REVIEW ARTICLE

Nutritional, Therapeutic, and Cultural Uses of Shami Plant *Prosopis cineraria*: A Review

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Abstract

This review article describes the various uses of *Prosopis cineraria,* commonly known as the Shami plant. The plant grows in the subtropical arid climate worldwide. This plant belongs to the family Leguminosae and is primarily used in the indigenous system of folk medicine for various ailments. Plant parts, such as leaves, pods, flowers, stems, and seeds, contain various metabolites and major compounds. These metabolites include fatty acids, proteins, carbohydrates, saponins, tannins, alkaloids, and C-glycosyl flavones, which exhibit pharmacological effects such as pain relief, anti-tumor, and antimicrobial activities. It can help alleviate issues such as leprosy, dysentery, bronchitis, asthma, leukoderma, hemorrhoids, muscular tremors, and mental confusion. Products made from *Prosopis* pods, such as flour and syrup, are used in food and dietary supplements. Leaves and fruits are used to prepare medicines for the treatment of nervous, respiratory, and gastrointestinal disorders. Overall, *Prosopis* plants have a positive impact on human health and diet.

Key words: Antimicrobial activities, anti-tumor, phytochemicals, *Prosopis cineraria*

INTRODUCTION

Shami, scientifically known as *Prosopis cineraria* (PC) Druce (L.), is a flowering tree that belongs to the Leguminosae family. It is a native plant mentioned in Ayurveda for its healing properties.[1] This hardy tree grows across Western Asia and throughout the Indian subcontinent. Its wide diversity is found in Rajasthan's desert areas, where it produces pods and is commonly called Khejri. People use PC for animal feed, firewood, and the production of traditional Ayurvedic medicines. People know it by different names depending on where you are in India – it might be called Shami, Jammi, Khijro, Khejri, Janti, Jand, or Banni mara. This plant grows in harsh conditions like these; it produces specialized compounds that can be very useful medicinally.[2] The tree plays an important role in fighting desert expansion and helping restore damaged land.[3] What is impressive is how it survives in desert conditions where there is barely any visible water. Plant spots as green, flowering trees thriving in dry and semi-dry areas across Afghanistan, Bahrain, Iran, India, Oman, Pakistan, Saudi Arabia, the UAE, and Yemen. It even grows in parts of Southeast Asia, particularly Indonesia. In the UAE, locals call it Ghaf, and it is their national tree.

PC is a compact tree that typically grows to about 3–5 m tall, which is roughly 10–16 feet. The tree produces lovely pink and white flowers with tiny bristles. These flowers attract many insects and small birds that come to feed on nectar. Flowers eventually develop into seed pods. The green leaves make great food for livestock, and camels especially love munching on them. Its leaves have a feathery appearance with multiple small leaflets arranged on branches, and you will notice thorns scattered along the stems between the leaf joints [Figure 1]. This is highly remarkable that how this tree thrives in some of the driest places on earth, surviving on as little as 6 inches of rain per year, though it needs access to underground water. Just like other trees in the Prosopis family, this one can tolerate salty, alkaline soil that would kill most other plants.[4] Purplish-brown heartwood is preferred over other types for firewood.

The tree is useful all around – different parts, such as leaves, pods, flowers, stems, and seeds, contain various beneficial compounds. Farmers love these pods because

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Figure 1: The aerial vegetative parts of the *Prosopis cineraria* plant

they make excellent feed for camels and goats. The flowers have two colors and come with small leaf-like structures, while the pods are plump and can be eaten fresh or dried as vegetables [Figure 1]. *Prosopis* plant holds special meaning in Hindu culture and plays an important role during Dussehra celebrations. There is a famous story in the Mahabharata about the Pandava brothers hiding their weapons in one of these trees during their year of living in disguise in the Virata kingdom.[5] People of the Thar Desert use pods called Singhri or Sangri in their traditional cooking, especially in vegetable dishes and curries. It has been a staple food in that region for generations.[6]

