

ACTIVE BIO MOIETIES AND PHARMACOLOGICAL PROPERTIES: A REVIEW ON *ACACIA CHUNDR*

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ABSTRACT

In Ayurveda, the traditional medical practice that comes from India, the herbal plants are used for maintaining health and addressing illnesses. Historical Ayurvedic writings like Charaka Samhita and Sushruta Samhita provide detailed information about plant-derived remedies employed to cure a range of diseases. *Acacia chundra* (Rottler) Willd. is a medicinal plant belonging to the family Fabaceae. It is prevalent in India and other tropical regions, and is known for producing bioactive compounds such as tannins, flavonoids, and phenolics. The herb is widely used in ethnomedicines due to its efficacy against wounds, infections, gastrointestinal and digestive disorders, and inflammations. Various scientific investigations have reported numerous potential benefits associated with the plant, including antimicrobial properties, antioxidative action, anti-inflammatory effects, antidiabetic effects, ulcer-preventive activity, and analgesic action. In laboratory tests, it proved to be highly efficient and even exceeded many standard drugs in efficacy. Despite its popularity and proven effectiveness, the use of the herb clinically is not widespread. The present review will provide a detailed taxonomic, botanical description, geography, phytochemistry, traditional and pharmacological activity of *Acacia chundra*. In this review paper, *Acacia chundra* will be targeted in terms of its therapeutic features and its significance as a natural source of future drug development.

KEYWORDS: *Acacia chundra*, Khair, Wound Healing, Anti-Ulcer Activity, Anti-fungal Activity.

INTRODUCTION

According to the World Health Organization, herbal remedies are important for treating and preventing a variety of illnesses, especially in primary healthcare systems around the globe. It acknowledges the therapeutic potential of medicinal plants and promotes their safe, efficient, and scientifically supported usage in the treatment of a variety of illnesses. India has a large network of healing pharmacies where local wisdom and herbal medicine remain important to health care, especially among rural populations. For generations, a large part of the population has depended on herbal medicines for the treatment and prevention of various disorders. One of these vital, yet unrecognized, medicinal plants is *Acacia chundra* (Rottler) Willd., a species well deep rooted in India's traditional healing systems.^[1]

Temporary *Acacia chundra* (Fabaceae) has been used in extracting therapeutics in Ayurveda for many centuries for many conditions and diseases. It is found in almost entire southern and western India and in Sri Lanka, Northern Territory of Australia, Myanmar, Nepal, Pakistan, Thailand, and in many African and Asian countries.^[2] It is popularly known in India and abroad by several names, such as, Karangali, Kodalimurunkai, Rat Kihiriya, Red Cutch, Red Khair, and Lal Khair. It is a top seller in the traditional medicine of many cultures.^[3]

Phytochemical analysis of *Acacia chundra* has shown that it is an plenty of bioactive constituents, with tannins being the most dominant. Other significant chemical constituents are catechu tannic acid, catechuic acid, catechu red, flavonoids like epicatechin, epigallocatechin, quercetin, taxifolin, and other compounds like mucilage, saponins, asparagine,

triterpenes, sesquiterpenes, essential oils, gallic acid, protocatechuic acid, ellagic acid, alkaloids, and a few glycosides.^[4]

Exceptional for its strength as well as its great potentiality in phytotherapy, *Acacia chundra* has been used in the treatment of sore throat and cough, as an astringent to facilitate and improve digestion, and for the relief of infections, severe skin irritations, wounds and ulcers, tooth decay, diarrhoea, bronchitis and arthritic pains. Studies have shown that the plant has a vast and a wide range of pharmacological activities such as anti-microbials, anti-inflammatory, anti-diabetic, wound healing, antioxidants and analgesics. It is also used in traditional medicine for the treatment of fever as well as jaundice, skin burns, gastric troubles, bronchial asthma, leprosy and leukoderma.^[5]

Under the present research situation, systematic reviews of herbal plants are becoming a demanding need to know the importance of phytoconstituents and scientifically prove their therapeutic uses. Based on this view point, the review under consideration is an effort to collect and wide-range if therapeutic (including pharmacological) activities. One of such plant named as *Acacia chundra*, commonly known as "Green teak" is an indigenous tree and grows abundantly in the tropical and subtropical regions of Karnataka State for several centuries, being used for traditional knowledge and ethnomedicine. Phytochemical studies indicate that the plant is a store house of bioactive secondary metabolites as, catechu tannic acid, (15-33 %) catechuic acid, gallic acid.

