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Pharmacognosy study of Medicinal Plant Solanum xanthocarpum

Ms Jyoti singh Dr.Bishnu kumar Dr. Shailesh Gupta Sandeep singh

Dept. of Pharmacologey,
Associate professor bamc medical college
Professor in Deptt.of Pharmacologey
Dept. of Pharmacognosy

ABSTRACT: Plants do indeed have Nephroprotective & medicinal properties. Investigations are carried out to provide experimental evidence, which confirms that many of these worldwide traditional plant remedies, which are used for such treatment and that on recent years surprising that a considerable interest has been developed in the examination of those numerous caused by viral infection, there are few effective plants that cure liver diseases. Therefore, it is not or scientific evaluation except for the use of appropriate vaccine for the treatment of hepatitis types of liver diseases. But most claims are anecdotal and very few have received adequate medical claimed for centuries that extracts of plants can be effectively used for the alleviation of different Ayurveda and other traditional medical practitioners from different countries that failure is fundamentally categorized into acute and chronic renal failure. There is a failure of regulation of fluid and electrolyte balance along with endocrine dysfunction. The renal of kidney, leading to retention of nitrogenous waste products of metabolism in the blood. In addition to this, which may attenuate its toxicity? The term renal failure primarily denotes failure of the excretory function of various medicinal plants possessing nephroprotective activity along with different nephrotoxic agents substances. Early literatures have prescribed various herbs for the cure of renal disorders. Medicinal plants have curative properties due to the presence of various complex chemical necessary therapy.

KEYWORDS: Medicinal plants, toxicity, antioxidant and Nephroprotective activity.

I INTRODUCTION

Nephrotoxicity is one of the most common kidney problems and occurs when body is exposed to a drug or toxin. A number of therapeutic agents can adversely affect the kidney resulting in acute renal failure, chronic interstitial nephritis and nephritic syndrome because there is an increasing number of potent therapeutic drugs like aminoglycoside antibiotics, NSAID's, chemotherapeutic agents have been added to the therapeutic arsenal in recent years. Exposure to chemical reagents like ethylene glycol, carbon tetrachloride, sodium oxalate and heavy metals such as lead, mercury, cadmium and arsenic also induces nephrotoxicity. Prompt recognition of the disease and cessation of responsible drugs are usually the only necessary therapy. Nephroprotective agents are the substances which possess protective activity against Nephrotoxicity. Medicinal plants have curative properties due to the presence of various complex chemical substances. Early literatures have prescribed various herbs for the cure of renal disorders. Coadministration of various medicinal plants possessing nephroprotective activity along with different nephrotoxic agents which may attenuate its toxicity. The term renal failure primarily denotes failure of the excretory function of kidney, leading to retention of nitrogenous waste products of metabolism in the blood. In addition to this, there is a failure of regulation of fluid and electrolyte balance along with endocrine dysfunction. The renal failure is fundamentally categorized into acute and chronic renal failure.[1-6].

Ayurveda and other traditional medical practitioners from different countries have claimed for centuries that extracts of plants can be effectively used for the alleviation of different types of liver diseases. But most claims are anecdotal and very few have received adequate medical or scientific evaluation. Except for the use of appropriate vaccine for the treatment of hepatitis caused by viral infection, there are few effective plants that cure liver diseases. Therefore, it is not surprising that a considerable interest has been developed in the examination of those numerous worldwide traditional plant remedies, which are used for such treatment and that on recent years investigations are carried out to provide experimental evidence, which confirms that many of these plants do indeed have Nephroprotective properties. Recent