MEDICAL USE

In India, the PC tree is mentioned in ancient Ayurvedic literature. This is included in traditional medicinal system. Species of the *Prosopis* genus have long been used in traditional medicine in many countries, that is, native to America, Africa, and Asia. Plant parts of various species *Prosopis africana*, *Prosopis alba*, PC, *Prosopis farcta*, *Prosopis glandulosa*, *Prosopis juliflora*, *Prosopis nigra*, *Prosopis ruscifolia,* and *Prosopis spicigera* are used for various medicinal purposes. These were found highly effective in asthma, birth/postpartum pains, callouses, conjunctivitis, diabetes, diarrhea, liver infection, malaria, otitis, pains, pediculosis, and rheumatism. Leaves are used to treat scabies, skin inflammation, spasms, stomachache, and to remove bladder and pancreatic stones. Bark extract is used to treat flu and fever. Extracts from unripe fruit pods of the plant were shown to ameliorate artificially induced damage to testes in an animal model.[7] Leaves of this tree can ameliorate mouth ulcers. Chewing its leaves for a few minutes can release leaf juice, which can help prevent oral cancer.[8] People use this plant for traditional healing, treating everything from skin conditions, and breathing problems to digestive issues and muscle troubles. The plant shows antiplasmodial, antipyretic, anti-inflammatory, antimicrobial, anticancer, antidiabetic, and wound-healing effects. This is used in the treatment of respiratory and gastrointestinal ailments.[9]

The plant contains alkaloids, saponins, tannins, zinc (Zn), iron (Fe), calcium (Ca), phosphorus (P), and magnesium (Mg). Alkaloids have good anesthetic and spasmolytic activity. Saponin boosts the immune system, lowers cholesterol levels, and reduces the risk of intestinal cancer. Leaves of the Shami plant contain C-glycosyl flavones such as schaftoside, isoschaftoside, vicenin II, vitexin, and isovitexin. Leaf paste is applied on boils and blisters, together with mouth ulcers in livestock, and leaf infusion is employed on open sores on the skin.[10] Leaves and fruits are used to prepare medicines for curing nervous disorders. *Prosopis* leaves have high nutritional value and exhibit antibacterial, antihyperglycemic, and antioxidant activities.[11] The plant's bark provides immediate relief to an individual bitten by a snake or scorpion.[12] This is highly helpful in the treatment of infectious diseases, dysentery, bronchitis, asthma, leukoderma, piles, and muscle tremors.[13] Rheumatism, cough and colds, diarrhea, worm infestations, and skin problems.[14] Plant pods are of great pharmacological and nutraceutical significance.[15] *Prosopis* has the potential to be an ideal dietary source, containing abundant nutritional fiber, minerals, and vitamins can help make a low-fat diet. These also affect the human diet and general health [Figure 1].

NUTRACEUTICAL USES

The leaves, besides the pods, are eaten by camels, goats, and cattle. Its flowers contain antidiabetic biochemical agents.[16] Tribal peoples eat Sangari as its pods are rich source of vitamins and minerals. Pods are full of various nutraceuticals with potential to develop into functional foods.[17] Sangri pods flour is mixed with wheat flour to make bread (chapatti) and bakery products. People also make drinks from *Prosopis* pods, which contain protein and beneficial plant compounds and are high in nutritional value. The bark and unusual leaf growths are well-suited for treating leather, while the wood is used for building boat frames, houses, fence posts, and tool handles. *Prosopis* pods have also been potentially used in food and food supplement formulations in many regions of the world. The tree yields a pale to amber-colored gum with properties like those of the gum acacias (*Acacia senegal*). Plant gum is highly nutritious, has a good taste, and is used by pregnant women during delivery. The gum possesses soothing and healing properties. It is also astringent, demulcent, and pectoral.[17] *Prosopis* pods are used to make beverages. These contain protein and phenolic compounds, as well as excellent nutritional properties.[18] The bark and leaf galls are used for tanning. The wood is used to make boat frames, houses, posts, and tool handles; the poor quality

of unimproved trees limits its use as timber. *Prosopis* pods are used to make beverages. *Prosopis* pods are used to make beverages. These contain protein and phenolic compounds, as well as excellent nutritional properties[19] [Figure 2]. This plant is an attractive source candidate for the extraction of various nutraceuticals with a potential for development into a functional food and can provide extra nutritional benefits. This review examines medicinal, nutritional, and pharmacological uses of various species from the genus *Prosopis*.

