in the world, where a number of recognized indigenous system of medicine viz., Ayurveda, Siddha, Unani, Homeopathy, Yoga, and Naturopathy are being utilized for the health care of people. The demand for plant based medicines, health products, pharmaceuticals, food supplement, cosmetics etc.^[1]

The use of medicinal plant in curing diseases has being used since decades. The World Health Organization (WHO) has long organized and drawn the attention of many countries to the ever increasing interest of the public in the use of medicinal plants and their products in the treatment of various ailments. India is a rich source of medicinal plants and a number of plant-derived extracts are used against diseases in various systems of medicine.^[2]

Medicinal plants a key function inside the human fitness care. Approximately 80% of the world populace is predicted on using conventional medicine that predominantly based on plant materials. The traditional medicine refers to a best variety of ancient herbal health care practices. It is predicted that approximately 7,500 plants are utilized in local fitness traditions in, typically, rural and tribal villages of India out of these, the real medicinal cost of over 4,000 plants either little acknowledged or unknown to the mainstream population. The classical system of drug which includes Ayurveda Siddha, Amchi, Unani and Tibetan use about 1,200 plants. Detailed researches are documentation of flower utilized in local fitness traditions and Pharmacological evaluation of these plants and their Taxonomical family can cause the improvement of invaluable plants drugs for plenty dreaded sickness. Random screening of plants has no longer proved economically effective.^[3]

Plants used for Hepatoprotective activity**1. *Silybum marianum*****Fig No. 1: *Silybum Marianum*.**

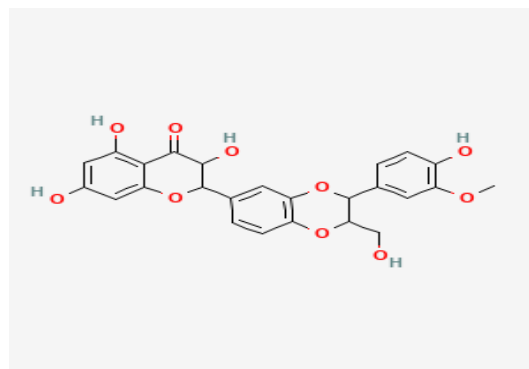
Silybum marianum is a medicinal plant whose therapeutic history dates back to 2000 years ago and was used as a hepatoprotective medication to treat jaundice and enlarged liver and spleen. Originally, *Silybum marianum* was a native of Asia and South Europe, but it is found throughout the world. It has been used for treatment of numerous liver disorder characterized by functional impairment or degenerative necrosis. Silymarin is also able to protect kidneys against nephrotoxic agents.

Botany and Morphology

Silybum marianum is of *Asteriaceae* family and has various other names including milk/thistle, Marian thistle, Mary thistle, Mary's thistle, Saint Mary's thistle, Blessed milk thistle, Mediterranean milk thistle, variegated thistle, *Cardus marianus*, and Scotch thistle. *Silybum marianum* has shiny pale green leaves and red to purple flowers with white veins. In Persian and Arabic countries, it is called Mary thiqhal.

Chemical Compounds

The seeds of this plant contain many compounds such as silybin, silibinin A and B, silicristin, silidianin, apigenin, dehydrosilybin, deoxysilybin, among other. Extract of dried seed of this plant contains up to 4% Silymarin. Silymarin is a combination of flavonoids such as silibinin.

**C₂₅H₂₂O₁₀ Silymarin**

Hepatoprotective activity: Silymarin protects the liver against toxicities resulting from various toxins such as carbon tetra chloride, acetaminophen, and tetrachlorometane. It has been reported that Silymarin provides the Hepatoprotective effect by different mechanism including Antioxidant activity and scavenging free radicals, stimulation of DNA polymerase and stable of Hepatocellular membrane.

2. *Woodfordia fruticosa*



Fig NO 2: *Woodfordia fruticosa*.

