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PROSOPIS CINERARIA PHARMACOLOGICAL PROPERTIES AND HEALTH BENEFITS: A REVIEW STUDY OF A POTENTIAL HERB OF THE THAR DESERT

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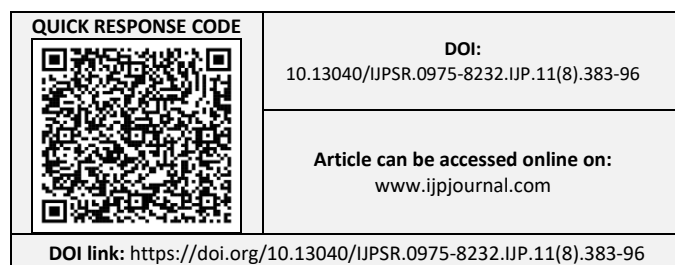
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ABSTRACT: Background: *Prosopis cineraria* is regarded as a significant herbal plant because of its many therapeutic properties. It is a member of the global tribe Leguminosae, subfamily Mimosaceae, and genus Prosopis. Prosopis species, which are indigenous to Africa, the Americas, & Asia, have long been used in traditional medicine. The Prosopis species that are used for medicinal reasons most frequently are *Prosopis africana*, *Prosopis alba*, *Prosopis cineraria*, *Prosopis farcta*, *Prosopis glandulosa*, *Prosopis juliflora*, *Prosopis nigra*, *Prosopis ruscifolia*, and *P. spicigera*. **Method:** The economically significant Prosopis tree component is its wood, which is used to make charcoal, firewood, and fuel. It is becoming evident that biological effects are related to the Prosopis plants' phytochemical makeup, particularly the presence of C-glycosyl flavones in these species (such as isoschaftoside, vicienin II, and isovitexin) Prosopis plants are consequently advantageous for human diet and overall health, claims study. In such a way, this current study offers a thorough summary of the research on the chemical make-up, pharmacology, and food uses of Prosopis plants, ranging from pre-clinical information to upcoming clinical investigations. **Conclusion:** Medical herbal medicines are considerably more effective than synthetic ones since they have fewer toxic ingredients and side effects. This study makes it abundantly clear that *Prosopis cineraria* have a variety of pharmacologic capacities, and extracts of the plant's numerous components have been claimed to have a number of therapeutic potentials that can be used to treat a variety of illnesses.

INTRODUCTION: Medicinal plants are used for therapeutic reasons & are considered a wide source of therapeutic compounds due to their diverse phytochemical and pharmacological qualities. Human illness prevention and treatment greatly benefit from the use of herbal plants. Ancient literature alluded to *Prosopis cineraria* as an important herbal plant ¹. The Leguminosae tribe, subfamily, and global genus Prosopis all contain the species Cineraria (L) Druce, also referred to as Khejri ².

The dry, desert habitats where *Prosopis cineraria* generally flourishes include those in Arabia, several dry regions in India, including Rajasthan, Gujarat, Punjab, Haryana, & West Uttar Pradesh, along with the drier regions of the Deccan. Some of the regional names for it include Janti & Chonksa (in Delhi), Jhand & Jhind (in Punjab and Haryana), Banni (in Karnataka), Kandi (in the Sindh), Sumri (in Gujarat), & Khejri (Sanskrit) ³.

Prosopis is a quick, drought-tolerant fuel and fodder tree that is frequently planted, but in many countries, it spreads unrestrained like an invasive weed. Prosopis wood is a good fuel source, and poor farmers can make a large amount of money from selling firewood and charcoal. The State branches of a tree were used as fence posts and poles for constructing homes & shelters. Sawn-Prosopis wood is used to make both furniture &



flooring. Prosopis has extensive and abundant flowering and yields the best honey ⁴⁻⁶. The gum, paste, leaves, and smoke of this Prosopis plant contain a wide range of bioactive properties, including antitumor, antidiabetic, anti-inflammatory, anti-bacterial, and antioxidant properties ⁷⁻⁹. Its existence of phytoconstituents including flavonoids, alkaloids, and phenolics has increasingly been connected in research to these effects. In fact, the most prevalent phenolic compounds in Prosopis plants have been recognized as anthocyanins and flavonoid apigenin, luteolin, and quercetin, among their derivatives ¹⁰⁻¹². About 45 species of thorny trees and shrubs belong to the Prosopis genus, which is a component of the Fabaceae / Leguminosae family. Members of this genus can be found both in tropical & subtropical areas of world. The Prosopis genus has historically been used to treat lots of ailments, including respiratory disbalances, calluses, conjunctivitis, diabetes, diarrhoea, the common viral, milk production, liver infections, malaria, sinus inflammatory processes, aches, painful process, rheumatoid arthritis, ringworm, skin inflammations, spasms, stomach pain, and the removal of bladder and pancreatic stones ¹³⁻¹⁵. Acta-cosanol, hentriacontane, cholesterol, sterols, stigmasterol, and other sterols are among those found in prosopis leaves ¹⁶. The extracted phytocompound vitexin from P. cineraria may be used to treat leukaemia due to its anti-proliferative properties ¹⁷. In addition, Prosopis offers shade, fruit, fuel, timber, vegetable and livestock feed, building and fence supplies, and medicine ¹⁸. Fresh-leaf juice combined with lime juice can be used to treat dyspepsia; crushed pod extract can

treat earaches, toothaches, and pain from broken bones; and topical application of leaf and bark extract to wounds can be helpful ^{19, 20}. There are numerous pharmacological effects of P. cineraria, including pain relief, anti-pyretic, antihyperglycemic, anti-mutagenic, nootropic, & antidepressant, among others ²¹⁻²⁵. This is because it contains a lot of primary and secondary metabolites. Given that it may be used as food, fuel, and medicine, this plant is sometimes referred to as "Kalpataru." History indicates that many communities hold Khejri in high regard ²⁶. Sangria is the common name for the Prosopis cineraria pod, which are regarded as the desert's dry fruits and are used to prepare Panchkuta, a traditional dish from Rajasthan ²⁷.

