



“The Healing Touch of *Capparis brevispina*”: Unveiling Its Pharmacological Benefits and Advantages

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Received: 2024-09-03

Revised: 2024-09-11

Accepted: 2024-09-15

ABSTRACT

Medicinal plants stand as important plants concerning the health of all human beings throughout the world, as they possess bioactive compounds responsible for various therapeutic benefits such as anti-inflammatory, anti-viral, anticancer, antimalarial, and analgesic properties. More particularly in places like Myanmar, where drugs are not easily available, about 80% of the people rely on these natural remedies. *Capparis Brevispina* DC, or Indian Caper, is among the most important species exhibiting distinct specialization to occupy certain ecological niches, mainly in coniferous forest on dry rocky soils. It has some very striking botanical features, such as thorny stipules, leathery leaves, big yellow flowers, plump fruits. The plant is rich in chemical constituents like alkaloids, flavonoids, saponins and terpenoids which contribute to its antioxidant, antimicrobial, cytotoxic and hepatoprotective activities. Traditional use of *Capparis Brevispina* as a tonic, stomachic, and wound healing agent is supported by studies regarding the potential use of this plant in treatment for fever, liver disorders, and even cancer. Therefore, plants like these need to be conserved now because *Capparis brevispina* is an endangered species in Sri Lanka. The broad spectrum of pharmacological activities of *Capparis Brevispina* is evidence that it is a natural drug that has excellent potential for health benefits, hence its cultivation and research in medicinal plants like this one in both traditional and modern medicine carefully managed.

Keywords: *Capparis Brevispina*, Traditional medicine, Phytochemical richness, Hepatoprotective activity, Antioxidant properties, Capparaceae.

INTRODUCTION

Medicinal plants are incredibly important because they have special ingredients that are really good for our health. These plants do a lot of helpful things. They can reduce swelling in our bodies, fight off viruses, stop cancer cells from growing, help prevent or treat malaria, and also help with pain relief. The World Health Organization, which is a big and important group that focuses on health, has said that many of our medicines come from these plants. In fact, in countries where people don't have as much money and access to modern medicine, about 80% of them depend on these natural plant remedies for their basic health needs.⁽¹⁾

In Myanmar, which is a country in Southeast Asia, people have been using medicines made from these plants for a really long time. They use these traditional methods to stay healthy and to treat common problems like malaria, which is a serious disease spread by mosquitoes, as well as diarrhea and fever. This shows just how important and useful these plants are in taking care of people's health, especially in places where there might not be a lot of modern medical facilities.^[2]

The genus to which *Capparis brevispina* belongs is a fascinating collection of flowering plants found across different continents, encompassing a vast array of species that have been documented globally. The species *Capparis brevispina*, commonly known as "Karah," is particularly noteworthy. It is distinguished by its unique features, which have garnered the interest of botanists, ecologists, and practitioners of traditional medicine. ^[3]

This review endeavors to offer an extensive examination of *Capparis brevispina*, covering its botanical characteristics, ecological preferences, and the pharmacological properties it possesses. By delving into its taxonomic significance, we will explore where this species fits in the broader plant kingdom and its relationship with other species in the genus.



Regarding its habitat, *Capparis brevispina* is known for specific environmental preferences, thriving in certain climates and soil types. Understanding these ecological aspects is crucial for both the conservation of the species and for exploring its potential cultivation.

The most compelling aspect of *Capparis brevispina* lies in its therapeutic uses. This plant has been attributed with a range of medicinal properties, which have been acknowledged and utilized in traditional medicine systems. This review will investigate these properties, supported by scientific research and traditional knowledge, to provide a clear understanding of the plant's potential health benefits.

Capparis Brevispina

Botanical information:

Capparis brevispina DC, a significant medicinal plant in India, belongs to the *Capparis* genus, which is a key part of the *Capparaceae* family [4]. This plant is characterized as a shrub, notable for its thorny stipules, tough, leathery leaves, and distinct white flowers. The berries of *Capparis brevispina* have an ovoid to ellipsoid shape [5]. *Capparis brevispina* is one of the examples for secondarily balanced tetraploids. [6]

