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Comprehensive review on Solanum virginianum Linn

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ABSTRACT:

Solanum virginianum, commonly known as Kantakari, is a widely used medicinal plant in traditional systems of medicine, especially in Ayurvedic and folk medicine. This plant, primarily found in India, possesses a rich ethnomedicinal history, with different parts such as roots, stems, flowers, fruits, and seeds employed for treating various ailments. Ethnobotanical reports highlight its usage in managing diseases like asthma, diabetes, inflammatory disorders, respiratory issues, and skin diseases. The plant's roots are traditionally used as a tonic, while its fruits are known for treating inflammatory conditions, throat infections, and diabetes. Additionally, the plant's seeds, stem, and flowers exhibit therapeutic effects for conditions such as dental caries, burning feet, and respiratory distress.The pharmacological activities of Solanum virginianum have been extensively studied, revealing its anti-inflammatory, antibacterial, analgesic, wound-healing, and anti-ulcer properties. Moreover, its phytochemistry profile includes significant bioactive compounds such as steroidal alkaloids (solasodine, solamargine), flavonoids, and saponins, which contribute to its diverse medicinal effects. The plant's therapeutic potential has been further demonstrated through studies on its antioxidant, antidiabetic, anti-asthmatic, and anti-cancer properties. Despite its extensive use, further research is needed to validate its efficacy through clinical trials and to explore its potential in modern pharmacology. Overall, Solanum virginianum represents a promising candidate for the development of natural remedies and the preservation of ethnomedicinal knowledge.

Introduction:

Solanum virginianum, commonly known as Yellow Berried Nightshade, is a significant medicinal plant in Ayurveda and traditional medicine.[1][2][3]Belonging to the Solanaceae family, it is primarily found in arid regions of India and is recognized for its diverse pharmacological properties. The plant contains bioactive compounds like alkaloids, flavonoids, glycosides, and terpenoids, which contribute to its therapeutic potential. It is traditionally used to treat throat infections, asthma, skin disorders, headaches, and hair fall. Additionally, it exhibits antimicrobial, antitumor, anti-inflammatory, antioxidant, antidiabetic, hepatoprotective, and antifertility activities.In Ayurveda, Solanum virginianum is highly regarded and mentioned in ancient texts like Charaka Samhita and Sushruta Samhita. Ayurvedic formulations such as Dashmularishta, Kantakari Ghrita, and Dasmul Asava incorporate this plant for treating cough, cold, fever, asthma, and cardiovascular ailments. Its roots are also considered a tonic for lactating mothers. The fruits and the whole plant have been used for conditions like misperistalsis, tympanitis, piles, dysuria, and as a rejuvenative agent. With its array of bioactive phytochemicals such as solasodine, solanocarpidine, and diosgenin, Solanum virginianum has immense potential in therapeutic development, particularly for cancer and infectious diseases.

Synonyms-

Marathi	Kataringani, Bhauringani
Sanskrit	Dusparsha, Kantakee, Kshudra, Nidigdhika, Vyaghri
Hindi	Katai, Ringani, Katali/Kateli, Chhotikateri, Bhatakataiya, Kattay
Telugu	Nelamulaka, Mulaka, Vakudu, Pinnamulaka, Chinnamulaka
Farsi	Badagan barri
Oriya	Bhejibaugana, Ankarati, Chakada Bhoji
Manipuri	Leipungkhan
Thai	Makhua Khurn
Malyalam	Kantakari Chunda, Kantakariccunta, Kantakarivaluntana, Kantankattiti
Kannada	Nelagulla, Kiragulla
Kashmiri	Kath
Panjabi	Kandiari
Bengal	Kantkari
Tamil	Kandangatri, Kandankatri, Kandanghathiri

Table: 01 [4][5][6]

1. Botanical Profile of Solanum virginianum:

It is a thorny, low diffuse suffrutescent, perpetual spice or under-bush, with little stem, however having various unpredictably ramous or following woody divaricated somewhat three-sided, flexuous branches that spread near the ground, frequently establishing at the hubs and covering the roundabout region 2-4 feet in measurement. The entire plant is thickly outfitted areas of strength for with based sharp compacted straight whitish or yellowish-white prickles almost around 50% of an inch long. They shoot when youthful and are covered with stellate down yet become scarcely glabrous when mature. They bear praise or applaud oval sinuately lobed or pinnatifid inadequately pubescent to glabrescent thorny membranous leaves which are dim green above and extensively lighter or paler below[4], [7]

