A Review on Ethnobiological & Medicinal Potential of Capparaceae Family Plant: *Capparis decidua* (Forssk.) Edgew

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Abstract  Rajasthan state is rich in flora of xerophytic plants. *Capparis decidua* (Forssk.) Edgew. is a wild bushy plant found in hot arid regions. This plant has wide range of distribution in many parts of India. Ethnobiologically, this plant is useful as its various parts like immature flower buds, semi-mature fruits, young shoots with small leaves are pickled for use as a condiment and traditional people use this plant in treating ailments like digestive diseases, anodyne, sudorific, constipation, gout, cough, flu, dropsy, palsy, asthma, and intestinal worms, lumbargo, odontalgia. *Capparis decidua* (Forssk.) Edgew. contains chemical compounds like alkaloids, flavanoids, terpenoids, phenolic compounds, steroids, vitamins, quaternary ammonium compounds and many more phytoconstituents that are responsible for its medicinal value. Different parts of this plant like seed, root, stem, flowers, fruits and leaves have medicinal importance and has shown numerous pharmacological activities like antimicrobial, antibacterial, antifungal, anti-inflammatory, antioxidant, hepatoprotective, anthelmintic, antidiabetic, antisebum, antihyperlipidemic, antiscorbutic, antisyphilitic, antiplaque, analgesic, sedative and anticonvulsant. Economic importance of this plant has tended for harvesting, yield and marketing specifically in Thar Desert. Future potential of this crop is very promising as it is a drought and heat tolerant plant which makes it a good weather forecasting species; also it provides people with food (pickle & vegetable), fodder, wood and fuel. The presence of numerous phytoconstituents makes it a medicinally important crop for treating deadly diseases. This review covers taxonomy, distribution, phytochemicals, and nutritional value, traditional and pharmacological aspects of *Capparis decidua* (Forssk.) Edgew.

Keywords  *Capparis decidua* (Forssk.) Edgew., Xerophytic, Phytoconstituents, Pharmacological Activities

1. Introduction

The wild plants have been utilized by native community in a medicinal way to cure cuts, wounds, burns and other disease ailments having dietary or pathogenic origin. Rajasthan state is having extremely dry climatic conditions and local community is coupled with poverty and natural disaster like drought which is challenging for them to cope up with food and medicine. But the flora of this state comprises of drought resistant plants having photochemical and mineral ingredients to carry out nearly all biological reactions of body. [1-4]. As per the reports, it is estimated that about 70–80% of world population, especially in developing countries, depends on plant medicine to prevent and cure diseases. In addition, it has been reported that about 25% of the synthesized drugs are being derived from medicinal plants [4, 5]. *Capparis decidua* (Forssk.) Edgew. (Kair) is a multipurpose perennial woody plant, of caper family (Capparaceae), found chiefly in hot arid region of different parts of world. The caper family includes 650 species of plants found in 30 genera located principally in tropical and warm temperate regions. Nearly 26 of these species are reported to occur in India [6]. Because of its xerophytic adaptive nature this plants grows well under the harsh climatic conditions of arid regions. *Capparis decidua* (Forssk.) Edgew. is salt-tolerant and grows along saline hard planes in Thar Desert. Mature plants develop extensive root systems that penetrate deeply into the soil. Leaf stipules form into spines to reduce transpiration. It also protects birds and animals from scorching heat during summers. [7]

1.1. Taxonomical Classification [8]

Kingdom: Plantae
Division: Phanerogamae
Subdivision: Angiospermae
Class: Dicotyledoneae
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Subclass: Polypetalae  
Order: Thalamiflorae  
Suborder: Parietales  
Family: Capparaceae  
Genus: Capparis  
Species: deciduas

**1.2. Monograph**

Arabic: Hanbag, Kiabara, Margh, Sodab, Tundub  
Deccan: Karyal  
English: Caper berry, Caper bush, Caper plant  
Hindi: Kabra, Kachra, Karer, Karil, Karu, Kurrel, Pinju, Teent, Tent, Tenti  
Sanskrit: Apatra, Chakrak, Granthil, Gudhpatra, Kantaki  
Rajasthani: Kair, Kareal, Kerro, Taint  
Scientific Name: *Capparis deciduas*  
Family: Capparaceae  
Duration: Perennial  

Growth Habit: Grows abundantly in dry, arid and exposed habitat like wastelands, ditches, drying ponds, cultivated lands, road sides and surrounding plains of hills as it is tolerant to prolonged drought due to its excellent adaptation to arid conditions.