The *Capparaceae* family, to which this plant belongs, is predominantly found in tropical regions. This species is native to the region spanning from India to Assam and Srilanka, where it thrives a shrub or tree, predominantly in the seasonally dry tropical biome [7]. This family comprises various forms of vegetation, including herbs, shrubs, and in some cases, even small trees. Many of these plants, whether they are erect or climbing, are adapted to thrive in warm climates. Across the world, the *Capparaceae* family is quite diverse and expansive, encompassing around 39 genera and approximately 650 species. This widespread distribution underscores the ecological and botanical significance of the family, particularly in warmer parts of the globe [8]. *Capparis brevispina* DC's prominence as a medicinal plant in India highlights the important role that plants from the *Capparaceae* family play in traditional medicine systems, especially in regions with rich biodiversity and long-standing herbal medicine traditions. This species, with its unique physical characteristics and medicinal properties, contributes to the diverse and valuable botanical heritage of the *Capparaceae* family.

Taxonomy:

Root: Root

Kingdom: Plantae

Phylum: Tracheophyta

Class: Magnoliopsida

Order: Capparales

Family: Capparaceae

Genus: *Capparis*

Species: *Capparis brevispina* DC. [9]

The Indian caper scientifically known as *Capparis Brevispina* DC is known by different vernacular names in different parts of India, indications its wide acceptance and use in traditional practices:

In Tamil it is called as **Adanda, kattukanji**.

In Oriya, they are called by names such as **lepara, lephra, nepheda and nipura**.

In Malayalam it is known as **chedimukanthi**.

In Marathi **govindha phalam** is known as **vagathi**.

This plant usually grows as a climber and is commonly found in coniferous forests [3]. It is known to occur in occasional clusters in plains and coniferous forests, showing adaptation to specific ecological niches Indian caper flowering and fruiting period from January to September. The prickly thorns of this plant are distinctive. Indian caper leaves are short and vary in shape from broadly lanceolate to ovate, typically pointed and mucronate, with a smooth base. The flowers of this plant are particularly remarkable, being large at around 2 inches in diameter, with the top two flowers often yellow and displaying distinctive blue anthers. Indian caper fruits are plump and yellow when ripe.

- Short, spiny stipules are relatively straight.
- Leaves are short petiole, broadly lanceolate, oval with a leathery texture, smooth surface, and net like veined pattern, appearing paler on the underside.
- Slender, solitary, 1- flowered pedicels arising from the leaf axils, shorter than the leaves.
- An oblong ovary densely covered in fine hairs.
- A nearly spherical and smooth berry as a fruit [10]. This concise botanical overview captures the unique features of *Capparis Brevispina*, highlighting its distinct leaf morphology, flower characteristics and fruit structure.[11]

Distribution of Indian caper is common in the Malabar region and thrives mainly in dry rocky soils [5]. This habitat preference highlights its ability to adapt harsh and low yielding environments, making it a resilient plant in the Capparaceae family widely used traditionally by Indians; cultural diversity also highlights the importance of medical plants in the region.



CHEMICAL CONSTITUENTS:

The chemical constituents which are reported in *capparis brevispina* species are alkaloids, flavonoids, saponins, terpenoids. [12] Antioxidant activity against 2,2-difenil-1-pikrilhidrazil (DPPH), 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid (ABTS), and phosphomolybdenum assays has been reported for *Capparis brevispina* based on the research.

PHARMACOLOGICAL PROPERTIES OF CAPPARIS SPECIES:

Species such as *Capparis mooni* and *Capparis tomentosa* are reported to treat tuberculosis [13]. *Capparis decidua* is used to treat diabetes and hypercholesterolemia [14].

The seed of *Capparis seiparia* and fruit of *Capparis zeylanica* were used as antidotes for snake bite [15]

Recently more interest has been raised towards *Capparis spinosa* due to its large amount of bio active ingredients.it is found to have various pharmacological activities like antioxidant, anti-microbial, rheumatism, gout, anti-cancer and hepatoprotective effects.



Capparis spinosa possesses anti-tubercular properties and is widely used in ayurvedic preparations to treat acute viral hepatitis and cirrhosis [16].