Since *Acacia chundra* has been credited for various curative properties, and the goal of the current review is to collect, gather and systematically document all available information related to therapeutic potential of different parts of this plant. This review aims to specifically focus its phytochemical composition and medicinal applications of *Acacia chundra* in light of pharmacological point-of-view in order to elevate the relevance of this plant as a valuable natural source. The pharmacological which is proved are Antibacterial activity, Antifungal activity, Anti-Ulcer activity, Anti-diabetic Activity, Anti-Inflammatory Activity, Wound healing Activity, Gastroprotective Activity.^[6]

Historical Aspects of *Acacia chundra*:

This plant was previously called *Acacia chundra*. it's derived from Greek word "akē" which means "point" and "thorn".

TAXONOMICAL CLASSIFICATION

Kingdom	Plantae.
Division	Spermatophyta.
Class	Angiosperms (Magnoliopsida).
Order	Fabales.
Family	Fabaceae.
Genus	Acacia. ^[7]

VERNACULAR NAMES

Kannada	: Tare Gida, Kadhira, Kempu jali
Malayalam	: Karingali, Kannali
Marathi	: Khair
Tamil	: Karangaal
Telugu	: Sundra
African Nations	: <i>Senegalia chundra</i>
Common name	: Red cutch ^[8] .

Synonyms

Senegalia chundra (Roxb. ex Rottler) Maslin, *Acacia chundra* Roxb. ex Rottler *Acacia sundra* (Roxb). DC, *Mimosa chundra* Rottler, *Acacia catechu* auct. non Willd, *Acacia catechu* var. *sundra* (Roxb) Prain.



Figure 1: *Acacia chundra* tree.



Figure 2: Flower.



Figure 3: Bark.



Figure 4: Pods.



Figure 6: Roots.



Figure 5: Leaves.

GEOGRAPHICAL DISTRIBUTION

Acacia chundra has a wide geographical distribution, which signifies its adaptability and medicinal value. In India, the species is found in plenty in a large climatic range, including the southern, western, central, and eastern parts of the country, including Karnataka, Andhra Pradesh, Dadra and Nagar Haveli, Goa, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Rajasthan, Tamil Nadu, and West Bengal. Apart from India, *Acacia chundra* has a natural distribution in several parts of Asia, Africa, and Australia. It is found in Sri Lanka, Myanmar, Nepal, Pakistan, Thailand, Indonesia, and China, as well as in African countries such as Kenya and Mozambique and the Northern Territory of Australia. The wide distribution of the species signifies its adaptability and medicinal value.^[9]



Figure 7: Global distribution of *Acacia chundra*. Green: Native range. Purple: Introduced and naturalized regions. Source: POWO/Kew Science.

BOTANICAL DESCRIPTION

1. Leaves

Leaves of *Acacia chundra* alternate, twice-pinnate and well organized for photosynthesis in drought conditions. The leaf bears 5-12 pairs of pinnae and each pinna is divided into several leaflets, small in size. The petiole of 1-2cm in length normally bears a gland at the junction of uppermost pinnae (which may be involved in secretion or attracting insects). The shaft is slightly young or covered by small prickles. Leaflets are small and narrow to elongated in shape with slightly thick appearance in order to decrease water loss. Young leaves usually

covered with indument (fine hairs), giving golden or silky appearance.

2. Bark

Acacia chundra bark, which is "thick, hard and rough, serves to provide protection to the trunk". The bark of *Acacia chundra* is hard, thick, and rough, covering and protecting the trunk. Rough, cracked on old trees, vertical crack go deep into wood. Colour of the outer bark varies from dusty-brown to dark-brown with sometimes an Ash Gray in old age. Some trees lose the outer bark in irregular pieces leaving behind lighter

coloured tissues. The bark contains much more tannins and hence, is astringent and medicinally important. The stem is strong and cylindrical, occasionally holding an oblique, slightly twisted or bended crown, which is wind-and drought resistant.

3. Flowers

The small white aromatic flowers of *Acacia chundra* contribute to pollination as they attract insects. The flowers are presented in lateral cluster that can be spike-like and can be 2-11cm long. Flowers are attached, or appear to be carried on short pedicels and borne on peduncles which are 0.3-2.5cm. The cup-shaped calyx has a rough or slightly pubescent outer surface and minute lobes, measuring 0.2-0.6mm. The corolla is a fused structure, slightly longer than the calyx, and composed of a tube-shaped structure. The large numbers of included stamens that project beyond the corolla makes the flower somewhat feathery looking. Once flowering and pollination has occurred, fertilization occurs rapidly leading to a high fruit set.