Nativity: Dry places in Sind, Baluchistan, Western Rajputana, Deccan Peninsula, Egypt, Socotra, Arabia, Tropical Africa, Central India, Punjab, Gujarat, Tinnevelly and Pakistan.

**2. Botanical Description**

*Capparis decidua* (Forssk.) Edgew.(Kair) is a spiny, much dense and slender branched, green twiggy looking shrub or small tree growing gregariously bearing dense spherical crowns. The stem bark is smooth, green when young and turns yellow or whitish grey as it matures [9]. Leaves are deciduous, glabrous, small caducous, succulent that appear for maximum of one month, on new shoots. New leaves sprout from January to November [10], being sessile with very short petioles, pointed and small (2–12 mm in length and 1–3 mm in width). Fruits are globose, borne on a long stalk, green when immature and red or pink when ripened. Ripe fruits contain a sweet yellow pulp with many seeds. Flowering occurs on young shoots of the current year. Narrow leaves and stipular spines on shoots help reduction in loss of water due to transpiration in extremely drought conditions. It has well developed tap root systems which uptake water within ground at a depth of up to 4m [11].

**3. Distribution in Hot Arid Regions of India**

The natural habitat of *Capparis decidua* (Forssk.) Edgew. is on the lowerside of plains all over the hot and dry regions, semi-stabilized dune peripheries [12]. *Capparis decidua* (Forssk.) Edgew. flourishes well on shallow hard soils and rocky outcrops but not on shifting sand dunes or water logged areas [13]. It grows abundantly in sandy, saline and gravelly soils of pH 6.5-8.5. It can tolerate temperatures as high as 50°C and as low as 0 °C. It has also been found to thrive well on saline sodic soils [14]. This species shows wide genetic variability in plant size, morphology, fruit production and dimorphism in seeds. [15] (Figure 1)

**Figure 1.** Map of India showing growth of *Capparis decidua* (Forssk.) Edgew.

**4. Commercial Use**

*Capparis decidua* (Forssk.) Edgew. has been cultivated since past for several purposes. Different parts of caper plant are utilized in the form of drugs, foods and cosmetics [16, 17]. The commercially significant parts of *Capparis decidua* (Forssk.) Edgew. are the immature flower buds, which are used as food in the form of curry, pickled in vinegar or preserved in granular salt and as condiment mostly by the people living around the desert. Semi-mature fruits are called as caperberries and young shoots with small leaves pickled for use as a condiment. The flavor of caper can be considered as similar to mustard and black pepper. The strong aroma of caper comes from mustard oil: methyl isothiocyanate (released from glucocapparin molecules) arising from crushed plant tissues. Mature and semi-mature
fruits are also eaten as a cooked vegetable after removal of bitterness and pungency by keeping in salt solution. Ashes obtained after incineration of caper roots may be utilized as a source of salt. In cultivating land this plant is grown to form hedges for protection [18]. *Capparis decidua* (Forssk.) Edgew. seeds are rich in oil, fibers and proteins. Seed oil contains prominent amount of oleic and linoleic acids. Hence, seeds can be used in various forms for food and feed [19]. *Capparis* is also used for landscaping, control of erosion and animal feeding [16, 17]. Capparis wood is moderately hard and heavy, resistant to termite attack [20] and is utilized for making tool handles, boat knees, burning fuel etc. [21]. In Rajput territory and Sudan, this plant is fed to camels and goats [22].

