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## Review Article

# CAPPARIS DECIDUA (FORSK.) EDGEW: A REVIEW OF ITS TRADITIONAL USE AND ANTIMICROBIAL ACTIVITIES

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### ABSTRACT

*Capparis deciduas* (Forsk.) Edgew, commonly known as Kair (in Hindi), Caper berry (in English) and Karira (in Sanskrit), belongs to the family Capparidaceae. It is important medicinal plant, found in subtropical and tropical zones and other arid regions in southern Asia. It is a densely branched shrub, reaching a height of 4-5 m, with clear bole of 2.5 m. Its branches are tender and waxy with rough, corky, gray bark. It is an important plant of traditional Indian System of Medicine (ISM) and is mainly used to treat cough, asthma, ulcers, boils, piles and as antidiabetic remedy, antihypertensive, hypolipidemic, hepatoprotective and anti-inflammatory. Traditional *Capparis deciduas* is widely used to treat the microbial infections due to their rich source of antimicrobial activity and less cost. The different plant parts such as seed, fruit, root, bark, stem, leaf and even the whole plant were extracted using different solvents. This plant extracts were tested by disc diffusion method against gram positive, gram negative bacteria and fungi to determine their antimicrobial activity. In the present review paper, antimicrobial properties of *C. decidua* reviewed. The present review deals with the antibacterial and antifungal activity of *C. decidua*.

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## INTRODUCTION

*Capparis decidua* (Forsk.) Edgew. (Capparaceae) commonly known as ker, karer, karira or caper etc., is a densely branched, spinous perennial shrub or tree of Thar desert. It is chiefly found in tropical and subtropical zones and other dry arid regions of southern Asia, occurring as a small shrub with many dark green vine-like apparently leafless tender branches with waxy bloom, hanging in the form of bundles. The bark is grey rough, corky and turns whitish-grey colour with age. The bark is covered with light brown straight or recurved, 3-7 mm long, paired thorns on twigs at each node. Very minute (2 mm) leaves with a very short life span occurs only on young shoots, so Vernacular names English; Caper plant, Caper berry, Gujarati; Ker, Kerada Hindi; Kachra, Kurrel, Karer, Kabra Kannada; Nispatige, Nispatigae, Niovate-gidda, Chippur, Karira, Kariuppi-gidda Marathi; Nepati Punjab; Kair, Karil, Delha (fruit) Rajasthan; Kair, Kareal, Kerro, Taint Sanskrit; Karira Tamil; Sengam, Karyal Telugu; Enugadanta, Kariramu (Gupta and Tandon, 2004). Plant looks leafless most of the time but new flush of leaves generally emerge in November-

January. The leaves are linear, 1-2 cm long, short apex, stiff, pale mucro-like in appearance. Groups of red, pink rarely yellow coloured flowers in lateral corymbs are present on leafless shoots or axils of spines. Red coloured conspicuous flowers bloom in March-April and August-September and ripe by May and October respectively. Berries (fruits) are many seeded globose or ovoid, 1-2 cm in diameter. Raw fruit is green in colour while ripe fruit is mucronate pink-red berry which becomes bluish-brown on drying. The seeds are globose in shape, 2-5mm in diameter. It produces root suckers freely and coppices well (Anonymous, 2000).

The plant shows strong resistance to harsh environmental conditions. Despite of the adverse conditions, it does not seem to show any water stresses hence resistant to drought and tolerates frost well. It also attracts helpful insectivores. *Capparis decidua* can be used in landscape gardening, afforestation and reforestation in the semi-arid and desert areas; it provides assistance against soil erosion and floods. The immature flower buds are pickled in vinegar or preserved in salts. Additionally, fruits with soft seeds are used for preparing

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vegetables, curry and fine pickles; the plant is also used as folk medicine (Ghosh, 1977).