4. Prickles (Spines)

A very strong defensive modification is found in this plant, as prickles occur on branchlets, internodes and in many cases the leaf rachis. These have a purplish-brown to red-brown colour and curve backward, may be used to grip between other plants. They are relatively large, measuring up to 15mm long and are abundant in the flowering axis of the plant. In younger stems, prickles may be thin and soft, becoming harder and stiffer on

older stems. This is why the plant looks so spiky, a bit thorny and not very attractive.

5. Stipules

Stipules present at base of petiole of *Acacia chundra* are 12 X 7 mm in size but they are reduced or shed as the leaf matures. Unlike some Fabaceae the stipules are non-spiny and do not change into a protection structure but rather protect the simply leaf buds during their formation. The insignia nature causes absence of stipules at full development.

6. Seeds (Fruits)

Once fertilised, the plant develops legume characteristic of the family Fabaceae. Legumes bear seeds that are disc-shaped to globular and compressed laterally. Each seed is olive brown with a diameter that generally ranges between 6-9 mm with the characteristic central areole which is around 2.5-3mm long, perhaps with an adaptation regarding the spread of seeds and a source of nutrients for development. The seed coat is hard and protects it from unfavourable conditions in addition to its function in aestivation, allowing the seeds to survive the dry conditions in soil for considerable periods of time. sprouts take place under favourable conditions.^[10]

PHYTOCHEMICAL CONSTITUENTS

Acacia chundra, also known as *Senegalia chundra*, contains a variety of phytochemicals found in different parts of the plant.^[11-14]

Plant Part	Key Phytochemical Constituents
Bark	Catechu tannic acid, catechuic acid, catechin, epicatechin, quercetin, procyanidins, taxifolin, gallic acid, kaempferol, asparagine, sesquiterpenes.
Leaves	Quercetin, kaempferol, rutin, catechin, epicatechin, gallic acid, ellagic acid, camphor, phytol, amino acids, alkaloids, glycosides, saponins, steroids.
Pods	Catechins, quercetin, phenolic acids, flavonoid derivatives (including <i>p-coumaric acid-related compounds</i>).
Seeds	Catechins, quercetin, kaempferol, taxifolin, alkaloids, phenolics, poriferasterol acyl glucosides, essential oils.

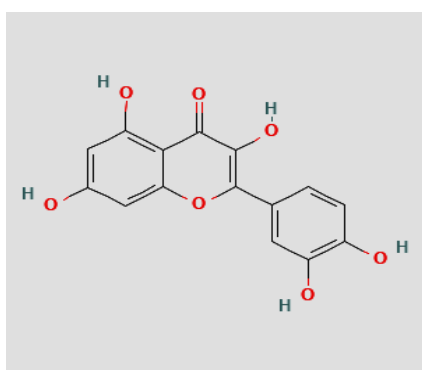


Figure 8: Quercetin.

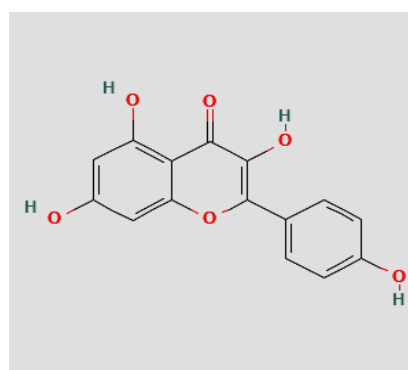


Figure 9: Kaempferol.

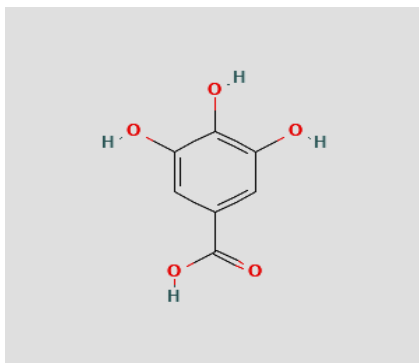


Figure 10: Gallic acid.