Taxonomic Hierarchy of Prosopis cinneria: The Taxonomic classification of *Prosopis cinneria* is described in **Table 1**.

TABLE 1: TAXONOMIC HIERARCHY OF PROSOPIS CINNERIA ²⁸

Kingdom	Plantae
Subkingdom	Viridiplantae
Infrakingdom	Streptophyta
Super Division	Embryophyta
Division	Tracheophyta
Subdivision	Spermatophytina
Class	Magnoliopsida
Superorder	Rosanae
Order	Fabales
Family	Fabaceae
Genus	Prosopis
Species	Cineraria

The whole description of the *Prosopis cinneria* plant is described in **Table 2**, representing the Prosopis biology and its distribution attributes.

TABLE 2: DETAILED DESCRIPTION OF PROSOPIS CINNERIA ^{29, 30}

Synonym	<i>Prosopis spicigera, Prosopis spicata</i>
Common name	Ghaf, Kandi, Jand, Khejri, Shemi,Shami,Khejado,jambi
Habit	Trees of dry environment, found in sandy plains arrows profusely in dry, exposed habitats including wasteland, cultivated areas, roadside ditches, and bordering plains of hills.
Distribution	The Prosopis is most frequently found in dry regions of the world, particularly in Delhi, western Rajasthan, Punjab, & Gujarat states of India.
Description	It is a tree with a length of up to 7 m, a straight bole that rises to a height of 2 m, and a circular crown that was created as a result of a lopping for fodder.
Variation	According to studies, growth rate, pod size, and the range of seeds collected vary between species.
Biology	It's an evergreen tree that blossoms and bears fruit at a young age. In the summer, whenever the old leaves fall, new leaves emerge. March to May sees the appearance of the little golden blossoms. Between the months of June and August, the pods mature.

Morphology of the Prosopis Plant: *P. cineraria* is indeed a huge tree with 25 m of height that is spiky, extensively spreading, and heavily branching. The cinereous cortex of the tree is covered with

intermodal prickles that really are macroscopic by size, straight, and scattered, and its base is big and conical. The morphology of the Prosopis and its different parts is described in **Table 3**.

TABLE 3: PLANTS PARTS USES AND THEIR DESCRIPTION ^{31, 32}

Part of Plant	Description
Root	The roots are taproots and measure around 3 meters in length.
Flower	The plant's flower is made up of a truncated calyx, a corolla, petals, anthers, and pistils. The blossoms are a pale golden hue.
Leaves	The lengths of the pinnae, petiole, and rachis on a leaf are 0.5–4 cm, the leaflets are 7–14 Jugate, oval in form, and lack any nerves (if any are present, they are exocentric at the base or midrib).
Seed	Prosopis cineraria plants have longitudinal and oval seeds that are 6 mm long.
Fruit	Fruits with a length of 8 to 19 cm are subcylindrical-torulose in shape, and their pericarp and endocarp are both thin and fragile.
Stem bark	The plant's bark has a rough, fissured, and hard feel, and it can be either brownish-white or yellowish-green in color. It has a shallowly curved shape with a thickness range of 2 to 5 millimeters. Periderm, collapsing phloem, and crystal dispersion make up this structure.

Prosopis cineraria Stem Bark Characteristics: Here, some significant macroscopic and microscopic properties are discussed.

Macroscopic Characteristics of Cineraria:

Colour: Externally Brownish greenor white in color.

Texture: Fissured and Rigid.

Taste: It is Slightly Pungent.

Odour: Aromatic.

Shape: Shallow Curved in nature.

Thickness: 2mm-5mm.

Microscopic Characteristics of Prosopis cineraria:

Periderm: Periderm is made up of outer cortical tissue, a limited zone of phelloderm, and a few layers of phellem on the outside.

Collapsed Phloem: Sieve components are crushed into little necrost masses in the collapsed zone. Phloem fibres are made of gelatin. The exterior cellulose wall of gelatinous fiber is thick, and the inside mucilage is undignified.

Crystal Distribution: The collapsing phloem zone contains calcium oxalate crystals. They are prismatic-type crystals.

Phytoconstituents: Numerous chemical components of Prosopis cineraria have nutritional value as well as specific actions in the treatment and prevention of disease.

The following listed **Table 4** lists various chemical components and describes how they help to prevent disease.

TABLE 4: PLANT PARTS AND THEIR COMPONENT USED ³³⁻³⁷

Name of the plant part	Chemical elements found in a plant component
Flower	Sitosterol, spicigerine, luteolin, and rutin sitosidepatuletin glycoside derivatives Both Prosogerin A and B
Leaves	Steroids such as methyl docosanoate, actacosanol, hentriacontane, sitosterol stigmasterol, campesterol, cholesterol, Diisopropyl-10,11-dihydroxyicosane1,20-dioate, Tricosan-1-ol, 7,24-Tirucalladien-3-one, and the spicigerine piperidine alkaloid
Seeds	Gallic acids, patuletin, patulitrin, luteolin, & rutin, as well as prosogerin C, prosogerin D, prosogerin E, and patulitrin
Bark	New keto alcohol hexacosan-25-on-l-ol, ombuin, as well as a triterpenoid glycoside. N-octacosyl acetate, a long-chain aliphatic acid, is vitamin K1. There are also reports of the existence of glucose, rhamnose, sucrose, and starch.

