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A COMPREHENSIVE REVIEW ON *CAPPARIS DIVARICATA* LAM.

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ABSTRACT: Medicinal plants remain an integral part of global healthcare systems, with nearly 70–80% of the population in developing countries relying on herbal remedies. *Capparis divaricata* Lam. (family: Capparaceae), a traditionally valued plant, has long been used as both food and medicine by various ethnic groups and practitioners of Ayurveda and Unani medicine. This review highlights the taxonomy, morphology, phytochemical profile, and pharmacological potential of *C. divaricata*. s. Pharmacological investigations report a wide spectrum of activities, including analgesic, antipyretic, antioxidant, anticancer, diuretic, CNS depressant, and antitubercular effects. Notably, ethanol and aqueous extracts showed potent inhibition of *Mycobacterium tuberculosis*, while chloroform and ethyl acetate extracts exhibited significant cytotoxicity against HeLa cancer cells. Collectively, available evidence suggests that *C. divaricata* is a promising medicinal resource with potential applications in drug discovery. However, detailed phytochemical isolation, mechanism-based studies, and clinical validation are essential to establish its safety and efficacy for future pharmaceutical development.

INTRODUCTION: Medicinal plants have a long-standing history of use in traditional medicine and continue to be employed in numerous countries for the treatment of various ailments. With the growing awareness of the importance of optimal nutrition and health, individuals are increasingly turning to plants as a source of both food and medicine. Medicinal plants are becoming increasingly significant in the pharmaceutical industry due to their active phytochemicals, which can provide diverse health benefits. Herbal and plant-based products are often perceived as less hazardous to human health and the environment, as they contain bioactive compounds with multiple applications. It is estimated that 70-80% of the world's population, particularly in developing countries, relies on herbal medicine to prevent and cure diseases. Furthermore, it has been reported that approximately 25% of synthesized drugs are derived from medicinal plants. The Capparis genus comprises around 80 different species. The Capparis plant and its components have a long-standing tradition of being utilized as both a food source and a medicinal resource in numerous regions across the globe [1, 2, 3].

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FIG. 1: LEAVES AND FLOWER OF PLANT *CAPPARIS DIVARICATA* LAM.

TABLE 1: TAXONOMY /PLANT PROFILE [4-8]

Kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida
Order	Capparales
Family	Capparaceae
Genus	Capparis
Species	*Capparis divarcata* Lam.

TABLE 2: VERNICULAR NAME

Vernicular name	Different language
Pachunda	Marathi
thottala	Kannad
sengathali	Tamil
badreni	Tamil
Pakhoda	Sanskrit
turrati	Tamil

Synonyms:

- *Capparis caerulea* Heyne Ex Wall.
- *Capparis horida* Banks Ex Wight & Arn.
- *Capparis reticulate* Klein Ex Wall.
- *Capparis stylosa* DC.
- *Capparis verrucosa* Wight Ex Wall [9].

Plant Morphology:

Common Name: Spreading caper.

Vernacular Name: Pachunda.

Distribution: Common in scrub forests in plains.

Morphology: A much branched shrub or small tree, bark is very rough, brown, deeply cleft. Leaves- Simple alternate, 1 ¼ – 2 ½ by 3/8 – ¾ inch, 5-7 nerved from the base, narrow, ablong, obtuse or retuse, rarely acute, mucronate, rounded at the base, the young leaves tomentose, the older glabrous, petiole- 1/8 – 3/16 inch long, stipular thorns, stout, straight or slightly curved (hooked).

Flowers: 2 ¼ inch in diameter, axillary, solitary, greenish, buds beaked, pedicel ½ - ¾ inch long, stout, tomentose, sepals- ovate, acute. Flower white creamy, turns entirely into pink/purple.

Gynophore: ¾ inch long, stamens- many 1 ½ inch long, filaments – yellow turning reddish brown when old.

Ovary: Glabrous, ribbed. Fruit- 2 inch in diameter, sub globose, scarlet or red at maturity, 5-6 ribbed obtusely beaked, seated on the elongated and greatly thickened gynophore.

Flowering: Feb-april Medicinal uses the fruits, roots, and seeds of capparis have been used traditionally as anti-rheumatic tonic [10].

HPTLC Fingerprinting Analysis of plant *Capparis divaricata* Lam: The concentrated methanolic extract was applied in the form of bands measuring 5 mm in length using a 25-L syringe on a pre-coated silica gel aluminium plate 60 F254, sized 5 x 10 cm with a thickness of 0.25 mm (Merck, Darmstadt, Germany). Prior to use, the plates were rinsed with methanol.

The development chamber for TLC was saturated with the mobile phase utilizing filter paper. The sample and standard solutions were introduced as bands that were 6 mm wide and spaced 10 mm apart, employing an Automatic TLC Sampler 4 applicator (CAMAG, Muttenz, Switzerland, provided by Anchrom Technologies, Mumbai) equipped with a 25-µL Hamilton syringe and nitrogen flow. A consistent application rate of 15µL/sec was maintained. The distance between the bands was set at 20 mm/sec. The slit dimension was maintained at 4×0.20 mm, and a scanning speed of 20 mm/sec was utilized. The mobile phase was composed of a saturated mixture of toluene, with Ethyl acetate: Methanol: Glacial acetic acid in a ratio of 7:2:1 v/v, which proved effective for the separation of phytoconstituents in the studied species. Chromatography was conducted using 10 mL of mobile phase in a 10×10 cm twin-trough glass chamber (Camag, Muttenz, Switzerland) with linear ascending development [24].