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progress in the study of such plant has resulted in the isolation of about 170 different phytoconstituent from plants belonging to about 55 families, which exhibit Nephroprotective activity. raditional system of medicine has plants, used for centuries for protecting liver for the treatment of liver dysfunctions. Ancient literature also mentions herbal medicine is related diseases namely Memory lose, Osteoporosis, Diabetic wounds, Immune and Liver disorders etc, for which in modern medicine or only palliative therapy is available. Indian system of traditional medicine it is presumed that the knowledge of ayurveda is given by gods of a different world .it is accepted as the oldest written medical system that is also supposed to be more effective in certain cases than modern therapies.India, a veritable emporium of plants, occupies the topmost place among the leading users of herbal medicines. India the abode of Ayurvedic system of medicine, assigns much importance to the pharmacological aspects of many plants. Herbal drugs are playing an important role in health care programmes worldwide and there is a resurgence interest in herbal medicines for treatment of various ailments including haptopathy. India has an ancient heritage of traditional medicine .material medica of India provide lots of information on the folklore practices and traditional aspect of therapeutically important natural products. Indian traditional medicine is based on various systems including ayurveda, sidda and unani. The evaluation of these drugs is mostly based on phytochemical, pharmacologically and allied approaches including various instrumental techniques like chromatography, microscopy and common thread running through these system in their fundamental principle and practices. Herbal drugs are constitutes a major part in all the traditional system of medicine. Herbal medicine is a triumph of popular therapeutic diversity. Plants above all other agent have been used for medicine from time immemorial because they have fitted the immediate personal need .there are approximately 1250 Indian plant medicinal plant ,which are used in formulating of therapeutic preparation according to ayurveda and other traditional system of medicines . Herbal drugs are constitutes a major part in all the traditional system of medicine. .Herbal medicine is a triumph of popular therapeutic diversity.

II AIM AND OBJECTIVES

Our present study aims at the scientific validation of Medicinal properties like nephroprotective and antioxidant properties of selected plant so that new herbal drug will come in the market.

III MATERIALS AND METHODS

1. References of Medicinal plants have been collected from the classical books of Ayurveda
2. All the data is compiled, analyzed and discussed through in depth for *Medicinal Plants for its* Medicinal properties.
3. Ayurvedic and modern approach have been compiled in this review

IV. PLANT PROFILE

I.Solanum xanthocarpum

Genus - Solanum
Family Solanaceae
Order - Solanales
Subclass - Asteridae
Class - Magnoliopsida
Division - Magnoliophyta
Subkingdom - Tracheobionta
Kingdom – Plantae

Anthers 8 mm long, oblong lanceolate, opening by small pores. Ovary is globules. Lobes are 11 mm long, linear-lanceolate, acute and hairy outside. Filaments are 1.5 diameter and glabrous. Calyx is nearly 1.3 cm long, densely hairy and prickly; tube short, yellow, or white with green veins, surrounded by the enlarged calyx. Seeds are 2.5 mm in are green and white strips when young but yellow when mature. They are 1.3-2 cm in diameter, base usually rounded and unequal-sided; petiole 1.3-2.5 cm long, stellately hairy. The berries glabrous in age, armed on the midrib and often on the nerves with long yellow sharp prickles, sub pinnatified, obtuse or sub acute, stellately hairy on both sides, sometimes becoming nearly cm. Leaves are usually 5-10 in numbers and 2.5-5.7 cm in length, ovate or elliptic, sinuate or tomentum; prickles are compressed, straight, yellow, glabrous and shining, often exceeding 1.3 somewhat

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zigzag; branches are numerous, the younger ones clothed with dense stellate. A very prickly diffuse bright green perennial herb, somewhat woody at the base.

II. Taxonomic classification

It is one of the members of the *dashamula* (ten roots) of the Ayurveda. The properties are attributed to it, particularly in the treatment of asthma, chronic cough and Hindu *Materia Medica*, primarily as an expectorant and antipyretic. *Solanum xanthocarp* has held a place of some importance in the perennial herb, woody at the base, 2–3 m height, found through out India, mostly in dry places berried night shade (English) and kantakari (Sanskrit). It is a prickly diffuse, bright green Schrad. & Wendl. (Family: Solanaceae) commonly known as the Indian night shade or Yellow in the development of new drugs from plants. One such plant is *Solanum xanthocarpum* (SX) based on their use in the traditional systems of medicine forms the basis for an ideal approach selection of scientific and systematic approach for the biological evaluation of plant products medicine and therapies. However, the basis of its development remains rooted in traditional medicine or allopathy has gradually developed over the years by scientific and observational and minerals have been the basis of treatment of human diseases. The current accepted modern has been carried out on ayurvedic medicinal plants. Natural products, including plants, animals Considerable research on pharmacognosy, chemistry, pharmacology and clinical therapeutics Ayurveda is a traditional Indian Medicinal System practiced for thousands of years.