Structure of Main Flavonoids in Prosopis Plants: According to epidemiological research, consuming Phyto-chemicals (such as carotenoids & phenolics) lowers the chances of developing various diseases, particularly chronic conditions.

Alkaloids, phenols, particularly flavanones & phenolic acids glycosides, performance-enhancing drugs, tannins, and triterpenoids are just a few of the phytochemicals that are abundant in medicinal plants, and more specifically Prosopis plants.

These compounds are increasingly understood to have beneficial effects on health. Prosopis plants' chemical makeup has been identified and

quantified in a number of studies. Given Below Fig 1 represents various flavonoids in the Prosopis plants³⁸.

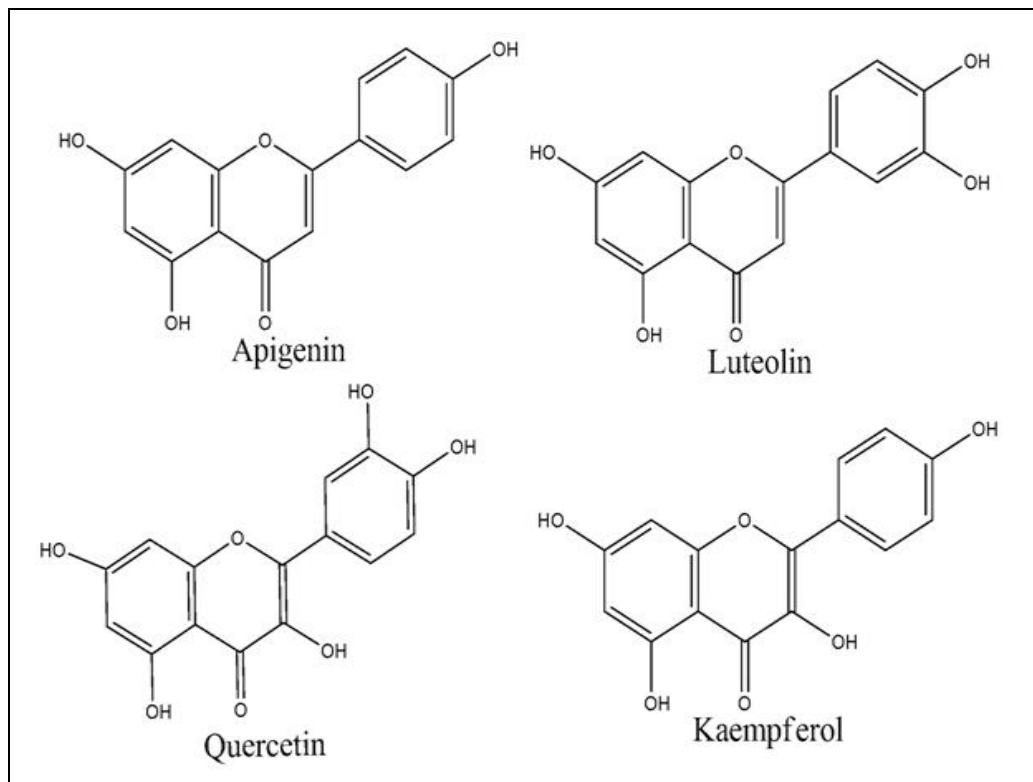


FIG. 1: VARIOUS FLAVONOIDS PRESENT IN PROSOPIS PLANTS

Some Prosopis Plant C-Glycosyl Flavones Structures:

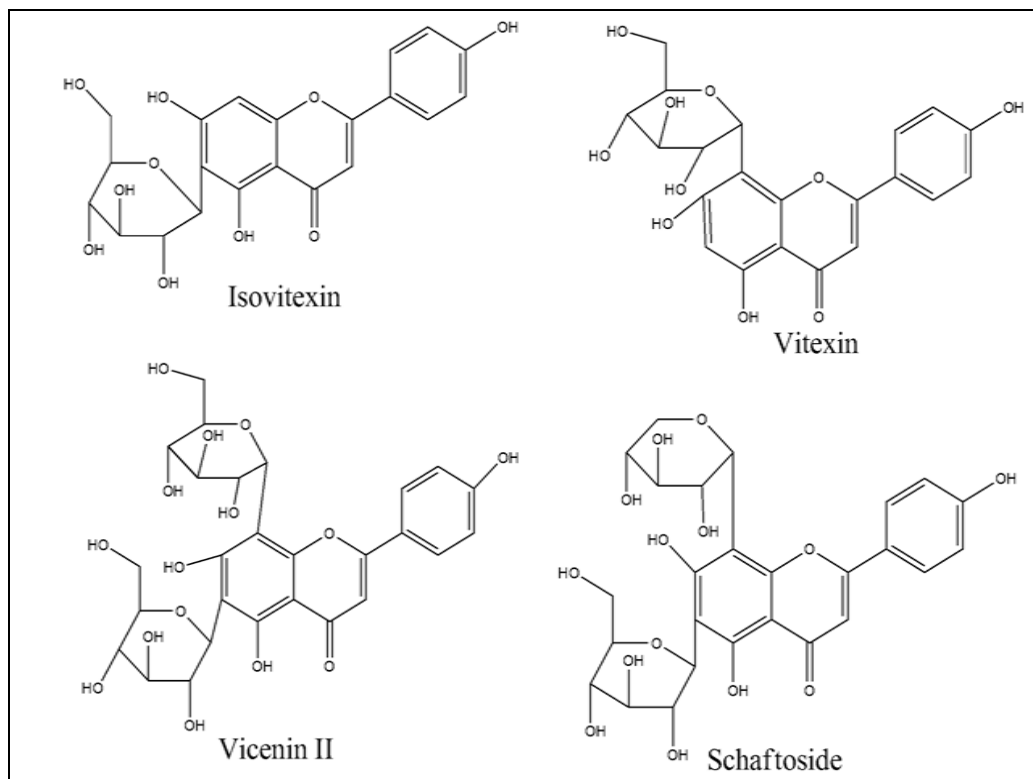


FIG. 2: VARIOUS C-GLYCOSYL FLAVONES PRESENT IN PROSOPIS PLANTS

Chemical Structure of Some Phenolic Acids from the Prosopis Species:

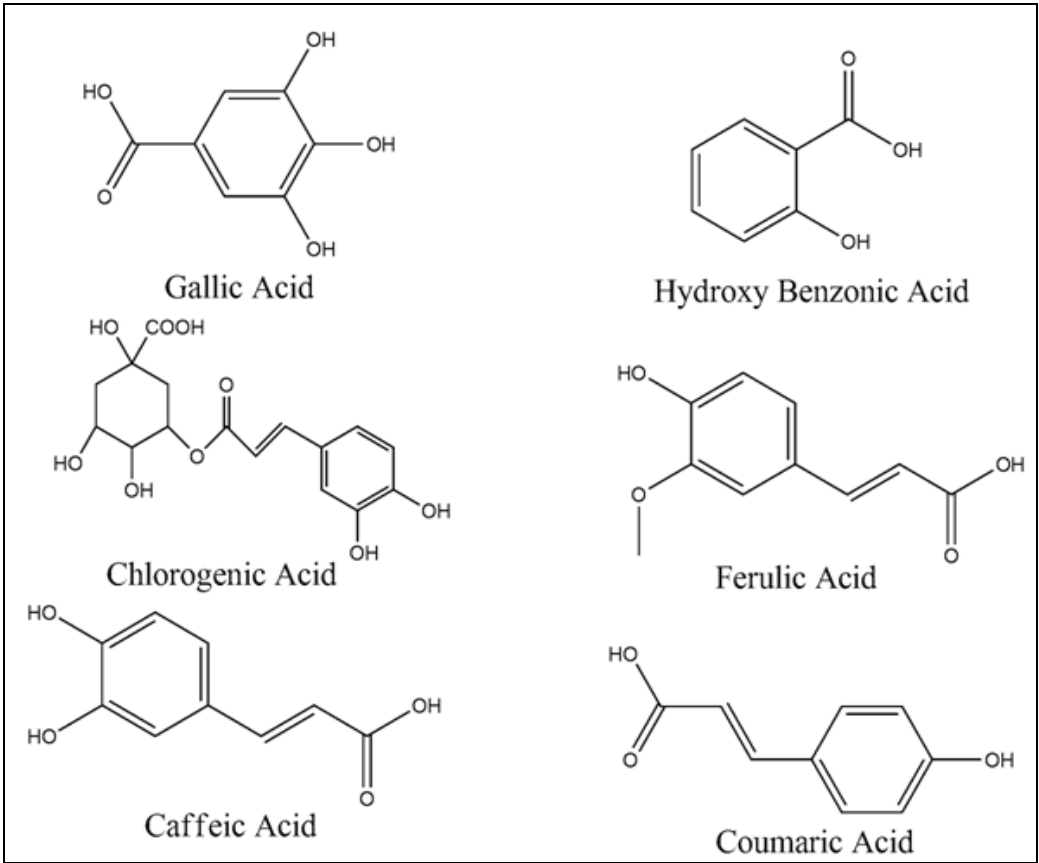


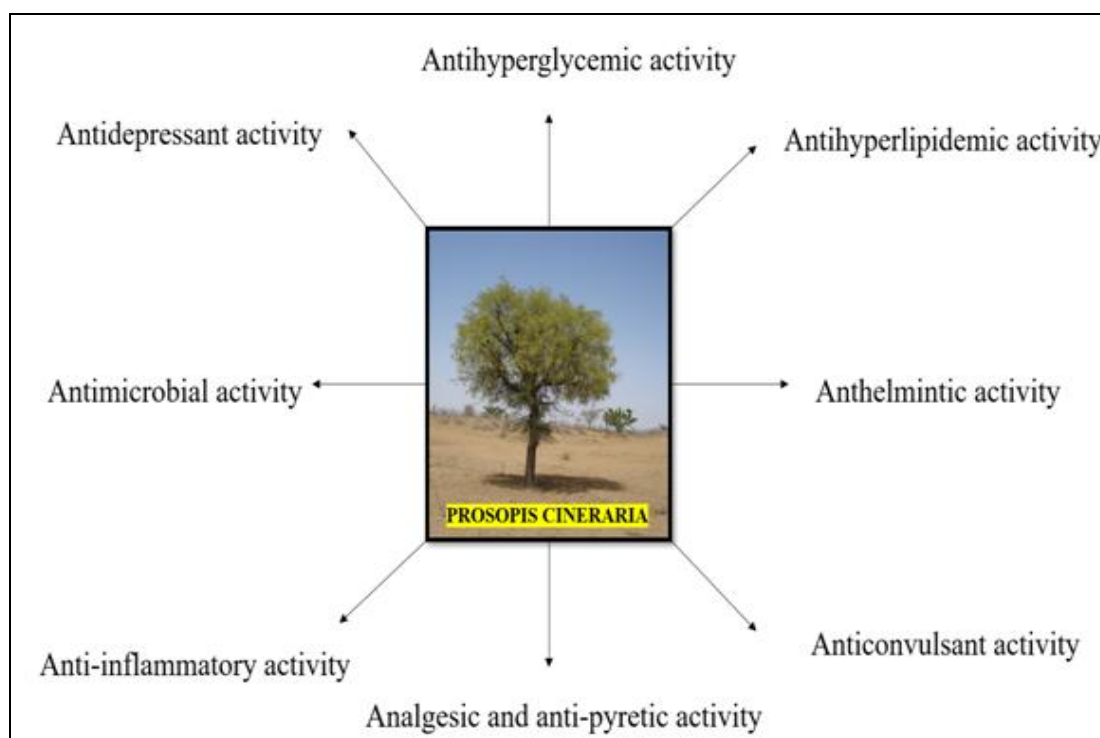
FIG. 3: STRUCTURES OF THE PHENOLIC ACIDS OBTAINED FROM THE PROSOPIS PLANTS

Prosopis Species Phytochemical Identification and Quantification: There are several species of Prosopis plants that contain different phytochemically active compounds as described in Table 5.

TABLE 5: PROSOPIS PLANT PARTS AND THEIR PHYTOCHEMICALS

Sr. no.	Parts of Prosopis Plant	Quantification and Identification of Phytochemicals	References
1.	<i>Prosopis alba</i> flours	Vicenin II, Schaftoside, Coumaric acid, Isovitexin, Vitexin, Ferulic acid	[39]
2.	<i>P. alba</i> pods	Q-hexoxide, Q-methyl ether dihexoside, Isovitexin	[40]
3.	<i>P. alba</i> flour	Vicenin II/Isomer, Isoschaftoside, Isoschaftoside hexoxide	[41]
4.	<i>P. alba</i> exudate gum	Apigetrin, chrysin, 3-O-feruloylquinic acid, Esculetin derivative	[42]
5.	<i>Prosopis nigra</i> pods	Digallic acid, Ferulic acid	[43]
6.	<i>P. nigra</i> flour	Malvidin dihexoside, Peonidin-3-hexoside, Petunidin3 hexoxides, Apigenin hexoxides rhamnoside	[44]
7.	<i>P. cineraria</i>	Isoschaftoside, Schaftoside, Isovitexin, Coumaric acid, Protocatechuic acid, Ferulic acid	[45-47]
8.	<i>P. laevigata</i>	Protocatechuic acid, Pituitrin, Caffeic acid, β -sitosterol, Chlorogenic Acid, Spicigerin, Luteolin	[48]
9.	<i>P. juliflora</i>	Catechin, Epicatechin gallate, Morin, Naringenin, Coumaric acid, Gallocatechin, Rutin, Luteolin	[49,50]
10.	<i>P. glandulosa</i>	Luteolin, Apigenin, (-)-mesquitol, Quercetin 3-O-methyl ether	[51]
		Hydroxybenzoic acid, Caffeic acid, Quercetin, Pyrocatechol, Ferulic acid, Gallic acid	

Pharmacological Activities of *Prosopis cinneria*: *Prosopis cineraria* plant plays an important role in showing various pharmacological activities. Fig. 4 represents the role of *Prosopis cineraria* in various therapeutic activities.

FIG. 4: *PROSOPIS CINERARIA* PHARMACOLOGICAL EFFECTS

Antihyperglycemic Activity: *Prosopis cineraria* is crucial for lowering blood sugar levels & maintaining diabetes, according to various studies. Alloxan was administered to male Swiss albino mice to cause diabetes. The mice's blood glucose levels dramatically dropped and their liver's glycogen content significantly increased after 45 days of treatment with an ethanolic of the bark. The extract also maintains a constant body weight and brings it back to normal⁵². The chloroform fraction of *Prosopis cineraria* also have anti-diabetic properties. After oral administration of in and in isolated chloroform fraction over a 21-day period to streptozotocin-induced Rats with diabetes were given doses of 50 & 100 mg/kg body weight, blood sugar levels and glycosylated haemoglobin were significantly decreased⁵³. The aqueous extract of *P. cineraria* leaves also showed antihyperglycemic properties when administered to male Wistar rats with diabetes. An extract demonstrates dosage dependence. Two fractions of pods ethyl acetate and n-butanol extract show substantial in-vitro and antihyperglycemic potential by inhibiting the enzymes -glucosidase and -amylase, respectively⁵⁴.

Antihyperlipidemic Activity: *Prosopis cineraria* exhibit exceptional hyperlipidemic features. Its leaves are a useful way to successfully lower the

elevated lipid profile parameters. Treatment with a hydroalcoholic extract of *Prosopis cineraria* leaves normalizes the raised lipid levels and restores the normal level of HDL in hypercholesterolemic mice. The dosage determines how effective it is⁵⁵. In accordance with additional research, the consumption of an ethanolic extract of *Prosopis cineraria* bark for 45 days to a male Swiss albino with alloxan-induced diabetes and elevated levels of cholesterol level, low-density lipoprotein (LDL) increased lipid profile specifications to normal. When the extract was administered orally to rabbits after inducing hyperlipidemia, the blood total cholesterol, LDL cholesterol, triglycerides, VLDL cholesterol, and ischemia markers (total cholesterol/LDL & LDL/HDL cholesterol) were reduced⁵⁶.