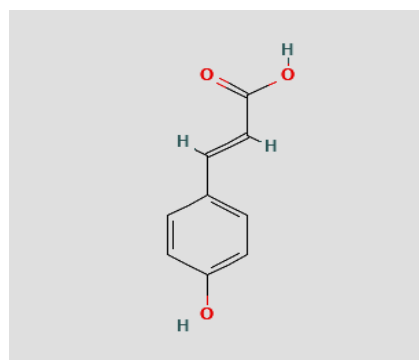


Figure 11: P-coumaric acid.

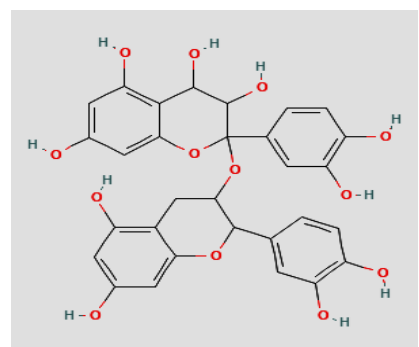


Figure 12: Procyanidins.

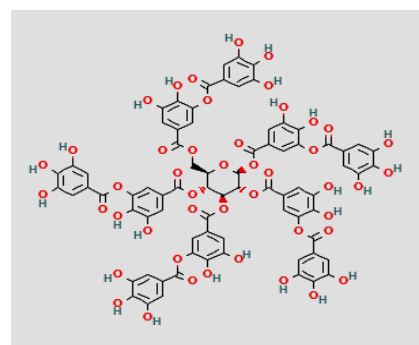


Figure 13: Tannic acid.

ETHNOMEDICAL USES

Acacia chundra, although not typically celebrated as a 'celebrity herb,' has been identified as having significant medicinal use. This plant has been linked to traditional medicine for a long time and is known to provide various health advantages that are also sought in modern herbal

medicine. One of its most recognized applications is in wound care.

Traditional medicine employs a decoction made from the bark for external treatment of Deep cuts or incision, pus-filled lesions, and ulcers. The bark is characterized by its strong astringent properties, which helps in rapid haemostasis while also reducing the microbial load, thus serving as a valuable resource in situations where modern antiseptics are not accessible. For internal ailments, *Acacia chundra* has been used to treat diarrheal diseases, dysentery, and haemorrhage. These properties are primarily due to its high tannin content.

In Ayurvedic medicine, this plant is sometimes employed in conditions like menorrhagia and haemorrhoids. To improve its taste and effectiveness, it is commonly consumed with ghee or honey. Another traditional application of the plant, although not as widely known yet still accepted, is for the purification of blood. Individuals with acne, skin rashes, or eczema have been advised to consume bark preparations for several weeks, particularly during seasonal transitions when pitta is imbalanced in Ayurvedic practice. This indicates a belief in the plant's efficacy for blood purification and skin regeneration.

Moreover, it plays a crucial role in oral and dental health. The bark powder is utilized as a natural cleanser, either independently or is combined with neem, to combat gum infections, bad breath, and dental plaque. In rural place, the bark is still chewed in small pieces to promote gum health and long-standing remedy similar to modern herbal toothpaste.

In addition to its applications for skin and gastrointestinal disorders, Evidence-based medicine has noted its mild diuretic and anti-inflammatory effects. Some traditional uses also suggest potential support for liver function, although further scientific research is necessary to validate these claims. Some traditional practitioners have also considered its role in weight management, including potential assistance in reducing obesity and regulating kapha, a principle in Ayurvedic medicine; although this claim is debated. Another recognized application is in managing joint pain and arthritis. The oil extracted from the bark is used in massage, with reports of reduced swelling and pain. While there is no scientific basis for this application, it is consistent with the recognized anti-inflammatory properties of the plant.

According to ethnomedicinal literature, this plant is recognized for its adjustability. *Acacia chundra* has been utilized in the treatment of numerous diseases, such as headaches and gastritis.