The optimized saturation time for the mobile phase in the chamber was 20 minutes at room temperature, with a chromatographic run length of 8.5 cm. Following development, the TLC plates were dried using a current of air facilitated by a hot air dryer within a wooden chamber that provided sufficient ventilation. Densitometric scanning was carried out with a (CAMAG TLC Scanner III) in absorbance–reflectance mode at wavelengths of 254 nm and 366 nm, utilizing a slit dimension of 4×0.20 mm and a scanning speed of 20 mm/sec. All instruments were operated using winCATS software (version 1.4.3 CAMAG) installed on the

system. The source of radiation employed was a deuterium lamp that emitted a continuous UV spectrum ranging from 200 to 400 nm. The concentrations of the chromatographed compounds were assessed based on the intensity of diffusely reflected light [11].

Reported Medicinal Activity on Plant: The plant *Capparis divaricata* has reported medicinal activity which include following

- Analgesic activity
- Analgesic and antipyretic activity
- Anticancer activity
- Antioxidant activity
- Locomotar and diuretic activity
- Antitubercular activity

Analgesic Activity: Analgesic properties of the of *Capparis divaricata* leaves (CDLE) and its synergistic effects when combined with the *Caesalpinia bonducella* seed kernel (CBSKE). Using the hot plate and acetic acid-induced writhing methods, the study evaluated the analgesic efficacy of CDLE, which showed significant pain-relieving effects. Similarly, CBSKE demonstrated notable analgesic activity. A combination of the two extracts at a reduced dose of 400 mg/kg displayed superior efficacy compared to the individual extracts and even the standard drug, diclofenac sodium, achieving 52.82% inhibition of writhing episodes and a heightened pain threshold in the tests. Acute toxicity studies indicated no adverse effects, underscoring the safety of the extracts. The findings suggest that *Capparis divaricata* possesses significant analgesic activity and that its combination with *Caesalpinia bonducella* offers an enhanced, synergistic effect, providing a promising natural alternative to conventional analgesics [12].

Analgesic and Antipyretic Activity: The study investigates the analgesic and antipyretic properties of *Capparis divaricata* leaves using animal models. Analgesic activity was evaluated through the acetic acid-induced writhing test and the hot plate method in mice, while antipyretic activity was assessed using Brewer's yeast-induced pyrexia in rats. The analgesic mechanism is suggested to involve both peripheral pathways, possibly through prostaglandin inhibition, and central pathways, as indicated by improved thermal pain thresholds [13].

Anticancer Activity: The study evaluates the anticancer activity of *Capparis divaricata* Lam leaves using various solvent extracts, including chloroform, ethyl acetate, and ethanol. The cytotoxic effects of these extracts were assessed against HeLa cervical cancer cells using the MTT assay. Results demonstrated significant dose-dependent cytotoxicity, with chloroform and ethyl acetate extracts exhibiting stronger anticancer activity at higher concentrations (1000 µg/mL), these extracts effectively inhibited cancer cell growth and proliferation [14].

Antioxidant Activity: The study titled a study on preliminary phytochemical screening and antioxidant activity of *Capparis divaricata Lam.*" investigated the antioxidant properties and phytochemical composition of the *Capparis divaricata* the antioxidant activities determined through DPPH and hydroxyl radical scavenging assays [15].

Locomotar and Diuretic Activity: Locomotor activity was assessed using an actophotometer, revealing that oral administration at doses of 250 mg/kg and 500 mg/kg significantly reduced locomotor activity, indicating CNS depressant effects. Diuretic activity was evaluated using the Lipschitz test in rats, where EEC demonstrated a significant increase in urine output comparable to the standard drug furosemide [16].

Antitubercular Activity: The study investigates the antitubercular activity of various organic extracts of *Capparis divaricata* Lam leaves against *Mycobacterium tuberculosis* using the Microplate Alamar Blue Assay (MABA). Extracts were prepared using solvents of increasing polarity: petroleum ether, chloroform, ethyl acetate, acetone, ethanol, and water. The ethanol and aqueous extracts exhibited the highest sensitivity at a concentration of 12.5 µg/ml, outperforming other extracts [17].

CONCLUSION: It is quite evident from review that *Capparis divaricata* Lam. is an important medicinal plant it contain number of phytoconstituents which are the key factor in the medicinal value of the plant the present review

summerize some important pharmacological studies on *Capparis divaricata* Lam. And phytochemical investigation and isolated principle from them through screening of literature available on *Capparis divaricata* Lam. depicted the fact that is popular remedy among the various ethenic groups, vaidyas, Hakims and Ayurvedic Practitioners for cure of variety of aliments.

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