Anthelmintic Activity: The term "anthelmintics" refers to medications with a specific toxic effect that are used to treat and control parasite infestations⁵⁷. According to research comparing the Anthelmintic activity of *Prosopis cineraria* stem bark extracts against albendazole as a reference standard by monitoring the paralysis and fatal duration of *Pheretima Posthuma* after administering various extracts, the methanolic-extracts of the stem bark are significantly more powerful than petroleum ether & aqueous extract

⁵⁸. The time needed for a dose of 60 mg/ml of methanol extracts to cause paralysis or death was found to be 62 min instead of 23 min for the standard medicine when the same substance was compared to a concentration of 10 mg of Piperazine citrate as a reference standard ⁵⁹.

Anticonvulsant Activity: *Prosopis cineraria* (Linn) Druce's stem bark's methanolic extract has been demonstrated in studies to be a highly efficient anticonvulsant when used to treat mice with convulsions induced by MES & Pentylenetetrazole (PTZ) induction. Induced MES causes mice to exhibit HLTE (hind limb tonic extensions) and PTZ causes them to experience seizures. Administration of the methanolic extract of the stem bark lowers HLTE & protects against seizures ⁶⁰.

Antipyretic and Analgesic Activity: Numerous investigations have shown that *Prosopis cineraria* bark crude extract has remarkable antipyretic properties, while an ethanol extract of the plant's stem has strong analgesic properties. According to a study, the combination of tannins and alkaloids is what provides these compounds with their analgesic properties ⁶¹. Rats exposed to oral dosages of 200 mg/kg and 300 mg/kg of the ethanolic extract of *Prosopis cineraria* roots had substantial analgesic action ⁶². The plant's berries and leaves also have analgesic properties. 200 mg/kg of ethanol extract from leaves lowers the rectal temperature in albino rats who have been given pyrexia, whereas, at 300 mg/kg, both leaves and fruits significantly lower pyrexia ⁶³.

Anti-inflammatory Activity: The anti-inflammatory action of *Prosopis cineraria* is one of the plant's most important pharmacological traits. It facilitates the healing of wounds. Hydroalcoholic extract fractions of *Prosopis cineraria* that are dissolved in ethyl acetate, chloroform, and butanol have anti-inflammatory effects. Rats' dorsal wounds healed faster when treated with a Page butanol fraction of a hydroalcoholic extract of *Prosopis cineraria* than they did in the control group, with an increase in the amino acid

hydroxyproline concentration and a shorter time for epithelialization & inflammatory indicators in the blood ⁶⁴.

Anti-microbial Activity: An antibacterial impact is the capacity to inhibit the development of microorganisms such as bacteria and fungi. *Candida albicans* is resistant to the antibacterial activities of *Prosopis cineraria* pod extract, which is based on methanol ⁶⁵. Using the agar well diffusion method, the leaves, stem, and pods of *Prosopis cineraria* were evaluated for the presence of antibacterial activity. This demonstrated that each of the three parts of the plant has an inhibitory zone that prevents the growth of microorganisms. Flavonoids, steroids, and other identified secondary plant metabolites may be responsible for the antibacterial activity. The study found that the methanol extract & aqueous extracts demonstrated considerable antimicrobial property against all the microorganism strains that have been tested at a level of 250 g/ml when the *Prosopis cineraria* peel preparations were analysed to begin analysing the antibacterial activity ⁶⁶.

Antidepressant Activity: A significant sense of sorrow, weariness, decreased thinking & activity, apathy, hopelessness, and suicidal thoughts are some of the symptoms of depression, a very common mental condition. The leaf of *Prosopis cineraria* have been used in traditional medicine to treat a variety of CNS conditions. The aqueous extract of this leaf has a discernible antidepressant effect. A forced swim test was done to examine the plant's ability to alleviate depression (FST). The period of time that FST animals remained immobile was measured, and it was found that leaves extract at a dose of 200 mg/kg significantly reduced this time ⁶⁷.

In-vivo Treatment of Various Diseases: *In-vivo*, *Prosopis cineraria* species is used in the treatment of various diseases through its different- different plant parts such as bark, stem, leaves, and fruits with its particular dose and through its pharmacological mechanism as shown in **Table 6**.

TABLE 6: VARIOUS IN-VIVO TREATMENTS

Species used	Model used	Part of the plant	Formulation and Dosage	Result	Ref.
Antidiabetic					