Plants species of *Capparis* family currently includes: [17]

1. *Capparis acutifolia* (sweet)
2. *Capparis annamensis* (baker f.)
3. *Capparis anomala* (F. Muell)
4. *Capparis arborea* – Brush caper
5. *Capparis artensis*
6. *Capparis assamica*
7. *Capparis batianoffii*
8. *Capparis beneolens*
9. *Capparis bodinjeri*
10. *Capparis brachybotrya*
11. *Capparis brassji* DC
12. *Capparis Brevispina* DC
13. *Capparis burmanica*
14. *Capparis buwaldae*
15. *Capparis callophylla*
16. *Capparis canescenes*
17. *Capparis cantoniensis*
18. *Capparis Cartilaginea*
19. *Capparis cataphyllosa*
20. *Capparis chingiana*
21. *Capparis chrysomeia*
22. *Capparis cinerea*
23. *Capparis cleghornii*
24. *Capparis corymbosa*
25. *Capparis cucurbitina*
26. *Capparis daknongensis*



27. *Capparis danielii*
28. *Capparis dasyphylla*
29. *Capparis decidua*
30. *Capparis diffusa*
31. *Capparis dioica*
32. *Capparis diyaricata*
33. *Capparis diyersifolia*
34. *Capparis dongyanensis*
35. *Capparis enchinocarpa*
36. *Capparis erycibe*
37. *Capparis erythrocarpos*
38. *Capparis fascicularis*
39. *Capparis fengii*
40. *Capparis flayicans*
41. *Capparis flouribunda*
42. *Capparis florida*
43. *Capparis fohaiensis*
44. *Capparis formosana*
45. *Capparis fusifera*
46. *Capparis gialaiensis*
47. *Capparis grandideri*
48. *Capparis grandiflora*
49. *Capparis grandis*
50. *Capparis hainanesis*
51. *Capparis henryi*
52. *Capparis hereroensis*
53. *Capparis hinnamnoensis*
54. *Capparis humistrata*.
55. *Capparis hypovellerea*



56. *Capparis incanescens*
57. *Capparis Irene*
58. *Capparis jacobsii*
59. *Capparis kbangensis*
60. *Capparis keberensis*
61. *Capparis khuamak*
62. *Capparis klossii*
63. *Capparis kollimalayana*
64. *Capparis lanceolaris*
65. *Capparis lanceolatifolia*
66. *Capparis laotica*
67. *Capparis lasiantha* .
68. *Capparis lianosa*
69. *Capparis lobbiana* .
70. *Capparis longestipitatae*
71. *Capparis loranthifolia*
72. *Capparis lucida* .
73. *Capparis macleshii*
74. *Capparis macrantha*
75. *Capparis masaikai*
76. *Capparis mekongensis* .
77. *Capparis membranifolia*
78. *Capparis micracantha*
79. *Capparis micrantha* .
80. *Capparis mitchellii* – wild orange
81. *Capparis monantha*
82. *Capparis mooni*
83. *Capparis multiflora*
84. *Capparis nilgiriensis*



85. *Capparis nobilis*
86. *Capparis nummuaria*
87. *Capparis olacifolia*
88. *Capparis ormana*
89. *Capparis pachypylla*
90. *Capparis paryifolia*
91. *Capparis poggei*
92. *Capparis pranensis*
93. *Capparis pseudocerasifera*
94. *Capparis pubiflora*
95. *Capparis pubifolia*
96. *Capparis pyrifolia*
97. *Capparis quiniflora*
98. *Capparis radula*
99. *Capparis ramonensis*
100. *Capparis rheedei*
101. *Capparis richardii*
102. *Capparis rigida*
103. *Capparis rotundifolia*
104. *Capparis roxburghii*
105. *Capparis rufidula*
106. *Capparis sabiifolia*
107. *Capparis sandwichiana*
108. *Capparis sarmentosa.*
109. *Capparis scortechinii*
110. *Capparis sepiaria*
111. *Capparis shanesiana .*
112. *Capparis sheyaronis*
113. *Capparis siamensis*



114. *Capparis sikkimensis*
115. *Capparis spinosa*
116. *Capparis srilankensis* .
117. *Capparis subsessilis*
118. *Capparis subbisiniana*
119. *Capparis tagbanururun*
120. *Capparis tchaourenbensis*
121. *Capparis tenera*
122. *Capparis thorelii*
123. *Capparis thozetiana*
124. *Capparis tomentosa*
125. *Capparis tonkinensis* .
126. *Capparis trichocarpa*
127. *Capparis trinervia*
128. *Capparis trisonthiae*
129. *Capparis umbonata*
130. *Capparis urophylla*
131. *Capparis velutina*
132. *Capparis versicolor*
133. *Capparis viburnifolia*
134. *Capparis viminea*
135. *Capparis wui*
136. *Capparis vunnanensis*
137. *Capparis zeylanica*
138. *Capparis zippelian*