5. Harvesting, Yield and Marketing

Fruits

Plants grown through seed start bearing fruits at 6 to 7 years of age, and vegetative propagated plants start fruiting after four years. The harvesting of the fruits is done manually. The thorns of the plant poses great difficulty for hand picking the fruits and natives collect the fruits by beating the crown with wooden sticks. The fruits are sold fresh in the local markets. The fresh fruits show astringency due to tannins and phenolic compounds. The astringency is removable by immersing fruits in a 5% solution of common salt, or in butter milk, for 4-5 days in an earthen pot. After the removal of astringency, the green fruits can be made into a vegetable or they can be preserved by sun drying for use in the off season. The dried fruits, with 5-7% moisture, can be preserved for 2-3 years in airtight containers and can be marketed later. Fruits can also be exported to foreign, urban and national markets. [23]

6. Traditional & Therapeutic Uses

*Capparis* species have been utilized in medicine since ancient times. These plants were used first time about 2000 years BC by Sumerians [24, 25]. The roots, flowers, and fruits of these plants with potential medicinal benefits, have been in use since that time against infectious diseases without any side effects [26]. Sharma and Kumar (2008)[27] suggested that the biological effects of *Capparis decidua* (Forsk.) Edgew may be ascertain to presence of antimicrobial bioactive compounds, like phenolics, flavonoids, polyamine alkaloids, glucosinolates, and vitamins that decrease the growth of microorganism, and are negligibly harmful for their hosts. The medicinal use of *Capparis decidua* (Forsk.) Edgew is also mentioned in ancient books. By Kavirajas, the plant is regarded as acrid, laxative, counterirritant and stimulant. They often prescribe it in heart diseases, colic pains, scurvy and phthisis [22]. The plant act therapeutically in flatulence, anorexia, respiratory disorders, skin diseases, in general weakness and also act as anthelmintic and diuretic [28,29]. Infusion of *Capparis decidua* (Forssk.) Edgew is used externally for eruptions, boils, joint diseases and internally in cough and as an antiodote in case of poisoning. Juice of fresh plant is used to kill worms in ear. It acts as a good substitute of senega [22, 30]. Crushed bark is applied as poultice for treatment of wounds [31]. Roots are acts as sudorific, thermogenic, expectorant, carminative, digestive, stimulant, antibacterial, aphrodisiac, anodyne, anthelmintic and useful in arthritis, dyspepsia, constipation, lumbago, odontalgia, amenorrhoea and dysmenorrhoea [32]. Root bark is known to be astringent, alterative, acrid, diaphoretic, alexeteric. Powder or infusion of root bark is used in gout, rheumatism, cough, dropsy, palsy, asthma, intestinal worms and intermittent fever. The root powder is applied externally on malignant ulcer [33]. Coal paste obtained after burning the wood is applied to muscular injuries [34]. Fresh leaves and young shoots, when chewed, relieves toothache immediately [35]. The local people of India and Pakistan consider caper fruits having anti-diabetic, eye smoothing, and laxative properties so, they use caper fruits in pickles and curry [22, 28, 31, 36]. Hakeems in India, suggest using Caper fruit powder mixed with sugar ameliorate rheumatism and diarrhea in livestock animals. Plants of genus *Capparis* contain spermidine, glucosinolates, alkaloids, phenols, glycosides, and flavonoids, which have various pharmacological properties [37-41] and anti-inflammatory activities [42]. Polyamine alkaloid called as spermidine, reported in caper species, delays aging in yeast, flies, worms, and human immune cells through the induction of autophagy [43]. Pichiah et al. (2011) [44] suggested that spermidine is used for treating type 2 diabetes. *Isoodonocarpine*, isolated firstly from *Capparis decidua* (Forsk.) Edgew, found useful against inflammation and asthma [36]. β-Sitosterol showed a significant anti-inflammatory activity, similar to indomethacin, in cageenan-induced rat paw edema. β-sitosterol showed to inhibit ear inflammation induced by multiple applications of tetradecanoylphorbol-13-acetate in mice. It also inhibited adjuvant-induced rat paw edema by inhibition of cyclooxygenase and 5-lipoxygenase pathways [45]. Phenols, flavonoids, and indoles are reported as bioactive constituents with anti-inflammatory effects in many other plants [46, 47]. Compounds extracted from Capparis species have also shown to be useful for controlling the metabolism of lipids. Alcoholic extracts of bark, flowers, and roots of *Capparis decidua* (Forsk.) Edgew reduced cholesterol, triglycerides, LDL (low-density lipoproteins), and VLDL (very low-density lipoproteins) levels [48], whereas, *Capparis decidua* (Forsk.) Edgew fruit extract showed beneficial effect on blood sugar levels, glycated hemoglobin levels, and lipid profiles in diabetic and normal male rats. Rahmani et al. (2013) [49] study concluded that consumption of *Capparis decidua* (Forsk.) Edgew fruits might decrease levels of sugar in blood and improve lipid
profile. Various uses of *Capparis decidua* (Forssk.) Edgew. are shown in Table 1.