<i>Prosopis cineraria</i>	Male-Swiss albino mice	<i>Bark</i>	The dry product was ground up, and then a Soxhlet extraction using 50% aqueous ethanol and concentration was performed. Oven-dried material was combined with 20% tween 20 into a saline solution for further testing.	Decreased blood glucose levels, improved liver glycogen stores, and maintained parameters of body weight & lipid profile within such a range that is roughly normal. Its extract's anti-diabetic & antioxidant activities were shown by the decreased activity of antioxidant enzymes and the increased content of non-enzymatic antioxidants in the tissues of diabetic rats.	68
<i>P. cineraria</i>	Hyperlipidemic rabbits	<i>Bark</i>	Rabbits were given a high-fat diet and cholesterol powder (500 mg/Kg body weight daily in 5 mL of a coconut oil for 15 days) orally in order to create a hypolipidemic model.	Decreased serum levels of ischemia indicators (TC/LDL and LDL/HDL), triglycerides, VLDL, and total cholesterol, LDL, and triglycerides. The prevented the aorta's atherogenic alterations. The elements of the toxicity profile remained within normal limits.	69, 70
<i>P. cineraria</i>	Male albino wistar rats	<i>Leaves</i>	Animals with wounds were excised, and rats received ethanolic for 13 days.	The most effective component against free radicals was determined to be the butanol fraction. Significant anti-inflammatory, collagenase, and elastase activity are present in butanol fractions. Rats' dorsal wounds were treated with butanol fractional ointment for 16 days in a row. This confirmed that the wounds healed more quickly, had more hydroxyproline, took less time to epithelialize, and had greater inflammatory markers in the blood than the control group.	71
Anti-pyretic					
<i>P. cineraria</i>	Induction of pyrexia in albino rats by Brewer's yeast	<i>Leaves & fruits</i>	At doses of 200 and 300 mg/kg body weight, it was researched.	Hyperpyrexia was dramatically reduced when compared to the normal control. Fruit extract reduced rectal temperatures in rats at a dose of 200, however, at a dose of 250 mg/kg, pyrexia and leaves were both greatly reduced.	72
Vasodilator-Activities					
<i>Prosopis cineraria</i>	In-vivo technique	<i>Stem-bark</i>	3 to 10 mg/mL of the extract	The extract relaxed both spontaneously & K ⁺ (80 mM)-stimulated convulsions in different rabbit jejunum preparations at tissue bath concentrations of 3–10 mg/mL. The extract showed a general relaxing effect on contractions induced on by the drugs carbachol (1 M) and K ⁺ in different rabbit tracheal preparations (80 mM).	73
Depression & CNS Disorder					
<i>Prosopis cineraria</i>	Mice	<i>Leaf</i>	The antidepressant effect was evaluated using the forced swim test. All mice under the supervision and receiving therapy had immobility times recorded.	After leaves extract (200 mg/kg), the quantity of immobilization period in the FST reduced significantly. The efficacy of the extract under investigation was comparable to those of imipramine.	74
Skin Caring & antiaging properties					
<i>Prosopis cineraria</i>	-	<i>Leaves, stems, and</i>	Non-invasive probe cutometer &	Bark extract did not induce significant toxicity or apoptosis when used with	75

	bark	elastomer measurements were taken to assess how well the 2% bark extract-loaded emulsified formulation performed in comparison to the standard formulation.	HaCat cells. In addition, the formulation (size 3 m) decreased the skin's levels of melanin, erythema, and sebum by up to 2.1, 2.7, & 79%, while also improving the skin's moisture & flexibility with up to 2 folds & 22%, respectively, in contrast to the base. A phytocosmetic formulation looked promising as just a skin-whitening, moisturizing, anti-wrinkle, anti-acne, and anti-aging therapy which may actively promote the healing process and resurfacing. It also had enhanced therapeutic advantages.
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In-vitro Treatment of Various Diseases: *In-vitro*, *Prosopis cineraria* species is used in the treatment of various diseases through its different- different plant parts such as bark, stem, roots, aerial parts, leaves, and fruits with its particular dose and through its pharmacological mechanism as shown in **Table 7**.

TABLE 7: VARIOUS IN-VITRO TREATMENTS

Species used	Model used	Plant Part used	Formulation/Dosage	Results	Ref.
Anti-oxidant					
<i>Prosopis cineraria</i>	<i>In-vitro</i> method	Stem-bark	When ascorbic acid was employed as the reference, analysis of the methanolic extract yielded a value of 193.54 g/mL ($y = 0.4992x - 101.25, 0.9921$).	It can be employed in the pharmaceutical sector, as a food supplement, and as a readily available source of natural antioxidants.	76
Analgesic Properties					
<i>Prosopis cineraria</i>	Methods using an <i>in-vitro</i> hot plate and tail immersion	Roots	To investigate the analgesic efficacy, ethanol extract dosages (200 & 300 mg/kg, dose orally) were chosen.	For the hot plate & tail immersion methods, extracts blocked the analgesic effect. In both experiments, 200 mg/kg of <i>Prosopis cineraria</i> roots extract was considerably more efficacious than 300 mg/kg body weight	77
Anti-plasmodial					
<i>P. cineraria</i>	Plasmodium falciparum 3D7 variant that is chloroquine (CQ) sensitive and toxic to the THP-1 cell lines.	Flowers, stems, roots, and leaves	Stepwise extraction using hexane, methanol, chloroform, and water In vitro tests on these extracts were performed using the lab-adopted P. falciparum 3D7 cell. The THP-1 cell line was used to investigate the cytotoxicity of the crude extracts.	Having IC50 values ranging from 5 – 50 g/mL, leaf extracts in chloroform & ethyl acetate revealed strong antimalarial activity. IC50 values for water, chloroform, methanol extract of the stems, flower, and root ranged from 50 to 100 g/mL. The ethyl acetate extract of the flower had excellent antimalarial activity (IC50 = 27.33 g/mL).	78
Anti-microbial					
<i>Prosopis cineraria</i>	<i>In-vitro</i> method	-	Antifungal prprotein38.6 kDa) were purified from P. cineraria extract using ammonium precipitation, ion-exchange chromatography, & gel filtration.	Purified protein demonstrated antifungal activity against infections caused by fruit fungus after harvest. <i>Aspergillus fumigatus</i> and <i>Theobroma Lasiodiplodia</i>	79