Kingdom	Plantae
Division	Spermatophytae
Sub-Division	Angiospermae
Class	Dicotyledonae
Sub-class	Gamopetalae
Series	Bicarpellatae
Order	Cucurbitales
Family	Solanaceae
Genus	Solanum
Species	virginianum.L

Table: 02 [4]

2. Taxonomy of Solanum virginianum:[4]

Solanum xanthocarpum, also known as Yellow Berried Nightshade, is a barbed therapeutic plant with a woody base, commonly found in northeastern India and throughout the country, especially in dry areas along roadsides and waste lands[8]. It is a thorny, radiant green perennial herb that grows to a height of 2-3 meters.[4] The plant features greenish-gray stems with numerous spines and younger stems covered with dense stellate hairs. Its leaves are elliptic or sinuate, hairy on both sides, and equipped with sharp yellow prickles along the midrib.

The plant produces vibrant blue flowers and globular, edible berries. The fruits are green with white stripes when young and turn yellow upon ripening, measuring about 1.25-2 cm in diameter. The calyx is densely bristly and thorny, while the corolla is purple and hairy on the outside. The anthers open through a pore, and the ovary is ovoid and glabrous. The seeds are smooth and glabrous, while the berries are encased in a persistent calyx. The plant is recognized for its hardy nature and distinctive appearance, including its thorny stems, prickly leaves, and colorful berries.

3. Occurrence and Distribution:

It happens all through India, in dry circumstances as a weed along the side of the road and badlands. It is normally spread by seeds in badlands. It is additionally appropriated in Ceylon, Asia, Malaya, and Polynesia[9] The plant is tracked down in all dry areas in the plain as well as low slopes all through India from Punjab and Assam to Cape Comorian. In South India, it is found bounteously along the Coromandel Coast and in the regions of Tirunelveli and Kanyakumari. Each sort of soil and circumstance which isn't excessively sodden appears to suit it, and it is regularly found developing as a weed on side of the road and badlands, on waste piles, and in comparable circumstances close to towns. The plant is in blossom and organic product all through the year[4]. This plant species [10][5] is native to India, Afghanistan, Pakistan, Nepal, Bangladesh, Cambodia, Inlet States, China South-Focal, Egypt, Iran, Malaya, Thailand, Sri Lanka, Japan, Hainan, Oman, Jawa, Saudi Arabia, Myanmar, Taiwan, Vietnam, and Yemen. It displays a wide conveyance in dry locales of India, East-West Himalaya ordinarily found as a weed in squander regions and along street sides[11][5]

Description of plant part:[4]

Solanum virginianum (Solanaceae), usually called as 'Kantakari', is an irritated enduring spice (Amir and Kumar, 2004). It is a thorny diffuse, dazzling green lasting spice, woody at the base, 2-3 m in level, found all through India, generally in dry spots as a weed alongside of the road and waste terrains. [4][12] The plant bears globular, berry type natural products which is yellow or white in variety with green veins.

Stem: [4]

A cross-sectional view of a mature stem, measuring 1.5-2 cm in thickness, shows a structure composed of multiple layers and tissues. The outer layer consists of 6-12 layers of cork with thin-walled, rectangular cells. The epidermis remains intact for a considerable period. The secondary cortex contains thickened, lignified cells forming stone cells and pericyclic fibers, often found individually or in small groups of 2-3. The phloem is divided into outer and inner regions, with fibers scattered in the outer and middle phloem and absent in the inner phloem. Stone cells occur singly or in groups of 2-4, and phloem rays are present.The cambium consists of 2-3 layers, while the xylem includes vessels, tracheids, parenchyma, and fibers. The vessels vary in shape and size, displaying bordered pits, while tracheids are elongated with irregular walls. Xylem fibers are thick-walled, lignified, and tapering, with pointed or bifurcated ends. Xylem parenchyma is cubical to rectangular, with simple or bordered pits. The xylem rays are distinct, often 1-2 cells wide and 2-25 cells high. The inner phloem comprises sieve elements and parenchyma, forming a nearly continuous band in the peri-medullary zone, with some fibers similar to those in the outer phloem. The central region contains a large pith, with simple starch grains present in the cortex, secondary cortex, phloem, medullary rays, and pith cells.