In Kenya, the roots are used to relieve back and joint pain, while in Nigeria, the seeds and pods are used to combat dysentery. Additionally, it is also utilized in the

treatment of pneumonia. Overall, *Acacia chundra* serves as an example of a medicinal plant with a broad spectrum of applications in traditional medicine, which is quietly effective, rich in cultural significance, and requires further scientific exploration.^[15-16]

PHARMACOLOGICAL ACTIVITY

Anti-cancer activity

Prabhu TP, Priya B, Srinivasan N, Waheeda TI, Suresh R. Journal of Chemical and Pharmaceutical Research. 2017. Ethanolic extract of *Acacia chundra* leaves were evaluated for *in vitro* anticancer cell line studies by MTT assay. It is reported that *Acacia chundra* is a member of family Fabaceae which has enormous values against variety of diseases. The phytochemical investigation indicated that the plant revealed the presence of alkaloids, tannins, flavonoids, phenols, steroids. The physicochemical parameters were determined. The ethanolic extract of *Acacia chundra* shows anticancer activity (cervical cell line) and it has an IC₅₀ value of 51.27 μ M showing moderate activity against cervical cancer. In conclusion that although modern medicine is easily available now, but the medicinal plant-based treatment has still continued to maintain position in majority of cases in studied area. Also, plant must be explored for identification of anticancer phytochemical constituents.^[17]

Antibacterial activity

Jain P, Bansal D, Bhasin PA, Anjali A. Journal of Pharmaceutical Research 2010. In order to check the *invitro* antibacterial activity of ethanolic extract of *Acacia chundra* leaves. The ethanolic extract of *Acacia chundra* leaves were assessed for antibacterial activity by Disc diffusion assay. *Acacia chundra* wild is an indigenous plant with lot of traditional uses against different type of diseases. By means of a phytochemical analysis, it was determined that the leaves contained alkaloids, flavonoids, tannins, phenols and steroids. Physicochemical analysis was done. Anti-bacterial activities show the presence of antibacterial activity in ethanolic extract of *Acacia chundra* against staphylococcus aureus, pseudomonas aeruginosa zone of inhibition was found to be 10mm (250g), 18mm(500g), 10mm(250g), 20mm(500g) respectively. From this investigation it was conclude that even though the availability of allopathic system of medicine is available for simple and complicated type of disease, the majority of the people in this region still rely upon plants for various type of diseases. And further more phytochemical investigation should be carried out to find the exact chemical present and causing anti-bacterial activity.^[18]

Antifungal Activity

Ficker CE, Arnason JT, Vindas PS, Alvarez LP, Akpagana K, Gbeassor M, De Souza C, Smith ML. Mycoses 2003. To investigate the antifungal activity of ethanolic extract of *Acacia chundra* leaves by Disc diffusion assay. *Acacia chundra* wild is one of the local

plants which possess vast medicinal values to varied conditions. In phytochemical investigation it shows the presence of alkaloids, flavonoids, tannins, phenols, steroids. Physicochemical analysis of the leaf extracts was carried out. Antifungal activity study demonstrated that ethanolic extract of *Acacia chundra* possesses antifungal activity against candida albicans which exhibit zone of inhibition 16 mm (250 g), 24 mm (500 g). We conclude that the modern medicinal systems for simple and serious problems are readily available. Many people in the examined areas are still using medicinal plants for the different kinds of disease treatment. It is necessary to examine the phytochemical constituents that contribute to antifungal activity.^[19-20]

Antioxidant Activity

Musa KH, Abdullah A, Al-Haiqi A. Food chemistry 2016. To study the antioxidant potential of ethanolic extract of *Acacia chundra* bark through DPPH assay. This study indicates the presence of the bioactive constituents like flavonoids and tannins, that might be related to the beneficial effects exhibited by the plant. This thesis will continue to add to the list of plant derived compounds utilized in modern medicine. Further, the bark extract was subjected for Physicochemical analysis. The bark was shade-dried and extracted with ethanol. It was subsequently analysed for phytochemical compounds like flavonoid, alkaloid, glycoside, tannins. The antioxidant evaluation was carried out by *in vitro* method using DPPH method. It was observed that *Acacia chundra* exhibited significant activity against the free radicals, comparable with Ascorbic acid. It indicated that the plant is potent as a free radical scavenging agent and exhibits significant antioxidant potential with 87.12% inhibition at concentration of 600 g/ml.^[21]

Anti-Ulcer Activity

Ubaka MC, Ukwe VC, Okoye CT, Adibe OM. Asian Journal Medical Science. 2010 This study was designed to examine the gastroprotective effect of the ethanolic bark extract of *Senegalia chundra* against experimentally induced gastric ulcers with combined model of indomethacin and pylorus ligation in Wistar albino rats. The mechanisms leading to ulceration, include infection by *H. pylori* or ingestion of non-steroidal anti-inflammatory drugs (NSAIDs).