SOURCE OF INFORMATION

For this extensive literature review, various databases were searched for information on the PC (Shami) plant. To collect

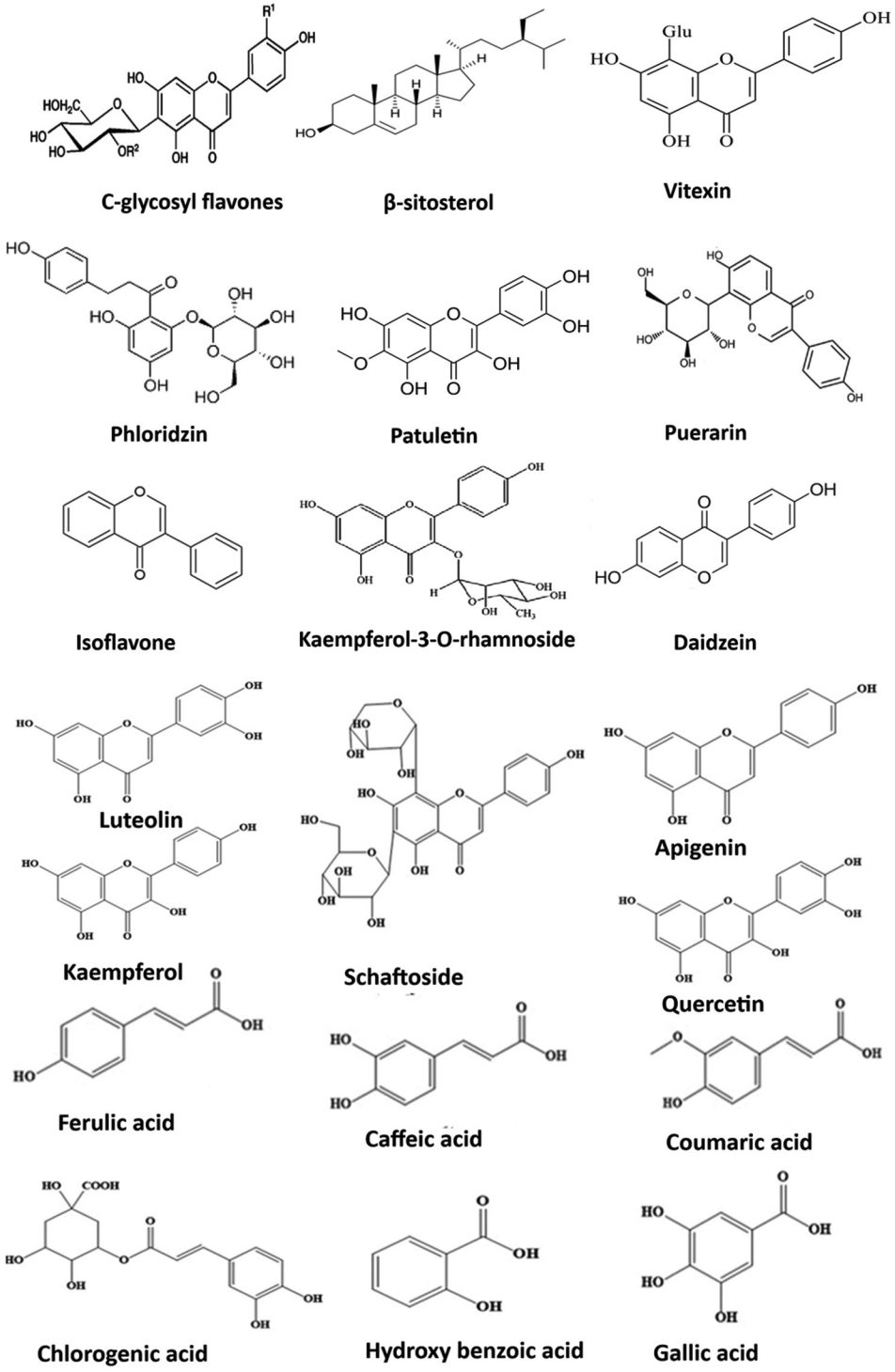

Figure 2: Major constituents found in *Prosopis cineraria* and its associated species