Leaves[4]

Petiole - A cross over segment of petiole shows round to wavy blueprints, the epidermis is single-layered, covered remotely by a thick fingernail skin, hypodermis comprises of 3-4 layers of collenchymatous, cells, one enormous bow formed, bicollateral, focal vascular pack and two little horizontal groups present, rest of tissue of petiole made out of polygonal, rakish, flimsy walled, parenchymatous cells, epidermis shows for the most part stellate and seldom go to tricellular hairs.

Midrib – A cross over part of the midrib uncovers a biconvex design with an epidermis on either side that is remotely covered by a thick fingernail skin. Underneath the epidermis, there are three to four layers of collenchyma, and the excess tissue is comprised of dainty walled parenchyma. The epidermis likewise has some stellate hair. Lamina - The dorsiventral design of the lamina is noticeable in the cross over segment, alongside the wavy framed epidermis on one or the other side, which is covered remotely by a thick fingernail skin. The upper side of the mesophyll is made out of a solitary layer of palisade and 4-6 layers of inexactly organized light parenchyma, as well as a few stellate hairs (4-8 armed).[4], [13]

Root:

It is 10 to 45 cm long, a couple of millimeters to two centimeters in measurement, almost barrel shaped and tightening, bearing a few fine longitudinal and cross over wrinkles with irregular scars or lenticels and little rootlets; dynamically smoothened surface uncovers a slight bark and wide minimal chamber of wood, crack, short, taste, harsh. Stems are herbaceous with unmistakable hubs and internodes, green when youthful, youthful branches shrouded in numerous hairs, mature branches glabrous, wrinkles more conspicuous in youthful stems showing up practically roundabout toward the basal locale, stem pieces 8 - 10 mm thick of variable length, outside surface light green, when dry, the surface yellowish green and smooth, transitionally smoothened surface shows an exceptionally slender bark and noticeable wood, focus shows a huge and particular, essence and hang down. Leaves are petiolate, exstipulate, praise elongated or elliptic, sinuate or sub-pinnatifid, sub-intensely furry, green, and shrouded in sharp prickles along the veins and midrib. The flavor and scent are not distinguishable[4]

Seeds:

Seeds are round, level, and various with a glabrous mesocarp and a severe, bitter flavor[4]

Ethnomedicinal use of Solanum virginianum:[11], [12], [15], [16], [17]

The roots of Solanum surattense are a key ingredient in the Ayurvedic formulation Dashmularishta, used as a tonic for lactating mothers. In traditional medicine, various communities across India utilize the plant for different purposes. The Kondh tribes in Odisha use a hot extract of its fruits to treat diabetes, while the people of Manipur employ the fruits for inflammatory conditions and throat infections. The entire plant is used to treat ailments like dropsy, nausea, and cough. In Rajasthan, the Mukunda tribes apply root paste to treat hernia, while root poultices are used for piles in many villages in South India. Seeds, often fumigated with mustard oil, are remedies for dental caries, toothache, gum swelling, and pus formation. Additionally, the stem, flowers, and fruits are used to alleviate burning sensations in the feet, while seeds serve as treatments for cough and asthma. Ethnomedicine, an ancient practice, remains vital for many communities, with 80% of the global population in developing regions relying on it due to limited access to modern healthcare. These traditional practices have significantly contributed to modern drug development and are increasingly recognized in developed countries for their potential benefits. Among ethnomedicinal plants, S. virginianum stands out for its extensive therapeutic uses, including its roots, flowers, stems, and fruits, which have shown remarkable efficacy in treating various diseases. Preserving and promoting these ancient remedies can be invaluable in combating both communicable and non-communicable diseases.

Sr. No.	Part Used	Form of Usage	Ethnomedicinal Use	Country/Province	Reference
1	Fruit	Juice	Throat Infection and Inflammatory Disorder	Manipur, India	[18],[19],[20]
2	Fruit	Paste	Pimples and swellings	Tripura, India	86,[18],[19]
3	Fruit	Juice	Sore throat, rheumatism	Tripura, India	86
4	Fruit	Extract of dried fruit	Diabetes	Kondh tribes of Dhenkanal district of Orissa	[18]
5	Fruit	Extract of dried fruit	Cough, fever	Tripura, India	86
6	Fruit	Extract of dried fruit	Cough, fever and heart diseases	India	[19]