### **Traditional Medicinal Importance of *C. Decidua***

The unripe fruits are considered anthelmintic and laxative and employed in the treatment of asthma, constipation, coughs, hysteria and other psychological problems (Ghazanfar, 1994). In traditional medicinal systems, it is regarded as laxative, astringent and vermifuge (Joseph and Jini, 2011). The root bark is prescribed for the treatment of toothache, intermittent fevers, asthma, cough, inflammations and rheumatism (Gupta, 2010). Fruits and seeds are regarded as diuretic, antidiabetic, astringent to bowels and said to be beneficial for cardiac troubles and seed oil is used to cure skin diseases (Singh *et al.* 2011). Fresh plant juice is used to kill ear worms in droplet form (Nadkarni, 2009). In Unani system of medicine, *C. decidua* is used as a tonic, aphrodisiac, carminative, emmenagogue, alexipharmic, appetizer, good for rheumatism, hiccough, lumbago, asthma and cough (Chopra, 2006). The top shoots and tender leaves powder has been used to treat blister, boils, swellings, eruptions and as poison antidote (Nadkarni, 2009). For the treatment of pyorrhoea, a decoction of ground stems and leaves has been used (Anonymous, 2007). Fruits of the plant are astringent and useful in heart problems. The tender flower buds and fruits have been used for making pickles. Traditionally Fruits are eaten either ripe or raw. Plant shows positive effects in treating facial paralysis, enlarged spleen and also used to kills intestinal worms (Gupta, 2010). It is also useful in heart diseases, phthisis and scurvy. Root powder with water is given in hepatic disorders (Shekhawat and Batra, 2006). For the treatment of haemorrhoids extract of root bark is given twice daily for 3 days (Jadeja, 2006). The plant has its medicinal properties in hypertension, diabetes, rheumatism and various gastric problems. Flower buds are used in stomach ache, paste of the root is applied on the scorpion bite. Stem coal powder is used for fractured bone treatment (Meenal and Yadav, 2010). Decoction of stem bark (10-15ml) is given two times a day in all pulmonary/respiratory disorders including asthma (Patil *et al.* 2008). The green immature fruits are considered antihelminthic and laxative and are employed in the treatment of asthma, constipation, coughs, hysteria and other psychological problems (Ghazanfar, 1994). The blanched fruit is used as a vegetable (Agarwal and Chavan, 1988). The seeds oil is edible when processed and also used to cure skin diseases (Singh *et al.* 2011).

### **Nutritional Importance of *C. Decidua***

The continuously increasing population coupled with poverty presents the problem of malnutrition especially in rural areas. Despite the government's large expenses on the livelihood of common people, the provision of balanced food and modern healthcare to rural people is still a far-reaching goal. Hence, it is recommended that researchers should resort to forms of nutraceuticals mainly in the native plant species to overcome the constraints of human necessities. Phytochemicals and minerals ingredients are necessary for virtually all reactions to occur in the body. While each has its own unique properties, they work synergistically to ensure reactions in the body occur appropriately. *C. decidua* contains appreciable amounts of tocopherols and vitamin C, which react with most reactive form of oxygen and protect unsaturated fatty acids from oxidation.

Unripe fruit (Teent) of *Capparis decidua* is a rich source of dietary fibers and is used to treat hypercholesterolemia. It significantly increased the fecal excretion of cholesterol as well as bile acids. The dietary fibre (42.88%) influenced total lipids, cholesterol, triglycerides and phospholipids of the liver to varying extents (Mahasneh, 2002). Fruit is a rich source of vitamin C, oils, minerals, sugar and protein (15.1%) that substantiate its nutritional value (Rai, 1987). Its seed oil contains minor and major nutritional mineral contents such P, Na, Mg, Fe and Ca and fatty acids, which are important dietary constituents.

### **Antibacterial and Antifungal Activities**

Bacteria have become resistant against the antibiotics because of the intensified clinical use of these drugs. Research in the field of microbiology is focusing on the management of these resistant bacterial strains. In this scenario, the importance of plants are being explored (Chan *et al.* 2007; Abirami *et al.* 2012; Gull *et al.* 2015). *C. decidua* possessed potent biocidal activity (Perez *et al.*, 2005, 2006a, 2006b., Upadhyay *et al.* 2010., Upadhyay, 2013). Different parts of the plant are found to be effective against different bacterial species (*Bacillus subtilis*, *Pasteurella multocida*, *Escherichia coli* and *Staphylococcus aureus*) (Gull *et al.* 2015).