### 7. Nutritional Value

Plants with adequate amount of protein, fiber, and essential minerals are valued for livestock and human nutrition [57-60]. *Capparis* species contain minerals in floral buds and fruits, which are used as vegetable and is pickled. The buds and fruit are also rich in protein, carbohydrates, lipids, and vitamins [55]. *Capparis decidua* (Forssk.) Edgew. is reported to have higher potassium content than several other nutritious trees. Kumar et al. (2013)[61] reported the presence of P(219.05 mg 100 g−1), Mg (49.16 mg 100 g−1), Fe (4.64 mg 100 g−1), Zn (0.31 mg 100 g−1), Cu (1.94 mg 100 g−1), Na (160.64 mg 100 g−1), proline (11.76 mg 100 g−1), Ca (3.24%), crude protein (14.94%), total carbohydrates (73.48%), soluble carbohydrates (18.03%), starch (15.28%), crude fiber (10.94%), neutral detergent fiber (30.48%), hemicelluloses (11.45%), cellulose (8.91%), lignin (7.62%), crude fat (5.38%) and total ash (5.97%) in *Capparis decidua* (Forssk.) Edgew. fruits. Arginine is involved in rapid regeneration of adenosine triphosphate, cell proliferation, vasodilatation, neurotransmission, calcium release, and imparting immunity [62]. *Capparis decidua* (Forssk.) Edgew. berries acts as a good source of arginine. The *Capparis decidua* (Forssk.) Edgew. seed oil contains oleic acid, linoleic acid and palmitic acid in increasing order. So *Capparis decidua* (Forssk.) Edgew. seed oil is a healthy source of fatty acids and thus, can be used in diet. The mature fruits, young shoots with small leaves and immature fruits are pickled in vinegar or granular salt. The presence of reducing sugar, fats, vitamin C, antioxidants, alkaloids, and carotene makes it a dietary supplement [63]. *Capparis decidua* (Forssk.) Edgew. bud and ripened fruits extract are also used in the food processing industry as a flavor agent. [64]