7	Seeds	Not mentioned	Cough and Asthma	India	[2]
8	Roots	Poultice	Piles	India	[2]
9	Whole plant	Not mentioned	Asthma, bronchitis, cardio tonic, chest pain, cough, diuretic, fever, gonorrhea, jaundice, skin diseases, toothache, tuberculosis, ulcers	Local people of Taindol village, Jhansi, Uttar Pradesh, India	[11]
10	Whole plant	Not mentioned	Hernia	Mukundara tribes of Rajasthan, India	[11]
11	Stem, flowers, and fruits	Not mentioned	Burning sensation in feet accompanied by vesicular erupt	India	[5][7][21]

Table: 03

Traditional Uses of Solanum virginianum[4], [22]

- The plant is used for treating asthma, cough and fever.
- The fruits, stem, blossoms and organic products are prescribed to treat burning sensation of feet and other joints.
- For the treatment of heart conditions, watery extract of dried fruits is prescribed.
- Given as a post drink in piles, Kantakari-Sunthi Dhanyak goes about as a purgative and carminative. If one wishes to dispose of heaps, drink buttermilk that has been put away for the time being in a holder that has been stuck inside a Kantakhariphala.
- Various health advantages of the natural product incorporate anthelmintic, antipyretic, calming, antitumor, cytotoxic, hostile to asthmatic, antispasmodic, and hypotensive properties. [21], [23]
- Solanum surretense natural product juice is helpful for ailment and sore throats.
- The organic product glue is topically applied to the distressed locale to fix zits and swellings.
- The root is an energizer. It comes as an electuary and is suggested for hack, asthma, and chest distress.
- Plant powder is hostile to tussive and its impact on patients with bronchial asthma and vague hack has been cleared up as due for the exhaustion of receptor from the lung and its expectorant activity as because of inorganic nitrogen content.
- It has mitigating, blood-refining, and cardio-invigorating characteristics. It assists with pneumonia, ongoing bronchitis, hacking, and asthma. Youngsters are given plant powder to treat persistent bronchitis.
- The essential advantages of Kantakari in different portion structures are its Shwasahara, Kasahara, and Jwarahara properties.
- The organic products are known for a few restorative purposes like anthelmintic, antipyretic, purgative, calming, hostile to asthmatic and Spanish fly activities.
- The natural product glue is applied remotely to the impacted region for treating pimples and swellings[20]
- Its root is an expectorant, utilized in Ayurvedic medication for hack, asthma, and chest torment.[24][25]
- Stem, blossoms and natural products are unpleasant and carminative.
- Its root is utilized in Ayurvedic medication for hack, asthma, and chest torment [26]
- Decoction of the plant is utilized in treating gonorrhea.

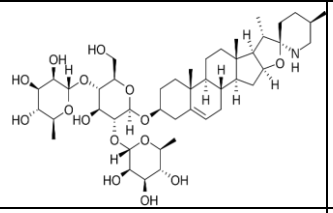
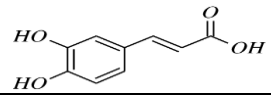
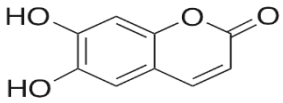
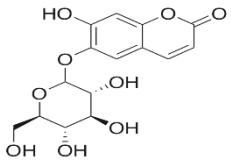
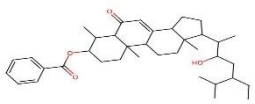
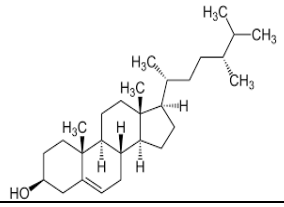
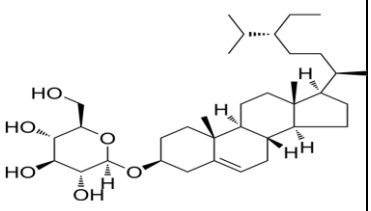
Phytochemistry profile of Solanum virginianum:[12], [27], [28]

