

***Karīra* (Capparis decidua Edgew.) – An Important Medicinal Plant of Arid Zone**

Dipti^{1*} and M.L. Jaiswal²

^{1,2}PG Department of Dravyaguna Vigyan, National Institute of Ayurveda, Jaipur, Rajasthan, India

Abstract

Karīra (Capparis decidua Edgew.) belongs to Capparidaceae family commonly known as *kair*. It is an important plant of xerophytic zone. It is densely branched shrub reaching a height of 4.5 cm, with a clear bole of 2.5 cm. In Védika literature, it has been described as having *krimighna* properties while in Ayurveda saṁhitā it is categorized under phala varga and śāka varga. Thus, *Karīra* is included both in *āhāra dravya* and *aushadh dravya*. This plant has its wider utility in traditional folk medicine and is used as ailments to relieve pain, toothache. Various *nighaṇṭu* emphasizes on its therapeutic values. It is useful in cough, asthma, inflammation, cardiac troubles, intermittent fevers and rheumatism etc. Being a desert plant, its different part possesses diverse chemical constituents which are of great medicinal and nutritional value. In this present paper medicinal uses of *Karīra* will be discussed.

Keywords

Karīra, Krimighna, Āhāra dravya, Aushadh dravya, Therapeutic



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INTRODUCTION

Karīra – a plant of capparidaceae family has wider therapeutic values in folklores. The genus *Capparis* comprises of 250 species including shrubs, trees and woody climbers¹. Out of these, 26 species of this genus occurs in India². *Capparis decidua* (Forsk.) Edgew is locally called as kair, karel, karer, karil, karu etc¹ grows under exposed habitat, dry places, often on foothills and in wastelands. It is mainly found in dessert areas, commonly found in Rajputana, Punjab, Sind³ and southwards to Tamil Nadu and Karnataka⁴, this plant is growing wildly in Western Ghats, Rajasthan and Gujarat⁵. Total 44% species of vascular plants are present and *Karīra* considered as one of the most important floras among them which comes under 'biodiversity hotspots'⁶. Distribution of *Karīra* is over 3540 km in piedmont plains of Jodhpur and Bikaner district in Rajasthan and the annual production of fruit is around 7,000 tons². People who lived in dessert areas used *Capparis decidua* for many purposes⁷. Caper buds are both wild-collected and cultivated⁸; cultivated plants are usually spineless. Cultivation is done under well drained, sandy soil in sun⁸. Propagation of plant is done after seed sowing in autumn or

spring; or even it can be grown by ripe woodcutting in summer at 19-24°C (66-75°F)⁸. *Karira* has wider therapeutic values. In *vedic vangmaya*, *Karīra -ishti yagya* have been mentioned indicating its antimicrobial activity. Similarly, It has been described as *krimighna* in *Kauśika sūtra*^{9,10} and *Kaiyadeva nighaṇṭu*¹¹. It is *vraṇanāśaka*, *garaviṣaghna*, *arśoghna* and *śophaghna*¹² etc. In Ayurveda texts, tender fruit of *Karīra* has been used as *āhāra dravya* and *Aushadh dravya* indicating its nutritional and medicinal values. In *siddha bhaiṣaja maṇimala*, tender fruit of *Karīra* has been used in bleeding piles as *auśadha dravya*¹³ and it is also used as *āhāra dravya* for preparing pickles¹⁴ and vegetables. It has been described in *Phala varga* and *Shaka varga* indicating its great nutritional value. It possesses diverse chemical constituents which are of great medicinal and nutritional value.

MORPHOLOGY

Capparis decidua (Forsk.) is a densely branched shrub or a small tree with scanty, small caducous leaves found only on young shoots. It is usually found in dry places of rajputana, punjab and sind. The round, fleshy, reddish pink fruits and the flower

buds are edible and are commonly pickled. Immature branches have waxy bloom; bark is greyish in color with rough and corky appearance which is covered by straight or curved approximately 3-7 mm long paired spines; leaves which comes on tender branches are 1-2 cm long, caduceus, linear, apex is short, stiff in nature, petioles are short, stipular thorns are generally long, pin pointed, straight with orange yellowish color¹⁵; flowers are commonly either red or pink but sometimes they are yellow also, in lateral corymbs pattern; fruit is round or ovoid having dull red color with diameter of 1-2 cm¹⁶, the fruit is hard woody in nature having 1-2 mm thick brownish rind; pedicel's are short and brittle; bitter in taste; strong and foetid odour¹⁷, seeds are globose having diameter of 2-5 mm¹⁶, dried seeds are kidney shaped having length, width and thickness of 4-5 mm, 3-4 mm and 1.5- 2 mm which is surrounded by white greyish fleshy aril¹⁶, the whole surface of seed have fine network of uniformly distributed shallow depressions, seed coat is very hard and black in color having pitted surface⁸, hilum is found in small depressions on the edges of the seeds towards the pointed ends⁸.