relevant information, specific terms such as medical subject headings (MeSH) and key text words, including "PC (Shami) plant and its therapeutic uses," published until 2025, were used in Medline. The most specifically targeted research, aimed at retrieving all articles on the traditional uses of PC (Shami) for therapeutics, was conducted in electronic bibliographic databases. Abstracts of published studies with relevant information on PC (Shami) were also collected. In addition, references were identified by searching for those cited in studies on the current topic. The relevant terms were used individually and in combination to ensure an extensive literature search. To update information on a subject and incorporate recent knowledge, relevant research articles, books, conferences, and surveys of public health organizations were selected and compiled based on the broader objectives of the review. This was done by searching databases such as SCOPUS, Web of Science, EMBASE, PubMed, Swiss-Prot, and Google. Based on this standard methodology, the results were identified and summarized in this final review.

Phytochemistry

Shami plant contains alkaloids, flavonoids, isoflavonoids, triterpenes, saponins, phenols, glycosides, and lupeol. These are potent antioxidant and phytoestrogenic compounds and are beneficial for human.[18] C-glycosyl flavonoids are abundant in *Prosopis* plants, as evidenced by the presence of schaftoside, isoschaftoside, vicenin II, vitexin, and isovitexin.[15] A few important bio-organic compounds, such as 1-nonadecanol, Nonacosane-15-one, 1-tetracosanoic acid, 1-heptacosanol, Stigmasterol, β-sitosterol, and phenolic compounds such as apigenin glycoside derivatives, with proven antioxidant capacities, have been isolated from this plant.[20] Its pods contain medicinally valuable flavonoids, that is, vitexin, puerarin, phloridzin, and daidzein. Other compounds which have been isolated from this plant are flavonol glycoside quercetin-3-O-rhamnoside, myricetin-3-O-rhamnoside, and kaempferol-3-O-rhamnoside[21] [Figure 2].

PC contains various phytoconstituents in different parts. PC stem bark possesses phenolic acids and catechol.[22] It also contains phenols, terpenoids, flavonoids, saponins, alkaloids, steroids, amino acids and proteins, reducing sugars, and carbohydrates.[23] This plant contains patuletin glycoside, sitosterol, spicigerine, and flavone derivatives prosogerin A and prosogerin.[24] It possesses steroids such as campesterol, cholesterol, sitosterol and stigmasterol, actacosanol, hentriacontane, methyl docosanoate, diisopropyl-10,11-dihydroxyicosane-1,20-dioate, tricosan-1-ol, 7,24-tirucalladien-3-one along with a piperidine alkaloid spicigerine,[25] prosogerin C,[26] prosogerin,[27] prosogerin E, gallic acid, patuletin, patulitrin, luteolin, rutin Bhardwaj *et al*.,[28-30] 3-benzyl-2-hydroxy-urs-12-en-28-oic acid, maslinic acid 3-glucoside, linoleic acid, prophylline, 5,5'-oxybis- 1,3-benzendiol, 3,4,5, trihydroxycinnamic acid 2-hydroxy ethyl ester, 5,30,40 trihydroxyflavanone 7-glycoside,[31] methyl heptadecanoate, heneicosanoic acid, 4-hydroxy benzoic acid, methyl 4- 4-hydroxycinnamate, methyl 2-methoxy-5-hydroxycinnamate, and O-coumaryl glycerol[6] [Figure 2]. Chloroform extract of the stem bark of PC contains methyl 5-tridecyloctadec-4-enoate, nonacosan-8-one, lupeol, β-sitosterol, and stigmasterol.[25] Plant is a rich source of dietary or nutritional fiber (29.6% dry weight), protein (9.5% dry weight), low contents of fat (1.0% dry weight), and carbohydrates (57.6% dry weight). It is a source of palmitic (12.6%), oleic (35.5%), and linoleic acids (45.8%), α-, β-, and γ- tocopherols, and β-sitosterol [Figure 2].

Biological effects

Anti-hypercholesterolemia

PC pods contain potent bioactive phytocompounds that inhibit hydroxymethylglutaryl-CoA reductase and have the potential to regress atherosclerotic plaque.[32] This plant also shows hypolipidemic and anti-atherosclerotic effects[33] [Table 1].