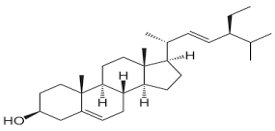
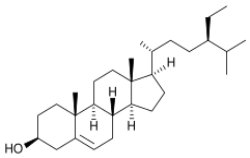
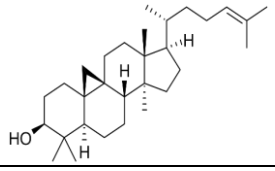
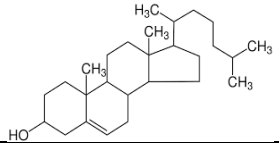
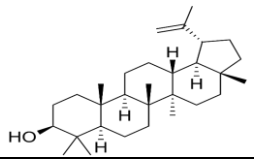
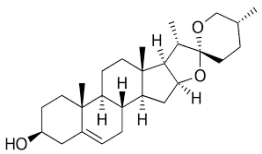
Solanum virginianum is rich in bioactive compounds, including alkaloids (e.g., solasodine, solasonine, beta-solamargine, solanocarpine, solanocarpidine), sterols (e.g., sitosterol, stigmasterol, campesterol, cholesterol), saponins, flavonoids, glycosides, sugars, fatty acids, and amino acids. The fruits are particularly abundant in alkaloids, with yields varying based on extraction solvents. Small amounts of acids like isochlorogenic, neochronogenic, chronogenic, and caffeic acids are found in dried fruits, while stamens produce quercetin diglycoside and sitosterol, and petals yield apigenin. Alcoholic extracts contain resinous and fatty substances, and unsaponifiable fractions of fruits include sterols like carpesterol. Additionally, the plant contains coumarins (scopolin, scopoletin, esculin, and esculetin) and has been assessed for the presence of flavonoids, saponins, and trace heavy metals (Cu, Fe, Pb, Cd, and Zn). Chromatographic isolation revealed steroidal constituents such as cycloartanol, cycloartenol, and solamargine.

Clinical study:[8], [29]

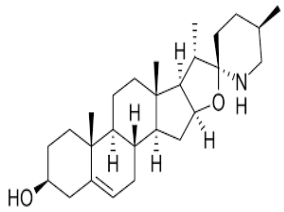
Solanum virginianum (S. virginianum) is a key ingredient in Shirishadi, a polyherbal medication used to treat asthma. Clinical studies on 60 patients with bronchial asthma showed significant improvements in pulmonary function parameters, including forced expiratory volume (FEV), pulmonary expiratory flow rate (PEFR), and forced vital capacity (FVC). A single 300 mg dose of S. virginianum provided symptom relief within an hour, lasting 6-8 hours, and gradually improved respiratory performance over three days without adverse effects. Although its bronchodilator effect was less potent than standard drugs like salbutamol, it matched the efficacy of deriphylline. The reduced response was attributed to the crude form or lower dosage of the plant extract. Improvements included reduced cough, dyspnea, and sputum production, validating its traditional use in asthma treatment. Clinical research confirms S. virginianum as a promising natural option for managing asthma in modern medicine.

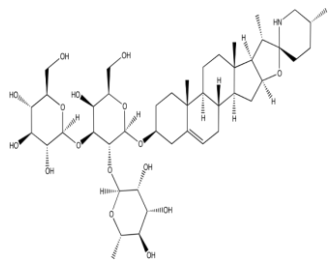
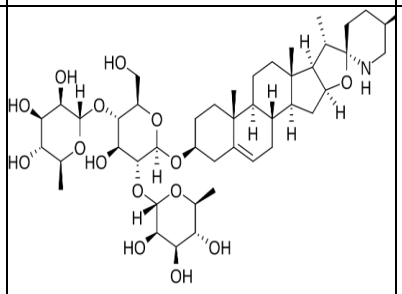
Phytoconstituents in Fruits:

CLASS	COMPOUND	STRUCTURE	THERAPEUTIC EFFECTS	REFERENCES
Steroidal Alkaloids	Solanocarpine	-	Antifungal, Anti-inflammatory, Antioxidant Effect	[2],[30], [31]
	Solanocarpidine	-	Anticancer potential, Antifungal, Anti-inflammatory Effect	[2],[30]
	Solamorgine		Antifungal, Anti-inflammatory, Antiviral, Anticancer Effect	[2],[30]
Polyphenols	Caffeic Acid		Antimicrobial, Anti-inflammatory, Antioxidant Effect	[2], [32]
Caumarins	Esculetin		Antimicrobial, Anti-inflammatory, Antioxidant, Anticancer, Liver protection, Cardiovascular health Effect	[2]
	Esculin		Anti-inflammatory, Antioxidant, UV protection, Venotonic Effect	[2]
Steroids	Carpesterol		Cholesterol Lowering Effect, Immune system Support, Bone Health, Metabolic Health, Skin Health, Antioxidant, Anti-inflammatory	[2], [33], [34], [35]
	Campesterol		Cholesterol Lowering Effect, Immune system Support, Bone Health, Metabolic Health, Skin Health, Antioxidant, Anti-inflammatory	[2]
	Daucosterol		Anti-inflammatory, Antioxidant, Cardiovascular health Effect, Skin/ Bone Effect, Neuroprotective, Hepatoprotective Effect	[2]