From this investigation, it could be observed that the plant extract displayed good antioxidant activity when the extract was tested against DPPH free radical at an acceptable percentage and compared with ascorbic acid. This indicates the free radical scavenging activity of the plant. Based on the histological study performed, the treatment with plant extract proved to protect the gastric mucosal tissue, and thus reduces ulcerogenesis. The treatment of the ulcerated rats by plant extract was observed to protect against the ulcer formation, same as the standard drug lansoprazole. Phytochemical analysis of the extract confirmed the presence of flavonoids,

tannins, alkaloid and glycosides, which possess anti-ulcer activity. Similar findings were reported in other plants such as *Baccharis trimera*, *Solidago chilensis*. In conclusion, it could be suggested that the extract *Senegalia chundra* can serve as a suitable candidate for treating peptic ulcer disease and further investigation is required in order to understand the mechanisms involved and also its efficacy.^[22]

Anti-diabetic activity

Quanhong LI, Caili F, Yukui R, Guanghui H, Tongyi C. *Plant Foods for Human Nutrition* 2005. Agarwal A, Sharma A, Bhatia S. *Pharmacognosy Magazine*. 2009. Ethanolic and aqueous extracts of the *Acacia chundra* hardwood were investigated for antidiabetic properties in normal and STZ diabetic rats. Oral glucose tolerance was elevated after administration of sucrose in normal as well as STZ diabetic rats for both the extracts. Both the extracts also significantly elevate the oral glucose tolerance in diabetic rats at the end of the 7th and 14th day respectively after administering extract. The ethanolic and aqueous extracts enhanced the oral glucose tolerance in STZ diabetic rats by 22% and 27% and 14% and 21% at 7th and 14th day respectively. Further studies demonstrated significant lowering of glucose in the STZ diabetic rats and High Fat Diet with low dose STZ rats. It lowered the AR activity in both normal and diabetic rat lenses. Increased Aldose Reductase activity is known to be responsible for diabetes complications such as diabetic cataract. Diabetes mellitus is a metabolic disease characterized by low level production or action of insulin.

Insulin therapy and sulfonylureas (conventional drugs) have adverse effects such as hypoglycaemia and gain in body weight respectively. Plant-based therapy is gaining importance due to low cost and least side effects. Flavonoids and glycosides present in *Acacia chundra* enhances insulin activity and thereby lowers the blood glucose level.^[23-24]

Anti-inflammatory activity

Kumar S, S., et al. (2012). *Journal of Ethnopharmacology*. 2012. The anti-inflammatory activity of *Acacia chundra* was investigated in rats. The various parts of the bark were collected, dried, powdered and extracted with ethanol. The rats were divided into five groups control, test, standard, higher dose and lower dose groups. Test groups were administrated with different dosage (100-450 mg/kg) of extracts whereas test animals were administrated with diclofenac. Inflammation was induced by injection of carrageenan in hind paw of rat. Swelling of paw was recorded at various time intervals. The extract possesses significant anti-inflammatory activity in dose dependent manner ($p < 0.05$) but was not as potent as diclofenac. Phyto-constituents such as flavonoids, tannins and polyphenol are present in the extract which blocks damaging agents like COX-2 and TNF-, resulting in reduced inflammation.^[25]

Wound healing activity

Gupta R, et al. *Journal of Wound Care*. 2011. An excision wound was created on the dorsal surface of albino mice in to evaluate the wound healing activity of the *Acacia chundra* extracts and animals were then allocated in 5 groups. Group I-control, Group II-standard (Povidone-iodine ointment) and group III, IV, V-treated animals (ethanolic extracts). A circular wound (diameter 10 mm, depth 2 mm) was made and treated with extract/ointment once daily for 21 days.

Measurements of the size of the wound and percentage contraction were taken on the day 0, 4, 8, 12, 16 and 21, and time for epithelization of the wound was calculated and also histological study was made. Results-In the treatment groups it was found that there was significant decrease in size of the wound size. Ethanolic extract produced maximum wound contraction effect of up to 46.68% and the most pronounced effect was observed with *Acacia chundra* bark extracts and it was clearly indicated that *Acacia chundra* possesses high wound healing activity.^[26]