CLASSIFICATION

According to various *samhitā* and *nighantu*

<i>Caraka samhitā</i>	<i>Phala varga, tikta skandha</i>
<i>suśruta samhitā</i>	<i>Phala varga, tikta varga</i>
<i>Aṣṭāṅga hṛdaya</i>	<i>śāka varga</i>
<i>Amarakōśa</i>	<i>vanauśadhi varga</i>
<i>Dhanvantari nighantu</i>	<i>āmrādi varga</i>
<i>Sōdhalanighaṇṭu</i>	<i>āmrādi varga</i>
<i>Nighaṇṭuśēṣa</i>	<i>vṛkṣa kāṇḍa</i>
<i>Abhidhānaratnamāla</i>	<i>svādu skandha, kaṣāya skandha</i>
<i>Mādhava Dravyaguṇa</i>	<i>phala varga, śāka varga</i>
<i>Siddhamantra</i>	<i>kaphavātaghna varga, pittakaphaghna varga</i>
<i>Hṛdayadīpaka nighaṇṭu</i>	<i>ekanāma varga</i>
<i>Madanapālanighaṇṭu</i>	<i>śāka varga</i>
<i>Kaiyadēvanighaṇṭu</i>	<i>auśadhi varga</i>
<i>Bhāvaprakāśanighaṇṭu</i>	<i>vaṭādi varga</i>
<i>Rājanighaṇṭu</i>	<i>śālmalyādi varga</i>
<i>Rājavallabhanighaṇṭu</i>	<i>mādhyāhnika pariccheda</i>
<i>Priya nighantu</i>	<i>śarādi varga</i>

Taxonomic Classification⁸ of *Karīra*

Domain - *Eukaryota*

Kingdom - *Plantae*

Subkingdom - *Viridaplantae*

Phylum - *Tracheophyta*

Subphylum - *Euphyllophytina*

Class - *Magnoliopsida*

Subclass - *Dilleniidae*

Order - *Capperales*

Family - *Capparaceae*

Subfamily - *Capparoidae*

Tribe - *Capparae*

Genus - *Capparis*

Species – *Decidua*

CLASSICAL NAMES AND ITS INTERPRETATION¹⁸:

Karīra - It has *mala* (waste product of body), *visha* (toxic elements) and *kapha hara* properties or which causes irritation to elephants or It bears more spines and grows near the burrial grounds.

krakara - While breaking its stem produces characteristics sound ‘*kra*.’

Granthila - *Karīra* has many nodes.

Chakra- Soft and round fruits.

Marubhūruha/ Marujanmā – Plant usually grows in arid zone.

gūḍhapatra - Small leaves on new shoots and the old branches staying leafless.

tīkṣṇakaṇṭaka - Branches are nodular with sharp spines.

śākapuṣpa- flowers are used to prepare vegetables.

VERNACULAR NAME: The plant name is available in the following languages

Sanskrit	Karira, karirah, tintiker
English	<i>Caper</i>
Hindi	Karel, karer, karil, karu, kurel, kurrel
Arabic	Hanbag, margh, sodab, tundub
Gujrati	Ker
Kannada	Nispatige, chippuri
Malayalam	Karimulli, karimullu
Punjabi	Karil, delha
Tamil	Sengam, senkam, sirakkali
Telgu	Enugudanta
Marathi	Nevati
Urdu	Titali, ab karir, kachia phal
Persian	Bergesodab
Rajasthan	<i>Kair, Dhalu</i>
Fruit	<i>Laddu</i>
Synonym	<i>Capparis aphylla</i> <i>Roth</i>

AYURVEDIC PROPERTIES¹⁹:

Rasa – *Katu, tikta rasa*

Guṇa - *laghu, rukṣa guṇa*

Vipāka - *kaṭu vipāka*

Vīrya - *uṣṇa vīrya*

Doṣaprabhāva – kaphavātaśāmaka

Part used: Fruit, stem, stem oil, root

CHEMICAL CONSTITUENTS²⁰:

Leaves and flowers possess steroids, Isocodoncarpine, Quercitin, Stachydrine, Vitamin C, Lutin, Rutin, tocopherols, fatty acids, protein, fiber, oils, minerals, sugar, protein and pro-vitamin A which shows hepatoprotective, anti-inflammatory, anticancer, wound healing, diuretic effects, antiviral, nutraceutical properties, respectively.

Flower buds have Tocopherol, Vitamin C glycosides, alkaloids that are anti-oxidants and Isothiocyanates that are Anticarcinogenic.

Fruits possess Biflavonoids which shows Anti-hypercholesterolemic activity, Isoginkgetin, Ginkgetin shows anti-inflammatory, Daucosterol, Uracil, stachydrine shows Anti-arthritis activity.

Mature fruit have Flavonoids, isoginkgetin, ginkgetin, isocodoncarpine show Anti-oxidant property, 5-(hydroxymethyl, Bis (5-formylfurfural) ether shows Anti-inflammatory property.

Seeds have Fatty acids, tocopherols, sterols, proteins shows Nutraceutical property.

Roots have Capparisinine,

Capparisesterpenolide that shows Anti-microbial property and Cappaprenol-12, Cappaprenol-13 shows Hepatoprotective action.

TRADITIONAL USES

In Rajputana, *Karīra* is used as camel fodder. Fresh plant juice is used to kill ear worms in droplet form³. In Unani system of medicine, *Karīra* is used as a tonic, aphrodisiac, carminative, emmenagogue, alexipharmic, appetizer, good for rheumatism, hiccup, lumbago, asthma and cough²¹. The top shoots and tender leaves powder has been used to treat blister, boils, swellings, eruptions and as poison antidote. When chewed they relieve toothache³. For the treatment of pyorrhoea, a decoction of ground stems and leaves has been used¹⁶. 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 kill intestinal worms²². It is also useful in heart diseases, phthisis and scurvy. Root powder with water is given in hepatic disorders²³. For the treatment of haemorrhoids extract of root bark is given

twice daily for 3 days²⁴. The plant has its medicinal properties in hypertension, diabetes, rheumatism and various gastric problems. Plant wood is strong and durable so had being used for the making of boundaries of wells and also used as fire wood²⁵. 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 treatment²⁶. Decoction of stem bark (10-15ml) is given two times a day in all pulmonary/respiratory disorders including asthma²⁷.

CLASSICAL USES²⁸

It has been used in both types of *arsha*. In bleeding piles, tender fruit of *Karīra* should be steamed and then dried in the sun and then it should be taken with supernatant fatty layer of curd in the morning. It pacifies bleeding piles. In dry piles; *Karīra* fruits, salt and *arka* mixed with *madya* (ayurvedic wine) and *amla dravya* (sours) should be burnt in closed heating. This alkali taken with tepid water; destroys dry piles. Fruit powder is taken to destroy oedema. Fruits of *Karīra* processed in closed heating and are mixed in curd along with salt, *yavakṣāra*, *jīraka*, *yavānī*, *trikaṭu*, *hingu* and then dried in the sun. In the night they are swallowed which act as laxative. It is used in

pādapraharṣa also. Oil extracted of the fresh stem of *Karīra* by *pātāla yantra* should be applied and rubbed on the affected part. It alleviates tingling sensation disorder caused by impure blood. The vegetables of *Karīra*, *sigru*, *paṭola* and *ārtagala* cooked in ghee are beneficial for eyes. *Caraka* has said that washing with decoction of *Karīra*, *dhava*, *nimba*, *arka*, *veṇṭuka*, *kośāmbra*, *jambu*. Root of *jhingini* and *vāsā* mixed with *sīdhu* of grapes and *sukta* removes discharge from vagina.