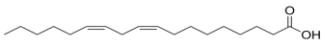
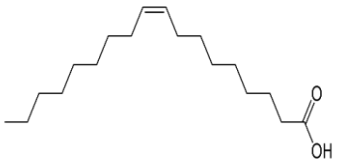
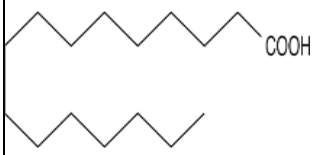
	Stigmasterol		Cholesterol Lowering Effect, Anti-inflammatory, Anticancer Bone health, Antidiabetic, Cardiovascular health, Neuroprotective Effect	[2]
	Sitosterol		Cholesterol Lowering Effect, Anti-inflammatory, Antioxidant, Bone Health, Metabolic Health, Skin Health, Cardiovascular health, Neuroprotective Effect	[2],[36]
	Cycloartinol		Cholesterol Management, Cardiovascular health, Anti-inflammatory, Antioxidant Effect	[2]
	Cholesterol		Synthesis of Bile Acid, Production of Vit. D	[2]
Triterpinins	Lupeol		Anti-inflammatory, Antioxidant, Antimicrobial, Skin/Digestive Health Effect	[2],[37],[38]
Sapogenin	Diosgenin		Hormone Replacement Effect, Anti-inflammatory, Anticancer, Cholesterol Management, Blood sugar Regulation, Anti-Aging effect	[2], [37],[38]

Phytoconstituents in Berries:

CLASS	**COMPOUND**	**STRUCTURE**	**THERAPEUTIC EFFECTS**	**REFERENCES**
Alkaloids	Solasodine		Steroid Synthesis, Anti-inflammatory, Anticancer, Skin health effect	[2],[38]

	Solasonine		Antimicrobial, Anti-inflammatory, Antioxidant, Anticancer	[2],[36]
	Solamorgine		Antifungal, Anti-inflammatory, Antiviral, Anticancer Effect	[2]

Phytoconstituents in Dry Seeds:

CLASS	COMPOUND	STRUCTURE	THERAPEUTIC EFFECTS	REFERENCES
Fatty Acids	Linoleic Acid		Cell Membrane Health, Skin/Cardiovascular Health, Anti-inflammatory Health Effect, eye health, brain health, weight management, harmone production, immune health effect	[2][36]
	Oleic Acid		Cell Membrane Health, Skin/Cardiovascular Health, Anti-inflammatory Health, immune health effect	[2],[36]
	Palmitic Acid		immune health, weight management effect, Cholesterol Management	[2],[36]
	Steric Acid		immune health, weight management effect, Cholesterol Management, Skin health effect	[2],[36]

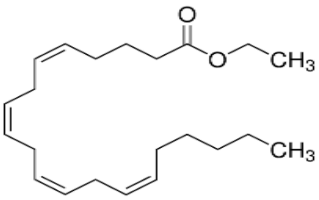
	Arachidonic Acid		Inflammatory Response, Brain health, Cell Growth and Repair, Cardiovascular health effect.	[2],[36]

Table: 04

Pharmacological Activity/ Profile of Solanum virginianum:[39]

Wound Healing Activity[40]

When applied topically, the methanolic concentrate of S. virginianum organic product effectively worked on injury withdrawal (30%), rigidity (37.5%) following 12 days, and wound recuperating process impressively (P0.01) contrasted with the control (Aloe vera Cream and Ketamine HCl). The results upheld its use in customary medication to mend wounds.

Anti-inflammatory activity[41]

Irritation is a confounded series of cell-solvent element communications that foster in the tissues because of contamination, injury, or harm. Conventional medication utilizes the products of S. virginianum as a calming medication. Just a generally limited quantity of paw edema brought about via carrageenan in rodents was restrained, as per examination into the mitigating impacts of S. virginianum leaf separates. The organization of Solanum virginianum Concentrate restrains edema starting one hour after organization and all periods of irritation in a portion subordinate way, which is possible because of the concealment of numerous physical and compound middle people of irritation.