Antioxidant and anti-hyperglycemic

The pods of PC possess tremendous medicinal value, containing flavonoids and isoflavonoids, including vitexin, puerarin, phloridzin, and daidzein, which exhibit strong antihyperlipidemic and antioxidative potential.[34] Its seeds and pods also contain aglycones, C-glycosides, and O-glycosides, which have been shown to have high antioxidant potential.[18] Ethanolic extract of PC pods is used for treatment of diabetes-associated neurological impairments[35] [Table 1].

Anticancer activity

Biofabricated silver and copper nanoparticles showed cytotoxicity on breast cancer cells (MCF-7). CuNPs exhibit a greater cytotoxic effect than AgNPs against the MCF-7 cancer cell line. Bioengineered AgNPs and CuNPs could be used as potential tools against microbial pathogens and cancer cells at a very low IC_{50} values, that is, 65.27 µg/mL, 37.02 µg/mL, and 197.3 µg/mL[36] [Table 1].

Anti-tumor activity

Hydroalcoholic extracts of bark and leaves showed antitumor activity against the Ehrlich Ascites Carcinoma (EAC) tumor model.[37] These extracts significantly reduced the solid tumor mass and *in vitro* cytotoxicity. Methanolic extract of leaves increases the levels of mitochondrial lipid peroxidation and cuts down liver weight in a dose-dependent manner. The extract also increased mitochondrial enzymatic antioxidant levels.[38] The methanol extract of PC exhibits a protective role by modulating membrane-bound enzyme levels and suppressing glycoprotein levels.[39] Similar antitumor activity is reported in the hydroalcoholic extract of the leaf (PCL) and stem bark (PCB) of PC (L.) in Swiss albino mice.

Table 1: Various biological activities of the Shami plant, *Prosopis cineraria*

Plant part	Name of plant species	Bio-organic constituent/s	Biological activities	References
Stem bark	*Prosopis cineraria*	C-glycosyl flavones, schaftoside, isoschaftoside, vicenin II, vitexin, and isovitexin	Antioxidant potential	(Sharifi-Rad *et al*., 2019)
Stem bark	*Prosopis cineraria*	Aglycone, C-glycoside, and O-glycoside	Antioxidant potential. potential for development into a functional food	(Asati *et al*., 2022)
Stem bark	*Prosopis cineraria*	Phenolic compounds	Pharmacological and nutritional properties	(Zhong *et al*., 2022)
The bark extract	*Prosopis cineraria*	Saponins, alkaloids	Antioxidant potential	(Pandey *et al*., 2023)
Leaf extract	*Prosopis pallida*	15-one, 1- Tetracosanoic acid), (β-sitosterol), 1-heptacosanol), Stigmasterol), and β-sitosterol	Antioxidant capacities	(Gonzales-Barron *et al*., 2020
Leaf extract	*Prosopis cineraria*	bioengineered AgNPs and CuNPs	Potential tools against microbial pathogens and cancer cells	(Jinu *et al*., 2017).
Leaf extract	*Prosopis cineraria*	Methanol extract	Exhibits a protective role by modulating the levels of membrane-bound enzymes and suppressing glycoprotein levels	(Maideen *et al*., 2012)
Leaves	*Prosopis chilensis*	Flavonoid, phenolic compounds	Exhibited anti-inflammatory activity, providing relief from joint pain and inhibiting oedema formation	(Abodola *et al*., 2015)
Leaves	*Prosopis farcta*	Flavonoid, phenolic compounds	Antidiabetic potential by attenuating the death and apoptosis induced by streptozotocin in β-TC3 cells and increase glucose consumption	(Feyzmand *et al*., 2017)
Stem bark	*Prosopis cineraria*	Flavonoids and isoflavonoids	Protective effects of CfPc in diabetes-associated complications	(Soni *et al*., 2018)
Stem bark	*Prosopis cineraria*	Methanolic extract	Anticonvulsant activity	(Velmurgan *et al*., 2012) (Loscher *et al*., 1991)
Leaves	*Prosopis cineraria*	Butanol fraction	Promoting collagen formation, re-epithelialization, and angiogenesis	Yadav *et al*., 2018
Leaves	*Prosopis cineraria*	Flavonoids and tannins	Anti-inflammatory, antioxidant, and antimicrobial effects	(Yadav *et al*., 2018)
Bark extract	*Prosopis cineraria*	Phenols, terpenoids, flavonoids, saponins, alkaloids, steroids, amino acids, proteins, reducing sugars, and carbohydrates	Antioxidant activity	(Pandey *et al*., 2023)
Leaf extract	*Prosopis cineraria*	Phenolic acids and catechol	Antimicrobial activity against *Staphylococcus aureus*, *Escherichia coli*, *Candida tropicalis*, and *Fusarium moniliforme*	Nava-Solis *et al*., 2022)
Leaf extract	*Prosopis cineraria*	Phenolic acids and catechol	Exhibits effective antibacterial compounds that function as antibacterial agents	(Neghabi-Hajiagha *et al*., 2016)
Leaves	*Prosopis laevigata*	Isorhamnetin, a flavonoid	Anthelmintic activity against sheep haemonchosis	(Delgado-Núñez *et al*., 2020)