III. Morphology

Tropical, Auastrana and Polynessia . Naturally propagated by seed in waste lands. It is also distributed in Ceylon, Asia, Malaya. It occurs throughout India, in dry situations as a weed along the roadsides and wastelands.

IV. Geographical Source

Kannad: Nelagulle
Telugu: Callamulaga, Pinnamulaka, Nelamulaka, Vakudu
Malayalam: Kantkariccunta, Kantakarivalutana, Kantankattiti
Tamil: Kantankattiri
Gujarati: Bhoringni, Bhonya-ringani
Hindi: Kateri, Kattay
Sanskrit: Kantkari, Nidigdhika
Latin: *Solanum surattense*, Syn. *S. Xanthocarpum*

V. Botanical description

It can grows on any type of soil but hot and dry region May and June is more suitable. It grow inUttaranchal, & other north east states..In India it is largely found in UP, Punjab, Bihar, Bengal,145 *Solanum xanthocarpum* plant is an perennial herbaceous .

It works against cancer and potentiation of general anesthetics. It act by inhibiting include lowering of cholesterol . Although they are reported to be potentially toxic, glycoalkaloids and hydrolysis secondary plant metabolites that are formed in a number of foods including potatoes, tomatoes, cycloartenol were reported from the fruits . Steroidal glycoalkaloids are naturally occurring, steroids carpesterol, diosgenin, campesterol, daucosterol and triterpenes like cycloartanol and solamargine . Other constituents like caffeic acid coumarins like aesculetin and aesculin , The fruits are reported to contain several steroidal alkaloids like solanacarpine [and phenolic substances, which could be identified as methyl caffeate and caffeic acid . glycoside of β-sitosterol with galactose as a sugar moiety has been obtained along with two which led to the isolation of glycoalkaloid, solasonine. From the non alkaloidal portion, a Chemical examinations of berries of SX were initially done by Saiyed and Kanga,(1936)

VI. Occurrence and distribution

Solanum xanthocarpum grow in dry and sandy places.

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VII. Phytochemistry

They have white or yellow having greenish veins. They are small, corolla is purple, deltoid lobes,and hairy outside. Fruits are of 1.3 cm in diameter, berry compressed prickles, straight, yellow and shining; leaves five to ten by 2.5 to 5.7 cm. It is a highly prickly diffused, bright green annual herb, two to three meter high having zigzag stem.