PHARMACOLOGICAL PROPERTIES AND ACTIVITIES OF CAPPARIS BREVISPIINA:

The plant *Capparis Brevispina* is known to reduce fever widely used as a stomachic, tonic and wound healing medicine and also have hepatoprotective activities. The main pollinators are birds and butterflies. According to the Sri Lanka conservation status of fauna and flora the *Capparis Brevispina* is an endangered plant. It is likely that when bioactive compounds are found in one species more species of the same genes may contain active compounds of similar nature. Other phytoconstituents such as alkaloids,



flavonoids, glycosides, steroids, protein, phenols tannins, terpenoids cardiac glycosides were found in the extract of methanol and diethyl ether.

Antimicrobial activity, Antioxidant and cytotoxic activities: [18]

The anti-microbial study conducted on different extracts of Capparis Brevispina revealed minimal inhibition against gram negative bacteria and selected fungi, while exhibiting resistance against gram positive bacteria. Notably ethanol and water extracts displayed significant antioxidant activity across all three methods employed. Moreover, the water extracts demonstrated higher flavonoid and phenolic content compared to other extracts. Flavonoids such as quercetin, showed cytotoxic effects against the human cancer cell line [16]. Among all the extracts, the water extract exhibited higher phenolic and flavonoid content. It is evident in the water extract of Capparis Brevispina. Due to the promising properties of aqueous extracts, they were selected for further analysis of their anti-cancer potential against the HeLa cell line using MTT assay. This assay is a common method for assessing cell viability and proliferation by measuring metabolic activity.

Hepatoprotective activity:

The research article suggests that initial investigations have revealed the presence of flavonoids within the stem bark of Capparis Brevispina, indicating their potential role in conferring hepatoprotective benefits. Flavonoids, commonly encountered in everyday diets, are renowned for their liver – protective attributes. Ongoing research endeavors seek to pinpoint the specific active flavonoids in Capparis Brevispina responsible for hepatoprotection. Overall the study affirms that Capparis Brevispina stem bark demonstrates robust hepatoprotective effects against paracetamol - induced liver injury in rats, accompanied by noteworthy antioxidant properties [19].

Advantages of using Capparis Brevispina:

1. **Antioxidant activity:** studies have shown that leaf extracts of Capparis Brevispina exhibit significant anti-oxidant properties which helps in combating oxidative stress and reducing cell damage.
2. **Cytotoxic effects:** the plant has demonstrated by cytotoxic activities, suggesting a potential role in fighting cancer cells.
3. **Phytochemical Richness:** Capparis Brevispina is a source of valuable phytochemical compounds that can have various physiological functions, contributing to overall health and well-being. [18]
4. **Medicinal Potential:** The plant's extracts have shown antimicrobial properties, indicating possible applications in fighting against harmful microorganisms.

These advantages highlight the potential of Capparis Brevispina as a natural remedy with diverse health benefits.

Conclusion:

Among the large family of Capparaceae, the Capparis Brevispina is one of the diverse ones. This species distinguishes itself by its botanical characteristics, ecology, and adaptation, not to mention the immense medical potential. This paper seeks to portray the extensive use of the plant in traditional medicine, especially where modern healthcare might be lacking, for example, Myanmar and parts of India. The chemical components in Capparis Brevispina are constituted by alkaloids, flavonoids and saponins, giving its pharmacological activities, which include antioxidant, anti-microbial, hepatoprotective and cytotoxic activities. Thus one of the criteria that may help plants to get adapted to harsh environmental conditions is its ecological resilience. Another reason the plant seems to have made an important part of the local flora areas like the Malabar region. On the subject of therapeutic values, traditional knowledge supported by scientific studies point out that the species Capparis Brevispina may make a very significant contribution towards developing drugs against ailments like liver diseases, cancerous conditions, and bacterial infections. Therefore considering the status of this species as being endangered in some parts, the conservation of it is very critical. In future, more studies of this plant are expected to elucidate additional bioactive compounds available in Capparis Brevispina so that one can realize its potential in modern medicine while being conserved for future generations. Generally, Capparis Brevispina provides a promising avenue for natural health solutions, hence acting a bridge between traditional practice and contemporary scientific inquiry.

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How to cite this article:

Asha Nandabaram et al. *Ijppr.Human*, 2024; Vol. 30 (9): 66-77.

Conflict of Interest Statement: All authors have nothing else to disclose.

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