(*Contd*...)

Table 1: (*Continued*)

Plant part	Name of plant species	Bio-organic constituent/s	Biological activities	References
Leaf extracts	*Prosopis cineraria*	Phenols, terpenoids, flavonoids	Antiproliferative activity MCF-7 breast cancer cell line	(Sundaravadivelu *et al*., 2012) (Sumathi *et al*., 2013)
Leaf extract	*P. juliflora*	Phenols, terpenoids, flavonoids, and saponins	Anti-termite potential against *Macrotermes* spp.	(Bezuneh *et al*., 2019)
Leaf extract	*Prosopis cineraria*	Patuletin glycoside patulitrin	Anti-inflammatory, antioxidant	Nadkarni, 2000
Leaf extract	*Prosopis cineraria*	Sitosterol, spicigerine, and flavone derivatives prosogerin A and prosogerin B	Anti-inflammatory, antioxidant	Sharma *et al*., 1964
Leaf extract	*Prosopis cineraria*	Steroids like campesterol, cholesterol, sitosterol and stigmasterol, actacosanol, hentriacontane, methyl docosanoate, diisopropyl-10, 11-dihydroxyicosane-1,20-dioate, tricosan-1-ol, 7,24 -tirucalladien-3-one, along with a piperidine alkaloid spicigerine	Anti-inflammatory, antioxidant	Bhardwaj *et al*., 1979; Malik and Kalidhar, 2007
Leaf extract	*Prosopis spicigera*	Prosogerin C	Anti-inflammatory, antioxidant	Bhardwaj *et al*., 1978
Leaf extract	*Prosopis spicigera*	Prosogerin D	Anti-inflammatory, antioxidant	Bhardwaj *et al*., 1980
Leaf extract	*Prosopis spicigera*	Prosogerin E, gallic acid, patuletin, patulitrin, luteolin, and rutin	Anti-inflammatory, antioxidant	Bhardwaj *et al*., 1981
Leaf extract	*Prosopis cineraria*	3-benzyl-2-hydroxy-urs-12-en-28-oic acid, maslinic acid 3- glucoside, linoleic acid, prosphylline, 5,5'-oxybis- 1,3- benzendiol, hydroxy ethyl ester, and 5,30,40 trihydroxyflavanone 7-glycoside	Anti-inflammatory, antioxidant	Ukani *et al*., 2000
Leaf extract	*Prosopis cineraria*	Methyl heptadecanoate, heneicosanoic acid, 4-hydroxy benzoic acid, methyl 4-hydroxycinnamate, and O-coumaryl glycerol	Anti-inflammatory, antioxidant	Liu *et al*., 2012
Pods	*Prosopis cineraria*	Phenols, terpenoids, flavonoids, and saponins	Hydroxymethylglutaryl-CoA reductase has potential for regressing atherosclerotic plaque	(Ram *et al*., 2020)

These extracts were found to be more potent and to possess significant cytotoxicity against EAC tumor cells.[40] PC shows anti-ulcerogenicity activities[23] [Table 1].