A number of analytical methods like high performance thin-layer many workers viz. gravimetric, non- aqueous, potentiometric, Chromatography, Colorimetric against 0.75% noted for the ripe berries. Solasodine has been estimated by various methods by (May, June). The solasodine content of the unripe berries was 1.7% (on dry weight basis) as without any trace of solasurine which was obtained from the material collected in summer berries collected in autumn (September, October) yielded only solasonine and solamargine 1.1% to 4.6% depending apparently on climatic and soil conditions. It has been observed that aglycon namely solasodine. The solasodine content of the berries of SX is reported to vary from variously known as solasonine, solamargine etc. with the common spiro aminoketal alkaloid or in most of the berries of the plant belonging to the genus *solanum* and the glycoalkaloids are corticosteroids, antifertility drugs, anabolic steroids etc. It is present in the form of a glycoside diosgenin and used as a steroidal precursor in the steroid drug industry for the manufacture of The berries are the main source of solasodine and diosgenin. Solasodine is N-analogue of for the manufacture of cortisone and sex hormones . Spiroketal alkaloid sapogenin with a heterocyclic nitrogen atom, which is the starting material unsaponifiable matter, 1.2 percent . SX has a high concentration of solasodine alkaloid, a 42.93; linolic acid, 36.18; palmitic acid, 5.37; steric acid, 9.77; arachidic acid, 0.35, and did not contain nitrogen or sulphur. The composition of the oil was calculated as oleic acid, powdered seeds were extracted with benzene and yielded 19% of greenish-yellow oil which The fruits contained 20.71% of dry seeds, 4.62 of pericarp and 74.67 percent of moisture. The solasodine , ß-sitosterol and carpesterol stimulating function .The detailed study on this plant resulted in the isolation of solasonine and The fruit of SX contains alkaloid saponins which can be extracted in alcohol and have a heart- from SX . exhibited estrogenic activity in an in vitro assay . Structures of some isolated phytoconstituents cholinesterase and of a malaria vaccine . Solanidine, but not the parent glycoalkaloids
found among many other *solanum* species. to solasodine ,which is the major alkaloid accompanying carpesterol in SX and commonly structural knowledge of carpesterol would shed some light on the biogenetic pathway leading
decades ago no structural studies of the sterol have been reported. Because it was hoped that a Carpesterol was the first compound isolated from the lipid fraction of plant.

Carpesterol

It is much higher than that obtained from the growing plant . It is detected earlier, the tissue cultures of SX have yielded ß-sitosterol and diosgenin in quantities diosgenin. Although only trace amounts of the steroidal alkaloid solasonine and solanine were from callus tissues of SX. M. R. Heble et al. (1968) reported the isolation and identification of ß-sitosterol and diosgenin solasodine showed significant reduction of the inflammatory reaction from 19.5 to 56.4% against carrageenan induced paw oedema in rats. The studies of S. Emmanuel, (2006) revealed that solasodine showed anti-inflammatory activity hormone used in the oral contraceptive industry . Nitrogenous analogue of diosgenin which can be converted to progesterone a steroidal sex Pure white crystals of solasodine could be obtained with 196-197°C m.p. Solasodine is a process of estimation as it may affect in actual recovery of solasodine due to over heating . Extraction, hydrolysis, basification and purification temperature should be high throughout the hydrochloric acid has some influence on the percentage recovery of solasodine. Further, they reported that the control of temperature, time of extraction and concentration of S. Emmanuel et al. (2006) reported satisfactory content of solasodine (0.84%) in the plant. Solasodine does not have a conjugated double bond in its structure .Electrophoresis, gas chromatography (GC) are available for determination of solasodine solasodine from orange extractable in chloroform. It gave maximum absorbance at 425 nm. determination of the solasodine content. Solasodine forms yellow colored complex with methyl steroidal alkaloid content was observed. The colorimetric method was used for the or maturity, an associated change in the steroidal glycoalkaloid content and therefore in the berries are attached turns brown in color from the original green. During fruit development standing in the plant becomes deep yellow in color, at which stage the stalk through which the signifies the beginning of ripening. On ripening it attains yellow color. Berries on further green in color with white blotched stripes [36]. On growing, it develops yellow color which was concluded that the berries of SX in the initial stages of fruit development are very small, fruit maturity viz. berries when green in color, color changing from green to yellow color. It Jolly et al.