### 8. Chemical Constituents

Isocodonocarpine (A), Spermidine alkaloid (B), Capparisinine (C), Capparidisine (D), Capparine, and capparine have been isolated from Caper roots [48, 56]. Codonocarpine (E), capparisine (F), cadabacine-26-O-d-glucoside, and capparipine-26-O-d-glucoside have also been isolated from dry root bark of *Capparis decidua* (Forssk.) Edgew. plant [7, 48, 56, 65, 66, 67]. N-acetylated spermidine alkaloids- 15-N-acetyl capparipine (G), and 14-N-acetyl isocodonocarpine (H) obtained from the root bark of *Capparis decidua* (Forssk.) Edgew.. It can be considered that roots of Capparis species are rich in spermidine alkaloid compounds [54] and can be used as a natural source for isolation of these polyamine alkaloids for formation of phytomedicines. Spermidine and spermine polyamines exhibit antioxidant and anti-allergic activities, and suppression on glycation process. Spermidine is a class of multifunctional polyamines, found in some animals and microorganisms. Spermidine and spermine polyamines are essential in the proliferation, growth, and development of mammalian cells. These polyamines exhibit antioxidant and anti-allergic activities, and suppression on glycation process [68, 69]. Polyamines prevent arteriosclerosis and promote healthy hair growth attributed to their anti-inflammatory properties and cell proliferative properties [70-73]. β-Sitosterol (I), is a principal phytosterol present in several plant including *Capparis decidua* (Forssk.) Edgew. has partial antimicrobial effect through inhibition of cyclooxygenase and 5-lipoxygenase pathways. Flavonoids are known to be the most abundant plant compounds in human diet. Flavonoids are commonly found in cell vacuoles of the outer coloring parts of the flowers, fruits, and leaves [74] and show anti-stress effects in plants. Seemingly, the concentrations of phenolics and flavonoids vary depending on the extraction methods, genetic factors, and climatic/growing conditions of different sites [75, 76]. Baghiani et al. (2012) [77] reported that ethyl acetate extracts of *Capparis decidua* (Forssk.) Edgew. leaves showed higher amounts of phenolic compounds and flavonoids, followed by the chloroform extracts of roots. Mann et al. (2013) [78] also investigated that the content of different compounds in extracts of *Capparis decidua* (Forssk.) Edgew. alters depending on the solvent used. *Capparis decidua* (Forssk.) Edgew. fruits also contain carotene, ascorbic acid, phytic acid and oxalic acid.

According to previous studies, water extract from roots of Capparis species exhibited better purgative effect as compared to alcoholic extracts indicating that different extracts can exhibit different pharmacological potential [79, 80]. Oil extract from leaves of *Capparis decidua* (Forssk.) Edgew. contains phenyl propanoid, terpenoids, isothiocyanate, and n-alkalenes [81]. Recently, isothiocyanates have shown as anti-cancer agents [82, 83]. In another investigation, the oil extract of *Capparis decidua* (Forssk.) Edgew. showed presence of thymol, isopropyl isothiocyanate, butyl isothiocyanate, and 2-hexenol. Gupta and Ali [84] explored oxygenated heterocyclic constituents from the alcoholic extract of root-bark of *Capparis decidua* (Forssk.) Edgew. Quaternary ammonium compounds and alkaloids were isolated from *Capparis decidua* (Forssk.) Edgew. leaves [85, 86]. (Figure 2) (Table 2)
Table 1. Representation of traditional and therapeutic uses of various plant parts of *Capparis decidua* (Forssk.) Edgew. in treating different body ailments.

<table>
<thead>
<tr>
<th>Plant parts</th>
<th>Ailments</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roots and root barks</td>
<td>Digestive diseases, stimulant, anodyne, sudorific, constipation, Gout, cough, flu, dropsy, palsy, asthma, and intestinal worms, lumbago, odontalgia, and amenorrhoea, intermittent fever, arthritis, thermogenic, expectorant, carminative, aphrodisiac, anthelmintic, dyspepsia, astringent, diaphoretic, alexeteric</td>
<td>[32,50,51]</td>
</tr>
<tr>
<td>Leaves and young shoots</td>
<td>Toothache, swellings, and blisters, Hypercholesterolemia</td>
<td>[28,52]</td>
</tr>
<tr>
<td>Stem barks</td>
<td>Toothache, cough, asthma, intermittent fever, rheumatism, inflammation, kidney infection, and treatment of wounds as poultice</td>
<td>[31,53-55]</td>
</tr>
<tr>
<td>Fruits and flowers</td>
<td>Diabetes, respiratory diseases, skin, anthelmintic, diuretic, cardiac and biliousness diseases, anti-diabetic and eyesight smoothing properties, laxative potential, atherosclerosis, and plaque</td>
<td>[22,27,31,36,50,56]</td>
</tr>
</tbody>
</table>