Antibacterial capability of *C. decidua* is attributed to the wide array of phenolics and flavonoids present in the plant extracts (Zia-ul-Haq *et al.* 2011; Imran *et al.* 2014). Antimicrobial potential of different flavonoid compounds found in various parts of *Tridax procumbens* and *C. decidua* using disc diffusion assay (Sharma and Kumar, 2008). The experimental organisms were *E. coli* and *Proteus mirabilis* (Gram-negative bacteria), *S. aureus* (Gram-positive bacteria), and *Candida albicans* (Fungi). Microbroth dilution method was used for the determination of minimum inhibitory concentration (MIC) of the extracts, whereas minimum antimicrobial concentrations were determined by sub-culturing of relevant samples. The results clearly declared the significant antimicrobial activity of extracts from both *T. procumbens* and *C. decidua*. The order of vulnerability of the microbed was found to be *C. albicans* followed by *S. aureus*, *P. mirabilis* and *E. coli*. Caper extracts showed selective antimicrobial activity (Mali *et al.*, 2004). Isothiocyanate aglycon present in *C. decidua* seeds retarded the growth of gram negative bacteria such as *Vibrio cholera*, *V. ogava*, *V. inaba*, *V. eitor* and *V. eltor* (Gand *et al.* 1972; Joseph and Jini, 2011; Juneja *et al.* 1971).

The methanolic extracts of *C. decidua* wood, Bark and seeds exhibited potent concentration-dependent antifungal activity against *Aspergillus niger*, *A. flavus*, *C. albicans*, *Fusarium moniliforme*, *Phytophthora sp.*, *Penicillium sp.*, *Mucor sp.*, *Trichophyton mentagrophytes*, and *T. violaceum*. The bark showed maximum and wood demonstrated minimum activities. The range of inhibition zones of the plant extracts was found to be 17-22mm (Tlili *et al.* 2011; Tripathi *et al.* 2015; Abdalrahman *et al.* 2016). The fruit and flower extracts of *C. decidua* possessed potential to prevent the formation of plaque by inhibition of bacterial growth (Rathee *et al.* 2010a, 2010b). Fruit extract of *C. decidua* is reported to exhibit antitubercular activity (Bundeally *et al.* 1962; Abra and Ali, 2011).

## CONCLUSION AND FUTURE PROSPECTS

*Capparis decidua* (Forsk). Edgew. is a perennial shrub used in Ayurveda, Unani and Siddha system of medicine from ancient time. Literature survey reveals a wide spectrum of bioactivities of *Capparis decidua* either in the form of powder, extracts or in its isolated phytochemicals. *C. decidua* is a important in healthcare as a source of new pharmaceuticals. Multidrug resistance in human pathogenic bacteria as well as undesirable side-effects of certain antibiotics has led to the increasing interest in the search for new antimicrobial drugs of plant origin. This review suggests that some of the medicinal plants possess antimicrobial properties which could be used as antimicrobial agents for topical use and also for incorporation of the plant extracts into topical drug delivery systems. Thus plant extracts and biologically active compounds isolated from plant species may be used in herbal medicine efficiently. Topical antibacterial agents remain attractive alternatives to systemic agents because of their versatility. It may be concluded that *C. decidua* with activity against different pathogens can be used as antimicrobial agents in new drugs for therapy of infectious diseases in human. Owing to its richness in nutritional parameters, it can be used to address the problem of malnutrition in rural areas of developing countries. *C. decidua* can make an excellent crop for extreme arid zone of Rajasthan and Gujarat states where a few species can survive and can be domesticated.