Anti-bacterial activity[42], [43]

Various exploration has been directed to exhibit how plant concentrates can stop the improvement of bacterial species. S. virginianum leaf separate altogether affects bacterial strains. Eight bacterial species, including Staphylococcus aureus (11.23 mm), Streptococcus (9.22 mm), Bacillus subtilis (16.25 mm), Escherichia coli (14.19 mm), Pseudomonas aeruginosa (4.16 mm), Salmonella typhi (1.16 mm), and Vibrio cholera (10.17 mm), were altogether restrained by ethanol extricate. While Shigella has no effect.

Analgesic activity[29]

Leaf removes from the Solanum virginianum plant might be utilized as a pain relieving. Concentrates on utilizing plant separate on lab creatures uncovered an upgraded reaction that was portion subordinate. This study confirms the authentic use of S. virginianum as a pain relieving and offers the chance to make regular analgesics in view of fables claims.

Mosquito larvicidal activity[44], [45], [46], [47]

Research on the larvicidal effects of Solanum virginianum root extract combined with cypermethrin demonstrated significant potential for eco-friendly mosquito control. Among the extracts tested, petroleum ether showed the highest toxicity, followed by carbon tetrachloride and methanol, with LC50 and LC90 values indicating strong larvicidal activity after 24 and 48 hours. Cypermethrin alone exhibited even greater toxicity. When combined with petroleum ether extract in ratios of 1:1, 1:2, and 1:4, the 1:1 ratio proved most effective, showing synergistic effects. This approach highlights a sustainable and effective method for controlling Anopheles stephensi, the malaria vector, using S. virginianum as a complementary bioactive agent.

Antiulcer activity[16]

Alcoholic concentrates have more antiulcer properties than other dissolvable concentrates, as per S. virginianum leaf removes. Plant remove lessens by and large sharpness and increments gastrointestinal items' pH (3.10), bringing down the ulcer record. The viability of the antiulcer properties of S. virginianum in lessening acridity was comparable to that of the normal antiulcer prescription Omeprazole. Contrasted with plant separates, omeprazole had a more perceptible impact in bringing down the ulcer list. decreased viability of plant removes since less enemy of ulcer synthetic substances are available in fundamental structure.

Anti-oxidant activity[48], [49], [50]

Receptive oxygen species (ROS), which cause oxidative harm, are vulnerable to hurt from cell reinforcements. Poisonous outcomes are created when free extremists communicate with biomolecules including DNA, proteins, and lipids. Many plants have been recognized as having the capacity to be enemies of oxidants because of their overflow of phytochemical parts like phenols and flavonoids. When 2,2-diphenylpicrylhydrazyl was utilized to

inspect the ROS rummaging viability of S. virginianum leaf separates, it was shown that the plant remove showed extraordinary cell reinforcement action at all test levels in a portion subordinate way.

Acute Toxicity Studies:[51]

Studies on Solanum virginianum L. extracts have revealed that they are non-toxic, even at high doses up to 2000 mg/kg. In contrast, other Solanaceae family members, such as Solanum tuberosum (potato), contain toxic glycoalkaloids like α-solanine and α-chaconine. These compounds, especially when improperly stored or processed, can accumulate and cause acute poisoning, severe lethargy, and even death in humans. Experiments with hamsters showed that high doses of α-solanine or α-chaconine caused mortality, intestinal swelling, and fluid accumulation. Although these glycosides have toxic effects, S. virginianum has not shown any associated negative impacts despite being in the same plant family. This suggests the toxicity of these glycosides may vary across species.

Future Perspectives:

Standardisation and stabilisation research on Solanum virginianum L. may be conducted in the future, which could demonstrate its potential as a source for the pharmaceutical and neutraceutical industries. Further comparative pre-clinical studies and bio -equivalence clinical studies have been needed to explore its different pharmacological properties.

10. Conclusion:

Solanum virginianum (Kantakari) is a significant medicinal plant in Ayurveda and traditional Indian medicine, used to treat various ailments. Phytochemical studies have identified numerous bioactive compounds, including flavonoids, alkaloids, phenols, saponins, glycosides, steroids, and triterpenoids, in its roots, leaves, and fruits. Traditional preparations, such as fresh juice (Swarasa) and decoctions, are commonly used for treating conditions like Shwasa (respiratory issues). Systematic research and clinical studies validate its therapeutic claims, highlighting its potential as a versatile medicinal plant. Further exploration of its active compounds could lead to innovative treatments and eco-friendly alternatives to chemical larvicides.

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