Gastroprotective activity

Mishra S, Sharma R, Gupta A, et al. *Journal of Herbal Medicine*. 2010. The rats were deprived of food for 18-24 hours and distributed into 5 groups (n=6). Controls received normal saline and atropine whereas test groups received ethanolic extract of *Acacia chundra* bark (250, 500, and 1000 mg/kg; p.o.). A charcoal meal was then administered after 60 min for intestinal movement analysis. The animals were sacrificed 30 min after charcoal meal and distance travelled by charcoal in the intestine was determined to determine the peristalsis index. Showed significant inhibition on the intestinal movement in dose dependent manner ($p < 0.05$). Thus, this inhibited intestinal movement as it inhibited peristalsis and prolonged the gastrointestinal transit time. Ulcer formation was reduced to 40-60 % in the models of ethanol induced ulcer. In isolated rabbit ileum at low dose, no effect observed however; at higher concentration the isolated muscle got relaxed. Thus, ethanol extract was confirmed to possess a good gastroprotective, antimotility and anti-diarrheal activity thereby justifying its use as an ethnomedicine for various intestinal diseases.^[27]

Antipyretic Activity

Rathi V, Sharma R, Gupta A, Patil SB. *Asian Journal of Traditional Medicine*. 2008. The antipyretic activity of *Acacia chundra* bark extract was evaluated using the Brewer's yeast-induced fever model in Wistar rats. Fever was induced by subcutaneous injection of yeast, and only rats with increased body temperature were selected. The extract was given orally at doses of 100, 200, and 450 mg/kg, while paracetamol (150 mg/kg) was used as the standard. Body temperature was recorded at 1, 2, 3, and 5 hours after treatment. The extract showed a significant, dose-dependent reduction in fever ($p < 0.05$). The 100

mg/kg dose showed moderate effect, while 200 and 450 mg/kg produced stronger and faster results.

At 5 hours, temperature reduction was 47.77%, 58.87%, and 67.52%, compared to 74.25% for paracetamol. This indicates strong antipyretic activity, likely due to inhibition of prostaglandin synthesis.^[28]

Analgesic activity

Rathi V, Sharma R, Gupta A, Patil SB. Asian Journal of Traditional Medicine. 2008. Analgesic potential of *Acacia chundra* bark extract was tested in Wistar rats by standard methods of testing. Drugs were administered orally to the Wistar rats as 100, 200, 300 and 450 mg/kg after 12 hours of starving. Peripheral analgesic effects were observed in acetic acid-induced writhing. *Acacia chundra* extract exhibited dose-dependent suppression of acetic acid-induced writhing in rats and highest dose was more effective comparable to standards like NSAIDs showing strong analgesic activity in periphery probably by inhibition of mediators like prostaglandins. Central analgesic effect was recorded in hot plate test. In hot plate test, there was increase in pain reaction time, maximum effect seen at highest dose suggesting the activity in the centre which might be mediated by interaction with opioid receptors. $P < 0.05$ was observed statistically. In the given studies, *Acacia chundra* extract possesses potential analgesic activity both at peripheral and central sites due to presence of bioactive molecules.^[28]

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CONCLUSION

In the Ayurvedic pharmacopoeia, *Acacia chundra* is comparatively muted, demonstrating that popularity does not automatically equate to medicinal power. It has been used extensively for haemostasis, wound healing, blood cleansing, and calming inflamed Pitta in traditional tribal and forest medicine. Its potent astringent quality makes it very useful for encouraging tissue healing, decreasing inflammation, and managing bleeding.

These historic claims are increasingly supported by contemporary scientific research, which reveals a rich phytochemical makeup dominated by phenolic chemicals, flavonoids, and tannins. The plant has long been used to treat ulcers, wounds, and skin conditions because of these bioactive components' well-known antibacterial, antioxidant, and anti-inflammatory properties. Its therapeutic significance is strengthened by the merging of traditional knowledge with modern pharmacognosy and pharmacology.

Acacia chundra still remains overlooked in traditional herbal medicine despite growing evidence. Because of its strength, it needs to be used carefully and accurately which is in line with an Ayurvedic idea of customized therapy as opposed to widespread use. Its efficacy is best achieved under controlled conditions with the correct formulation and dose, in contrast to commonly sold herbal medicines.

To guarantee safe and effective usage, consultation with a licensed Ayurvedic practitioner is advised. *Acacia chundra* is an example of a more thoughtful and based on evidence approach to healing in times where fast, generalized therapies are the norm. It shows that some of the most potent medicinal plants function with quiet reliability rather than popular notice.^[29]

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