(A) Isocodonocarpine

(B) Spermidine alkaloid

(C) Capparisinine
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(D) Capparidisine

(E) Codonocarpine

(F) Capparisine
(G) 15-N-acetyl capparisine

(H) 14-N-acetylcodonocarpine

(I) β-sitosterol
(J) l-Stachydrine

(K) Rutin

(L) Kaempferol-7-rhamnoside

Figure 2. Structure of various chemical constituents of *Capparis decidua* (Forssk.) Edgew. (A to L)
Table 2. Representation of chemical constituents found in various plant parts of *Capparis decidua* (Forssk.) Edgew.

<table>
<thead>
<tr>
<th>Plant Parts</th>
<th>Chemical constituents</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits</td>
<td>n-Triacontane, n-Pentacosane, β-Carotene, Carbohydrates, Proteins, Glucosinolates,</td>
<td>[56, 67]</td>
</tr>
<tr>
<td></td>
<td>n-Triacontanol, Tetrahydropryan-2-one, 2-Carboxy-1-dimethylpyrrolidine</td>
<td></td>
</tr>
<tr>
<td>Flower</td>
<td>Nonacosane, n-Triacontane, n-Pentacosane, n-Triacontanol</td>
<td>[48, 67]</td>
</tr>
<tr>
<td>Flower buds</td>
<td>n-Triacontane, n-Pentacosane, Quercetin, Isodulcite, Nonacosane</td>
<td>[22, 48, 67]</td>
</tr>
<tr>
<td>Shoots</td>
<td>Thymol, Isopropyl isoiothiocyanate, Butyl isoiothiocyanate, 2-Hexenol</td>
<td>[48]</td>
</tr>
<tr>
<td>Leaves</td>
<td>Phenol propanoid, Terpenoids, Isoiothiocyanate, n-Alkalenes. Thromiocnitrite, Kaempferol,</td>
<td>[81, 83, 85-88]</td>
</tr>
<tr>
<td></td>
<td>Quercetin, Isorhamnatin, rhamnocitrate, rhamnazin, quaternary ammonium compounds, alkaloids</td>
<td></td>
</tr>
<tr>
<td>Roots</td>
<td>Sitosterol, Spermidine alkaloid, Isocondonocarpine, Capparine, Capparicine, Cappariline,</td>
<td>[7, 13, 56, 48]</td>
</tr>
<tr>
<td></td>
<td>Codonocarpine</td>
<td></td>
</tr>
<tr>
<td>Root barks</td>
<td>Cadabacine-26-O-β-d-glucoside, Isocondonocarpine, Capparine, <em>Capparispine</em>,</td>
<td>[7, 48, 54, 65, 66]</td>
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<td></td>
<td>Capparicine, N-acetylated spermidine</td>
<td></td>
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<td></td>
<td>14-N-acetyl isodonocarpine, 15-N-acetylcapparisine, Rutin(K), 1-Stachydrine(β), β-Sitosterol, Terpenoids,</td>
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<td></td>
<td><em>Capparisesterpenolide</em></td>
<td></td>
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<tr>
<td>Seeds &amp; Seed oil</td>
<td>Glucocapparin, n-Pentacosane, n-Triacontanol, β-Sitosterol, Capric acid, Monoterpenes,</td>
<td>[25, 27, 67, 89]</td>
</tr>
<tr>
<td></td>
<td>Sesquiterpenes, Tocopherols (Vitamin E)</td>
<td></td>
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</tbody>
</table>

Table 3. Representation of pharmacological activities shown by various plant parts of *Capparis decidua* (Forssk.) Edgew. and phytoconstituents responsible for pharmacological activity