Analgesic and antipyretic activities

Prosopis chilensis exhibited anti-inflammatory activity, providing relief from joint pain and inhibiting edema formation. It also shows anti-analgesic effects in Wistar albino rats.[41] Similar analgesic activity was reported for the ethanolic root extract in an Eddy's hot-plate model at a dose of 300 mg/kg body weight (BW) in experimental mice.[42] The extract also exhibited significant antipyretic activity at the same dose using Brewer's yeast-induced hyperpyrexia model[43] [Table 1].

Anticonvulsant activity

Methanolic extract of stem barks showed a significant anticonvulsant effect in both models.[37,42] The methanolic

extract of PC (Linn.) Druce stem bark anticonvulsive activity against electroshock maximal electroshock seizure and pentylenetetrazole – induced convulsions in mice.[44] Similar anticonvulsant activity was reported in the methanolic extract of PC (Linn.) Druce stem barks[45] [Table 1].

Anti-diabetic and antioxidant

Hydro-alcoholic extract of stem bark shows anti-hyperglycemic activity using the Alloxan-induced hyperglycemia experimental at a dose of 300 mg/kg BW. Fasting blood glucose level decreased 27.3%, comparable to that of standard glibenclamide, which produced a 49.3% reduction, and liver glycogen content was significantly increased as compared to the control group. These were also normalized by drug treatment, thereby reducing the oxidative damage in the tissues of diabetic animals[34] [Table 1]. This plant shows antioxidant potential.[46] PC (Linn.) and *P. juliflora* (Swartz) showed antioxidant activities and were used as herbal medicine for treating diabetes mellitus.[47] *P. farcta* extracts protective effects in streptozotocin (STZ)-induced apoptosis in β-TC3 cells and showed antidiabetic potential by attenuating STZ-induced cell death and apoptosis in β-TC3 cells and increasing glucose consumption [Table 1].[48]

Dual inhibition of dipeptidyl peptidase-4 and cholinesterase enzymes by the phytoconstituents of the ethanolic extract of PC pods is used in the treatment of diabetes-associated neurological impairments.[31] Methyl 5-tridecyloctadec-4-enoate and Nonacosan-8-one, together with three known compounds (Lupeol, β-sitosterol, and Stigmasterol) from the chloroform fraction of the stem bark of PC (CfPc) showed antidiabetic activity in STZ-induced experimental mice. It successfully cut down the level of blood glucose, glycosylated hemoglobin, and restored BW, liver glycogen content, and serum insulin level in diabetic rats in a dose-dependent manner. A significant ($P < 0.05$) reduction in serum lipid profile markers and elevation in high-density lipoprotein cholesterol after treatment with CfPc is also seen.[49] No doubt pod extracts could be used as a safer complementary treatment in the management of diabetes and its associated complications[49] [Table 1].

Skin burns

Conventionally, PC (L.) Druce is used for the swift healing of cutaneous wounds. It is used for treating skin conditions, including burns and wounds, by applying its leaves or bark as a poultice or paste to promote healing. Butanol fraction of PC (BFPC) exhibited significant *in vitro* antioxidant and anti-inflammatory activity. Phenolic compounds-rich BFPC accelerates wound healing by regulating inflammatory markers and oxidative stress. BFPC mediates cell proliferation in the wound area by increasing collagen synthesis and its maturation. BFPC has the potential to serve as an effective agent for cutaneous wound healing. Promoting collagen formation, re-epithelialization, angiogenesis, and mainly the restoration of cutaneous appendages, that is, hair follicles[50] [Table 1].

Anti-venom activity

Aqueous, methanol, and petroleum ether extracts of medicinal plants such as *Aristolochia bracteolata, Mucuna pruriens*, PC and *Rauvolfia tetraphylla* were systematically screened against the lethality of crude venom of *Naja naja* using Swiss albino mice as animal models. The aqueous extract at a dose of 14 mg/kg BW was able to almost completely neutralize the lethal activity of 3LD50 (1.1 mg/kg BW) of the cobra venom, and the extract did not cause any adverse side effects in the animal models[51] [Table 1].