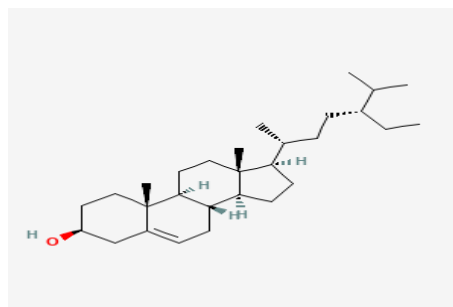
The world health organization (WHO) reported that an estimated 80% of the population in developing countries depend on traditionally used medicinal plants for their primary health care. Among the numerous species used in folk medicine, *woodfordia fruticosa* Kurz syn, *woodfordia floribunda* Salisb. It has been widely used by practioner of traditional medicine in different South East Asian countries since long back.

Hepatoprotective activity: These medicinal plants are Hepatoprotective activity of petroleum ether, ethyl alcohol, chloroform and aqueous extract of the flower of *Woodfordia fruticosa* against Phenytoin induced damage of liver in rats and carbon tetrachloride induced Hepatotoxicity.

Morphological features

Woodfordia fruticosa Kurz belongs to the family *Lythraceae*, which also includes other medicinally important plants like *Ammania baccifera* Linn. The plant is abundantly present throughout India, ascending up to an altitude of about 1500m, and also in a majority of the countries of South East and Far East Asia like Malaysia, Indonesia, and China.

Chemical compound: First demonstrated the presence of the common plant constituents' octacosanol and β -sitosterol in the stems. There was subsequently reported from the flower also, with β -sitosterol encountered even in the leaves. The other non-phenol constitutes reports include the steroid sapogenin hecogenin.^[6]



C29H50O B-sitosterol

3. *Schisandra Chinensis*

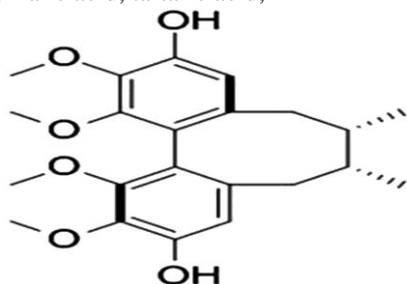


Fig No. 3: *Schisandra Chinensis*.

Schisandra Chinensis Turz (Bail) belongs to the family of *Schisandraceae* family. The plants are native to northeastern China, Japan Korea, Manchuria, and the Far East part of Russia. Their purple-red berries are called five-flavor fruits because of the sweet, bitter, pungent, salty, and sour taste. *Chinensis* is widely used as an herbal supplement in traditional Chinese medicine and in Western phytotherapy.

Chemical components: *S.Chinensis* fruits contain about 1.5% sugars (polysaccharides and monosaccharide, glucose, fructose, galactose, and arabinose).^[7]

The other chemical constituents are organic acids, including malic acid, tartaric acid,



C22H28O6 Gomisin J.

Hepatoprotective activity: Some Lignans bioactivities of antitumor-promoting by inhibiting early antigen activation and multi drug resistance in cancer cells and enhancing doxorubicin induced apoptosis in human hepatic cancer cells as well as inhibiting the platelet aggregation and anti-HIV effects. The plant shows various beneficial biological activities on the liver such as respiration, and central nervous and cardiovascular system. It exhibit a Hepatoprotective effect by lowering the serum glutamate pyruvate level and antioxidant properties.^[8]

4. *Ocimum Sanctum*



Fig No. 4: *Ocimum sanctum*.

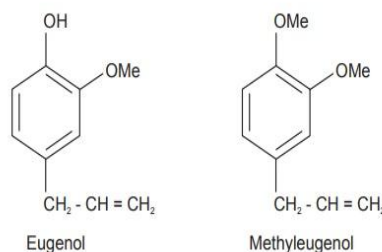
Tulsi means 'incomparable one' or 'matchless' and it is derived from Sanskrit. Tulsi is a sacred plant of Hindu religion worshipped all over the India. *Ocimum sanctum* is a many branched, erect, stout and aromatic herb about 75 cm high. They are cultivated in different parts of the world and are widely known for their medicinal properties. The leaves, seeds and root of this plant have been used in indigenous Ayurvedic medicine. This small herb is found throughout India and is cultivated, worshiped in temples and houses of Hindus.