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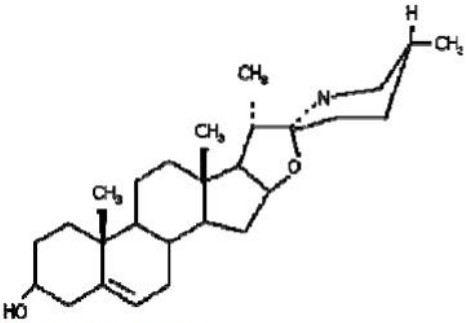
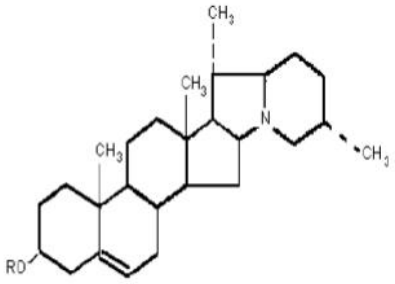
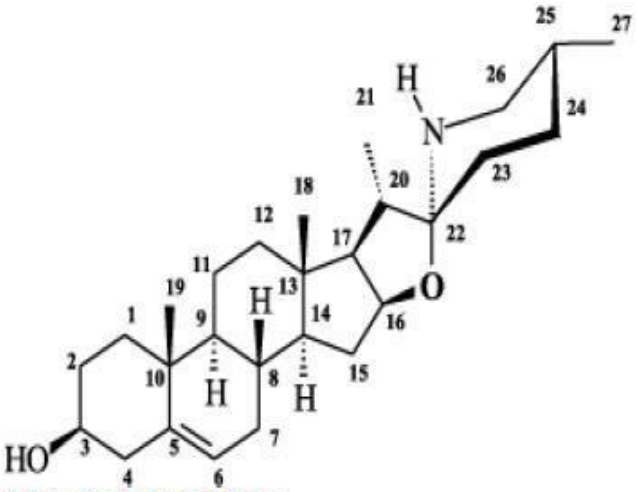
(1989) have reported the variation in the solasodine content, at different stages of and β-sitosterol. glycoside . Subsequent investigations of extracts from SX showed the presence of diosgenin Saiyed and Kanga (1936) isolated the substance carpesterol along with a steroidal alkaloid action.Constituents from *Solanum xanthocarpum* undoubtedly have the ability to kill tumor cell Lupeol, apigenin and solamargine from *Solanum nthocarpum* shows anticancer properties.



(A) Solasodine



(B) Solanidine



(C) Solasonine

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II. **Chemical constituent**

Solanum xanthocarpum fruits posses solanocrpidine and a sterol, carpesterol.

Plant consist sterols, saponin, amino acid, carbohydrate, fatty acid, glycosides, flavonoid, *xanthocarpum* behave as multi-target agent with enormous anti-inflammatory activity.

Carpesterol, stigmasterol, and diosgenin have proven anti inflammatory action.

III. Properties which are mentioned as following:

It is an important medicinal plant and in recent history this plant is reported for various medicinal in cough, fever, inflammation, asthma and as an antiemetic & diuretic. Deposited mucus and assist in its easy expulsion from the respiratory system.Root is beneficial Wild plant is very beneficial for the respiratory system. *Solanum xanthocarpum* defabricate the beneficial in heart ailments, urinary disease, thirst, piles, pains, bronchitis, fever, asthma. In Ayurveda, *Solanum xanthocarpum* is laxative, appetizer, stomachic, antihelmintic .

(a) Anti-fertility activity Solasodine is an alkaloid obtained from *Solanum xanthocarpum* it possesses antispermatogenic have hypoglycemic activity and causes beta cell regeneration of pancreas mechanism is not known.

(b) Anti hyperlipidemic activity

Certain alkaloids and flavonoids present in *Solanum xanthocarpum* The Anti hyperglycemic activity was linked with rise in plasma insulin level.

(c) Hepato protective activity Increased in the level of enzyme which shows the antioxidant action of *Solanum xanthocarpum*. *Solanum xanthocarpum* shows positive result when it was examined for hepatoprotective.

(d) Apoptosis inducing activity

Constituents from *Solanum xanthocarpum* undoubtedly have the ability to kill tumor cell Lupeol, apigenin and solamargine from *Solanum xanthocarpum* shows anticancer properity.

(e) Anti asthmatic activity Asthma relieving action. The therapeutic activity of *Solanum xanthocarpum* is antihistaminic.

(f) Hypoglycemic activity

Hypoglycemic activity is observed in extracts of *Solanum xanthocarpum*.

(g) Anti filarial activity

is also observed safe in toxicological studies.

(h) Anti-inflammation activity

Solanum xanthocarpum have good larvicidal activity and it was suitable for environment.

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