Anti-urolithiatic activity

PC bark crude extract shows anti-ulcer hydroalcoholic bark extract for pylorus ligation ulcer. It undergoes phytochemical screening of the bark extract, revealing the presence of phenols, terpenoids, flavonoids, saponins, alkaloids, steroids, amino acids, proteins, reducing sugars, and carbohydrates.[23] A greater dose of the extract lowered the gastric ulcer index and increased the percentage protection from pylorus ligation (75.05%) and ethanol (76.05%)-induced aberrations [Table 1].

Antimicrobial activity

PC phenolic acids and catechol in the methanolic extract were found to be active against *Staphylococcus aureus*, *Escherichia coli* (Minimum inhibitory concentration [MIC] = 0.62 mg/mL), *Candida tropicalis*, and *Fusarium moniliforme*.[22] Similarly, ethyl acetate fraction was found effective Gram-positive bacteria, at a very low MIC values ranging from 62.5 to 125 μg/mL and acted synergistically[52] [Table 1].

Anti-fungal

PC exhibits effective antibacterial compounds that function as antibacterial agents.[52] It shows *Botrytis cinerea*, *Alternaria alternata*, *Bacillus subtilis, S. aureus*, and *Candida albicans*, with MICs ranging between 0.125 and 1 mg/mL.[53] It shows fungal strains with the highest value, specifically the percentage inhibition of mycelial growth against *Geotrichum candidum* (66.2%) [Table 1].

Antiparasitic activity

PC stem bark exhibits anthelmintic activity.[54] *Prosopis laevigata* leaves contain Isorhamnetin, a flavonoid that shows anthelmintic activity against sheep haemonchosis[55] [Table 1].

Cytotoxic effects

PC leaf extracts exhibit antiproliferative activity against the human breast cancer cell line.[56] Cell death induced by the methanolic extract of PC leaves in the MCF-7 breast cancer cell line.[57] *M. longifolia,* PC, and *F. indica* showed anti-proliferative activity. These contain phytochemicals, including myricitrin, vitexin, and vanillin, which could be developed as natural drugs for treating acute myeloid leukemia, chronic myeloid leukemia, and acute lymphoblastic leukemia, respectively[58] [Table 1].

Insecticidal activity

Prosopis spp. shows larvicidal activity against mosquito larvae.[59] Both dichloromethane and methanolic extracts were found potent against cotton aphids, while hexane extracts were effective against *Spodoptera litura*. *P. juliflora* leaves showed anti-termitic potential against *Macrotermes* spp. at concentrations of 25, 50, 75, and 100 mg/L[60] [Table 1].

Miscellaneous

Various extracts of *Prosopis* displayed a wide range of biological properties, such as antioxidant, antihyperglycemic, antibacterial, anthelmintic, antitumor, and anticancer. In addition, *Prosopis* has the potential to be an ideal dietary source, containing abundant dietary fiber, minerals, galactomannans, and a low-fat content[17] [Table 1]. PC Linn has many cultural and medicinal properties.[61] Plants secrete yellow colored *P. spicigera* gum that has multiple uses.[62] The plant has many socioeconomic dimensions of the desert population; it has a large diversity which is used as fodder, feed, and fuel in draught-striven, yellow sandy soil arid ecology.[63] This is one of the important key stone tree species of the Indian desert.[64] The stem is often rich in tannin sacs and gum passages; they are used as fodder due to the presence of rhamnose, sucrose, and starch. The stem portion and wood are generally used as good fuel for the tribal people. Stem bark is recommended for snakebite. This plant is a potential herb of Thar desert.[65]

CONCLUSION

PC is a valuable medicinal plant recognized for its diverse health benefits and traditional applications. It treats various diseases without side effects and has garnered attention for its newly identified compounds and activities, discovered through research. There is significant potential for further studies on this plant, especially regarding its medicinal properties. The leaves and stems can serve as an alternative protein source for those with protein-energy malnutrition. The plant contains numerous compounds, including alkaloids and flavonoids, which may have therapeutic effects, such as antibacterial properties. Plants contain saponins, which lower cholesterol levels and reduce the risk of intestinal cancer. In addition, it shows promise as a treatment for diabetes due to its multifaceted action, making it a potentially safer option for managing diabetes and related issues. Plants benefit the heart, muscles, and kidneys.

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