Morphological feature: This branched fragmented shrub with the height of about 30-60 cm when mature and belonging to family *Labiatae*. Its leaves are simple,

aromatic, branched, opposite, obtuse, elliptical and have dentate margins. Tulsi leaves are purple in colour and seeds radish yellow and frits are small. It is planted after rainy season and harvested after few months.

Hepatoprotective activity: Hepatoprotective activity of *Ocimum sanctum* alcoholic leaf extract against paracetamol-induced liver damage in albino rats synergism with Silymarin and concluded that *Ocimum sanctum* that alcoholic leaf extract showed significant Hepatoprotective activity and synergism with Silymarin.^[9]

Chemical components: The leaves of *Ocimum sanctum* contain 0.7% volatile oil comprising about 71% eugenol and 20% methyl eugenol. Fresh leaves and stem of *Ocimum sanctum* extract yielded some phenolic compounds. Such as cirsilineol, circimaritin, isothymusin, apigenin and rosameric acid.^[10]



5. *Solanum Nigrum*



FIG.NO. 5: *Solanum Nigrum*.

Salanum nigrum is a medicinal plant and it is also known as black night shade in English, Makoi in Hindi, Kachchipandu in Telugu, Munatakali in Tamil, Piludi in Gujarati and Kamuni in Marathi.^[11]

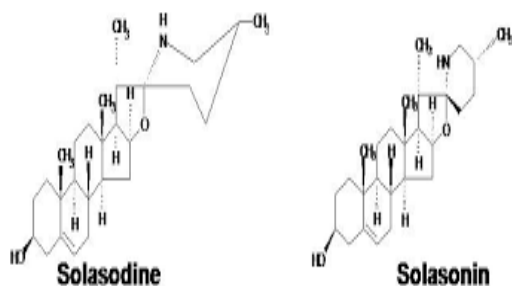
Two varieties of *Solanum nigrum* found one is black colour fruits and seconds is reddish roots are used for health point of view.

Morphological Feature: *Solanum nigrum* is 25-100 cm tall, pubescent with simple hairs. The fruits are dull black, the leaves are ovate, and bases are cuneate, 4-10 and 3-7 cm wide, pubescent, coarsely dentate, the apex is obtuse. Belonging to the family of *Solanales*.

Hepatoprotective activity: *Solanum nigrum* aqueous and methanolic extracts were studied for hepatoprotective activity in rats injected with 0.2 ml/kg of carbon tetrachloride for 10 consecutive days. Hepatoprotective against CC14-induced liver damage. The ethanol extract showed remarkable hepatoprotective activity. Ethanol extracts of *Solanum nigrum* Linn. Was investigated for the hepatoprotective activity against CC14-induced hepatic damage in rats. The histopathological changes of liver sample in treated animals and compared of the control.

Chemical components: The *Solanum nigrum* possesses numerous compounds that are responsible for pharmacological activities.^[12]

Whole plant reported that which contain alkaloids, flavonoids, tannins, saponins, glycosides, proteins carbohydrates, coumarins and phytosterols, Small unripe fruits of *Solanum nigrum*.



Several compounds have been isolated from different fractions of *Solanum nigrum* which have shown pharmacological relevance to the observed effects of whole plant preparation of *Solanum nigrum*. Solanidine is obtained after hydrolysis of solanine, solanine is less toxic. Although toxic constituents are present in most parts of the plants, nutritional potential of the leaves and seeds that *Solanum nigrum* is nutritive despite the presence of some anti-nutritive components like oxalate. Protein contents of the leaves and seeds were found to be 24.90 and 17.63% other findings are ash 10.18 and 8.05% crude fibres, 6.81 and 6.29% and carbohydrates, 53.51% for leaves and seeds.^[13]

CONCLUSIONS

The goals of ethnopharmacological studies on medicinal plants should not be restricted to finding new prototype pure compounds as drugs. These medicinal plants are very effective and proper pharmacological and clinical trials. The manufacture of plant products should be governed by standard of safety and efficacy.

These plants may offer new alternatives to the limited therapeutic options that exist at present in the treatment of liver disease or their symptoms.

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