Various *nighaṇṭu* emphasizes on its therapeutic values. It has been described as *arśoghna*, *śophaghna* (Anti-inflammatory), *vraṇanāśaka* (wound healing activities), *śvāsāghna* (Antiasthmatic), *arucināśaka* (Appetizer), *Sarvashulanashak* (Analgesic), *chardighna* (Anti emetic), *yakṛtajita* (Hepatoprotective), *hṛḍya* (Cardioprotective) in various *nighaṇṭu*. These action and properties can be explained by different pharmacological activities.

Pharmacological activities

Śophaghna or Anti-inflammatory can be explained by the recent study in which ethanolic extract of aerial parts of *Karīra* are used and it shows anti-inflammatory activity³⁴. Isocodonocarpine is the chemical

found which shows anti-inflammatory activity³⁴.

Similarly *krimighna* property can be explained by the antimicrobial activity- root bark and seed had good antibacterial activity. In a research study it was found that ethanolic extract of *Karīra* is effective against staphylococcus aureus, Pseudomonas aeruginosa and Escherichia coli²⁹. Seed is having isothiocyanate aglycon which shows significant antibacterial activity³⁰. And also it was found to inhibit cell cultures of Vibrio cholerae, V. ogava, V. inaba and V. eltor³¹.

Yakritjit or Hepatoprotective activity has also proved. Pharmacological activity showed that methanolic and aqueous extract of *Capparis decidua* stems have significant protective activity against CCl₄-induced Liver toxicity in rats⁸. Anti-Hypercholesterolemic activity were seen on extracts of unripe fruits and shoots of *Capparis decidua* cause reduction in plasma triglycerides, total lipids and phospholipids. It appeared to operate through increased fecal excretion of cholesterol as well as bile acids³². Depressant activity of Capparidisine alkaloid from *Capparis decidua* is reported on heart rate and similar effect also comes on coronary flow. Maximum fall in coronary

flow was achieved at 1mg/ml. Study reported at 2 ng dose, contraction and heart rate both were increased and later dose dependant fall was observed in force of contraction upto 128 ng and in heart rate upto 32 ng³³. Antidiabetic activity of *Capparis decidua* fruit powder has been proved. It Decreases lipid peroxidation and alters free radical scavenging enzymes such as superoxide dismutase and catalase in kidney, liver, erythrocytes and heart in aged alloxan induced diabetic rats³⁵. Antihelmintic activities of Alcoholic extract of the fruit pulp, root bark are found and Purgative activity of aqueous extracts of roots of *Karīra* is seen³⁶. Hypolipidaemic activity of ethanolic extract of different parts that is, flower, bark, fruit and shoot of *Capparis decidua* were found in rabbits. The serum cholesterol level was reduced to 61% by fruit, 58% by flower, 48% by shoot and 28% by bark of *Capparis decidua* after a dose of 500 mg/kg body weight given to rabbits³⁷. Antiatherosclerotic activity of ethanolic extract of fruit was found in cholesterol fed rabbits³⁸. Antihypertensive activity of ethanol extract at a dose of 1-30 mg/kg exerted a dose dependent fall in heart rate and also in blood pressure in experimental animals³⁹. *Karīra* also possess

nutritional value mostly aerial parts like leaves, flowers and fruits of *Capparis decidua*. Plant contains many essential dietary elements such as fibers, proteins, minerals and vitamins. This plant keeps rich nutritional value, therefore used for supplements⁴⁰.

DISCUSSION & CONCLUSION

In present era of globalization the use of medicinal plant is on high demand. Further the use of modern medicine or synthetic medicine is very popular these days but leads to serious side effects and can cause a serious health hazard. In order to emphasize the use of medicinal plant for making natural drug this plant – '*Karīra*' has been taken and explored. It has great medicinal value and used in various traditional practices also. It is described as *āhāra dravya* and *Aushadh dravya* in *Ayurveda* text and also used in traditions for making curry and pickles. It has been described as *krimighna*, *vraṇanāśaka*, *garaviṣaghna*, *arśoghna*, *hṛdya*, and *śophaghna* etc in *Ayurveda* texts and various nighantus which can further be explained by different pharmacological activities like antimicrobial activity, wound healing activity, Cardioprotective, anti-inflammatory

activities . It may become the good source of nutrition and medicine in present era. Moreover, this plant is not having substantial research in clinical field therefore further scope for clinical trials and also it has been listed as one of the endangered species of India. So, its conservation and cultivation should be done for serving the increasing demand of natural based products.

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