## References

- Gupta A.K., Tandon N. 2004. Reviews on Indian Medicinal Plants, 5(Ca-Ce), ICMR; New Delhi.
- Anonymous. 2000. The Wealth of India, A Dictionary of Indian Raw Materials and Industrial Products, 2(C), CSIR, PID; New Delhi.
- Ghosh R.C.1977. Handbook of afforestation techniques, Dehradun.
- Ghazanfar S.A. 1994. Handbook of Arabian Medicinal Plants. CRC Press; Boca Raton, FL USA.
- Joseph B., Jini D. 2011. A medicinal potency of *Capparis decidua* - A harsh terrain plant. Res. J Phytochem, 5:1-13.
- Gupta R.K.2010. Medicinal and Aromatic Plants with Colour Plates-Traditional & Commercial Uses, Agrotechniques, Biodiversity, Conservation. 1st ed. CBS Publishers and Distributors Pvt. Ltd., Dehli, India., 114-115.
- Singh P., Mishra G., Sangeeta S., Srivastava K.K., Jha K., Khosa R.L.2011. Traditional uses, phytochemistry and pharmacological properties of *Capparis decidua*: An overview. Der Pharm. Lett., 3:71-82.
- Nadkarni K.M. 2009. Indian Materia Medica, Bombay Popular Prakashan, Reprinted, 3<sup>rd</sup> Edn., 1:265.
- Chopra R.N., Nayar S.L., Chopra I.C. 2006. Glossary of Indian Medicinal Plants. National Institute of Science Communication and Information Resources, New Delhi. 7th reprint, 49-50.
- Anonymous.2007. The Wealth of India: A Dictionary of Indian Raw Materials & Industrial products. National Institute of Science Communication and Information Resources, CSIR., 3:210.
- Shekhawat D., Batra A. 2006. Indian journal of traditional knowledge., 5(3):362-367.
- Jadeja B.A., Odedra N.K., Odedra K.R.2006. Indian journal of traditional knowledge., 5(3):348-352.
- Meenal K.L., Yadav B.L.2010. Indian journal of traditional knowledge., 9(1):169-172.
- Patil G.G., Mali P.Y., Bhadane V.B. 2008. Natural Product Radiance., 7(4):354-358.
- Agarwal V., Chavan B.M.1988. A study on composition of hypolipidemic effect of dietary fiber from some plant foods. Plant Foods Hum. Nutr., 38:189-197.
- Mahasneh A.M.2002. Screening of some indigenous Qatari medicinal plants for antimicrobial activity. Phytother Res., 16:751-753.
- Rai S. 1987.Oils and fats in arid plants with particular reference to *Capparis decidua* L. Trans. Indian Soc Des Technol., 12:99-105.
- Chan E.W.C., Lim Y.Y., Omar M.2007. Antioxidant and antibacterial activity of leaves of *Etilingera* species (Zingiberaceae) in Peninsular Malaysia. Food Chem, 104:1586-93.
- Abirami, P., Gomathinayagam, M., Panneerselvam, R. 2012.Preliminary study on the antimicrobial activity of *Encostemma littorale* using different solvents. Asian Pacific J. Trop. Med. 5 (7), 552-555.
- Gull, T., Sultana, B., Bhatti, I.A., Jamil, A. 2015. Antibacterial potential of *Capparis spinosa* and *Capparis decidua* extracts. Int. J. Agric. Biol. 17, 727-733.
- Perez, P.R., Omar, N.B., Abriouel, H., Lopez, R.L., Canamero, M.M., Galvez, A. 2005. Microbiological study of lactic acid fermentation of Caper berries by molecular and culture-dependent methods. Appl. Environ. Microbiol. 71, 7872-7879.
- Perez, P.R., Abriouel, H., Omar, N.B., Lucas, L.R., Canamero, M.M., Galvez, A. 2006a. Plasmid profile patterns and properties of pediococci isolated from caper fermentations. J. Food Prot. 69, 1178-1182.
- Perez, P.R., Abriouel, H., Omar, H.B., Lucas, R.L., Canamero, M.M., Galvez, A. 2006b.Safety and potential risks of enterococciisolated from traditional fermented capers. Food Chem. Toxicol.44, 2070-2077.
- Upadhyay, R.K., Ahmad, S., Tripathi, R., Rohtagi, L., Jain, S.C., 2010. Screening of antimicrobial potential of extracts and pure compounds isolated from *Capparis decidua*. J. Med. Plants Res. 4,439-445.
- Upadhyay, R.K. 2013. Insecticidal properties of kareel plant (*Capparis decidua*: Capparidaceae) a desert shrub: a review. World J. Zoo. 8 (1), 75-93.
- Zia-ul-Haq, M., Cavar, S., Qayum, M., Imran, I., de Feo, V. 2011.Compositional studies: antioxidant and antidiabetic activities of*Capparis decidua* (Forsk.) Edgew. Int. J. Mol. Sci. 12, 8846-8861.
- Imran, I., Zia-ul-Haq, M., Calani, L., Mazzeo, T., Pellegrini, N.2014. Phenolic profile and antioxidant potential of selected plants of Pakistan. J. Appl. Bot. Food Qual. 87, 30-35.
- Sharma, B., Kumar, P. 2008. Extraction and pharmacological evaluation of some extracts of *Tridax procumbens* and *Capparisdecidua*. Int. J. Appl. Res. Nat. Prod. 1 (4), 5-12.