<table>
<thead>
<tr>
<th>Plant parts</th>
<th>Pharmacological activity</th>
<th>Phytoconstituents</th>
<th>References</th>
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<tbody>
<tr>
<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew. stems and flowers</td>
<td>Anti-bacterial, anti-fungal, antiparasitall activity</td>
<td>Quaternary ammonium compounds, Glucosinolate</td>
<td>[90, 91]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew. root, stem, fruit</td>
<td>Anti-microbial activity, anti-fungal activity</td>
<td>Phenolic and flavonoid compounds</td>
<td>[27, 92]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew. seeds</td>
<td>Anti-microbial activity</td>
<td>Isothiocyanate aglycon</td>
<td>[13, 93, 94]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew. leaves</td>
<td>Anti-oxidant activity</td>
<td>Phenolic compounds, Polyphenols, Tocopherols,</td>
<td>[95-97]</td>
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<td></td>
<td></td>
<td>Carotenoids</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew. leaves</td>
<td>Anti-plaque activity</td>
<td>Volatile oil-Thymol</td>
<td>[56, 98]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew. stem</td>
<td>Hepatoprotective activity</td>
<td>Flavonoids, Cytotoxic glycosides, Triterpenes,</td>
<td>[99]</td>
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<tr>
<td></td>
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<td>Vitamin C</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., root bark</td>
<td>Anthelminetic activity</td>
<td>Spermidine alkaloids, Tannins</td>
<td>[54, 100, 101]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., powdered fruit</td>
<td>Anti-diabetic activity</td>
<td>Alkaloids</td>
<td>[36, 102]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., Fruit &amp; shoot</td>
<td>Anti-sclerotic activity</td>
<td>Vitamins, Alkaloids, Phenolic compounds</td>
<td>[52, 103-106]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., fruit, flower, bark</td>
<td>Anti-hyperlipidemic activity</td>
<td>Saponins, Tannins</td>
<td>[52]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., plant</td>
<td>Anti-sebum activity</td>
<td>β-sitosterol, Essential fatty acids, Thioglucosides</td>
<td>[107]</td>
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<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., flowers, stem</td>
<td>Sedative and anticonvulsant activity</td>
<td>Alkaloids</td>
<td>[108]</td>
</tr>
<tr>
<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., stem</td>
<td>Analgesic and anti-nociceptive activity</td>
<td>Tannins, Diterpenes, Triterpenes, steroids</td>
<td>[109]</td>
</tr>
<tr>
<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., stem, root, root bark</td>
<td>Anti-inflammation activity</td>
<td>Isocondonocarpine, β-sitosterol</td>
<td>[36, 45]</td>
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<tr>
<td><em>Capparis decidua</em> (Forssk.)</td>
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<tr>
<td>Edgew., stem, flower</td>
<td>Anti-termite activity</td>
<td>Heneicosylhexadecanoate, triacontanol, 2-carboxy-1, 1-dimethylpyrrolidine, 6-(1-hydroxy-non-3-enyl)-tetrahydrophyran-2-one</td>
<td>[110]</td>
</tr>
</tbody>
</table>
9. Pharmacological Activities

Pharmacological activities of various parts of *Capparis decidua* (Forssk.) Edgew. have been shown in Table 3.

10. Conclusions

*Capparis decidua* (Forssk.) Edgew. has been used as an ethnic medicine in different parts of the world. Several researchers keenly participated and explored this plant for identifying, isolating, and extracting potential medicinal constituents which proved various pharmacological activities. Many of pharmacological activities have already been mentioned in text above but still a lot of focus needs to be addressed regarding this plant by scientists, chemists, pharmacists, microbiologists, and nutritionists. Despite the multitude of pharmacological activities shown by this plant some activities like antirheumatic, aphrodisiac which are traditionally well known but has not been authenticated by any researcher yet. Moreover clinical studies have not been conducted so far to conform to the results of preclinical studies.

Acknowledgements

We are very grateful to Prof. Kailash Agrawal & Dr. R. D Agarwal of Department of Botany, University of Rajasthan for their appropriate and constructive suggestions.

Conflict of Interest

Authors declare that there are no conflicts of interest.

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