<i>Prosopis-cineraria</i>	In-vitro method	<i>Aerial-parts</i>	The organic extract was prepared by maceration in methanol, and hexane & ethyl acetate were used to separate it.	The biggest antibacterial effects were seen in the ethanol extract. This plant's effective antibacterial components were two substances with molecular mass of 348 & 184 Dalton (MIC values).	80
Antihelmintic					
<i>Prosopis cineraria</i>	Pheretimaposthuma	<i>Bark</i>	Extract is prepared with methanol for screening.	It was noted how long it took for death and paralysis to occur. Aqueous and petroleum ether extracts performed less well than methanol extracts.	81
Anti-cancer					
<i>Prosopis cineraria</i>	Breast-cancer-cells (MCF-7)	<i>Leaf</i>	Using microwave-produced P. cineraria leaf extract, silver (PcAgNPs), and copper nanoparticles	The MTT assay results suggest that CuNPs, followed by AgNPs, may have a fatal impact just on MCF-7 cancer cell line. PcAgNPs, PcCuNPs, & P. cineraria leave extract each had an IC50 value of 65.27, 37.02, & 197.3, respectively.	82

The Importance of *Prosopis cinneria* and its Uses: The *Prosopis cineraria* are economically important because they may increase soil fertility and provide people with fuel, lumber, and vegetables, prosopis are crucial to the socioeconomic development of the population. The socioeconomic significance of *Prosopis cineraria* is covered in the sections that follow^{83, 84}.

Inside the Rajasthan area of India, the Prosopis has been utilized conventionally for thousands of years. "Marwari Mewa" is the name given to the dried Prosopis plant pods. Farmers will occasionally use it in hard times since it lessens the thirst for water in the summer. Dairy cows are encouraged to make milk by Prosopis pods. In addition to its use in the treatment of rheumatism, the Prosopis has a number of other medical uses, many of which have already been mentioned. Pregnant ladies consume the Prosopis blooms mixed with sugar to provide safety and avoid abortions, while the ash from the bark is used to remove excess body hair.

Uses for Prosopis in ceremonies Under the Prosopis tree, a variety of events are honoured, including weddings and the birth of a son. The Prosopis has been under protection for the past 40 to 50 years by a number of communities⁸⁵.

A Description of *Prosopis cineraria*'s Primary Component: Herbal Medications are non-pharmacological interventions that are used in the treatment and management various Life-disorders⁸⁶⁻⁸⁷. Locally, the Prosopis pod is known to as "sangri." It is acknowledged as a distinctive Rajasthani dry fruit and a crucial component of the "Panchkuta" meal. Sangri provides nutrients such protein, lipids, carbohydrates, and minerals in addition to meeting the body's basic nutritional needs. Sangri is recommended by many dietary organisations for the prevention of chronic illnesses including cancer and atherosclerosis. Every component of the sangri possesses therapeutic role, for the treatment of various diseases and disorders as depicted in **Table 8**.

TABLE 8: SANGRI CONTENTS AND THEIR IMPORTANCE⁸⁸⁻⁹⁰

The content present in Sangri	The significance of Sangria’s content in terms of medicine
Alkaloids	Alkaloids exhibit effective anesthetic and spasmolytic properties.
Saponin	Saponin improves the body's immune system, lowers blood cholesterol, and lowers the risk of developing intestinal cancer.
Tannins	Tannins have anthelmintic properties because they are attached to the unbound protein in the host animal's gastrointestinal system.
Zinc (Zn)	It relates to the subject of nutrition. Effects of antioxidant supplementation in diabetes

Iron (Fe)	mellitus.
Calcium (Ca) & Phosphorus (P)	Iron is used to treat growth problems, TB, and anaemia.
Magnesium (Mg)	Bone, tooth, and ligament diseases can benefit from them.
	It is essential for each organ, such as the heart, muscle, and kidneys, to function properly.

Future Perspectives of *Prosopis cinneria*: It is believed that *Prosopis cineraria* have a variety of pharmacological and therapeutic qualities that make it effective for the treatment of a no. of chronic conditions, although further research is still required. This tree safely and successfully cures a number of diseases without causing unfavourable side effects. The Indian government is required to give this tree the correct care, particularly in desert regions, as well as a suitable plan for pest management, which is essential for the tree's development.

The fall in the water table, mechanization of agricultural areas, and unrestrained pest growth are the main contributors to this. Around the world, 153 pests have been identified as specifically harmful to *Prosopis cineraria*. In northwest India, it has been shown that bugs swiftly cause damage to trees. One of several frequent organisms that kill the tree quickly is *Homoeocerus variabilis* Dallas. The organism grows at its fastest rate in December and at its slowest in July. By sucking sap from the freshly developed leaves, branches, and flowers, the beetle stunted the growth of the tree. This same diseased tree produces faulty pods that humans cannot consume. A common feature is inflorescence, and the development of insect galls prevents fruit from setting and reduces the population.

CONCLUSION: Due to the fact that they contain significantly fewer poisonous components and adverse effects than synthetic medications, medicinal herbal medicines are much more useful. The study makes it abundantly evident that the herb *Prosopis cineraria* have a variety of pharmacological capabilities, and extracts of the plant's various components have been asserted to have multiple curative properties that can be utilized to cure a variety of maladies. Therefore, it may be said that this plant has a significant therapeutic value. Locally called "Khejri," *Prosopis cineraria* contains a number of pharmacological properties that can significantly improve overall health. In order to treat a variety of medicinal effects, the herbal plant *Prosopis cineraria's* leaves,

bark, twigs, flowers, fruits, and pods are employed. These plants' leaves have properties that are anti-hyperglycaemic, anti-hyperlipidemic, anti-oxidant, analgesic, antipyretic, anti-depressant, and calm the skeletal muscles. While the plant's pods were said to have an anti-bacterial impact, the bark of the plant demonstrates anti-diabetic, anti-atherosclerotic, and nootropic effects. According to reports, *Prosopis cineraria* has a variety of phytoconstituents and exhibits a wide range of pharmacological activity, although further in-depth research is still required.

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