29. Mali, R.G., Hundiwale, J.C., Sonawane, R.S.R., Patil, N., Hatapakki, B.C. 2004. Evaluation of *Capparis decidua* for anthelmintic and antimicrobial activities. *Indian J. Nat. Prod.* 20, 10-13.
30. Gaind, K., Juneja, T., Bhandarkar, P. 1972. Volatile principle from seeds of *Capparis decidua*. Kinetics of in vitro antibacterial activity against *Vibrio cholerae* ogava, inaba, and eltor. *Indian J. Pharm.* 34, 86-88.
31. Joseph, B., Jini, D. 2011. A medicinal potency of *Capparis decidua*-aharsh terrain plant. *Res. J. Phytochem.* 5, 1-13.
32. Juneja, T., Gaind, K., Panesar, A. 1971. Investigations on *Capparis decidua* Edgew; study of isothiocyanate glucoside. *Panjab Univ. Res. Bull.* 21, 519-521.
33. Tlili, N., Elfalleh, W., Saddaoui, E., Khaldi, A., Triki, S., Nasri, N. 2011. The caper (*Capparis L.*): ethnopharmacology, phytochemical and pharmacological properties. *Filoterapia* 82, 93-101.
34. Tripathi, Y.C., Singh, S., Anjum, N., Srivastava, K.K. 2015. Antifungal activity of *Capparis decidua* extracts against seed-borne pathogenic fungi. *World J. Pharma. Sci.* 4 (10), 1500-1512.
35. Abdalrahman, A.A.A., Eltigani, S., Yagi, S. 2016. Biological activity of extracts from *Capparis decidua* L. twigs. *J. Med. Plant Res.* 10(1), 1-7.
36. Rathee, S., Rathee, P., Rathee, D., Rathee, D., Kumar, V. 2010a. Phytochemical and pharmacological Potential of Kair (*Capparis decidua*). *Int. J. Phys.* 2, 10-17.
37. Rathee, S., Mogla, O.P., Sardana, S., Vats, M., Rathee, P. 2010b. Antidiabetic activity of *Capparis decidua* Forsk Edgew. *J. Pharm. Res.* 3 (2), 231-234.
38. Bundeally, A.E., Shah, M.H., Bellare, R.A., Deliwala, C.V. 1962. Antitubercular activity of *Capparis* fruits. *J. Sci. Ind. Res. C Bio. Sci.* 21, 305-308.
39. Abra, H.H., Ali, M. 2011. Phytochemistry and bioactivities of ahars terrain plant: *Capparis decidua* (Forsk.) Edgew. *Nat. Prod. Ind. J.* 7 (4), 222-229.

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