

A review on leafy vegetable Kakamachi (Solanum nigrumLinn.)

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ABSTRACT

Kakamachi is a prominent herb in Ayurveda which is used as both food and medicine since long ago. Solanum nigrum.Linn. belongs to family Solanaceae, Commonly known as Garden night shade is one among the most common herb, grows as a weed in agricultural fields, gardens, waste places in India. It belongs to Shaka varga. The references of Kakamachi available in Samhita and Nighantu. It has properties such as Tikta Rasa, Laghu, Snigdha Guna, Ushna Veerya, Katu Vipaka, Tridoshaghna. It is indicated in Jwara, Trishna, Daha etc. It can be cultivated. And whole plant used for therapeutic use. This article reviews the various references of Kakamachi in Ayurvedic texts, its therapeutic uses and different formulations. The review also encompasses the pharmacological activities and various folklore uses of this plant.

KEY WORDS: Kakamachi (Solanum Nigrum.Linn)

INTRODUCTION:

In India variety of medicinal plants has been utilized since ancient times to cure several ailments. The indigenous systems of medicine including Ayurveda, Siddha, and Unani, have been in existence from several

centuries.In India variety of medicinal plants has been utilized since ancient times to cure several ailments. The indigenous systems of medicine including Ayurveda, Siddha, and Unani, have been in existence from several centuries.In India variety of medicinal plants has been

utilized since ancient times to cure several ailments. The indigenous systems of medicine including Ayurveda, Siddha, and Unani, have been in existence from several centuries.

Since Ancient period human beings have been dependent on natural products for their primary healthcare requirements. The black nightshades (*Solanum nigrum* L.) and related species are worldwide weeds of arable land, gardens, rubbish tips, soils rich in nitrogen, in moderately light and warm situations which occur from sea to montane levels. They are, however, also widely used as leafy herbs and vegetables, as a source of fruit and for various medicinal purposes.¹

Kakamachi is a drug which is used as food and it is available according to season, it is one among the Shaka Varga. The review includes the botanical description, classical reference according to Brihatrayi and Nighantu, properties, indication, and therapeutic uses, Pharmacological action of Drug Kakamachi which is highly potential Medicinal plants.

MATERIAL AND METHODS :

The literature regarding Kakamachi is compiled from

Brihatrayees and various Nighantus for its details like synonyms, classification (as Gana/Varga), vernacular names, pharmacological properties, parts used, dose, indications, folklore uses etc.

Nirukti

Fruits are very much liked by crows.

Synonyms

Kakamachi, Dhvankhamachi, Kakamata, Jaghanaphala, Sarvatikta, Bahuphala, Vayasi, Kakini, Rasayanavara, Gudaphala, Sundari, Gucchaphala, Vara.

Vernacular names :

Sanskrit : Dhvankshamachi
Assam : Kakamachi, Pikachia,
Bengali : Gudakamai
English : Garden Night Shade
Gujrati : Piludi
Hindi : Makoya
Kannada: Ganikayeagida,
Ganikegida, ganike, Ganikesopu,
Kage hanninagida
Malayalam: Karinthakkali,
Manatakkali, Manjathakkali
Marathi : Kamoni
Oriya : Lunlunia, Lunilunika
Punjabi : Mako

Tamil: Manarthakkali, Manaththakkali, Manitakkali, Maniththak

Classification : In different Literatures

Sl.No	Name of Literatures	Gana	Varga	Skandha
1.	Charaka Samhita			Tikta
2.	Sushruta Samhita	Surasadi		
3.	Ashtanga Hrudaya	Surasadi, Aragwadhadi		
4.	Madanpal Nighantu		Abhayadi	
5.	Dhanvantari Nighantu		Karaveeradi	
6.	Shodala Nighantu		Karaveeradi	
7.	Raja Nighantu		Shathwadi	
8.	Kaiyadeva Nighantu		Aoushadhi	
9.	Bhavprakasha Nighantu		Guduchyadi	
10.	Nighantu Adarsha		Kantakaryadi	
11.	Priya Nighantu		Shatapushpadi	

In Samhitas PARYESHANA in Samyoga viruddha

Following are the references of

ahara.

Kakamachi drug in **Charaka Samhita.**

iii. *Kakamachi* is mentioned in Shakha varga.

i. Author mentioned *Kakamachi* leaves in Aragvadadi lepa for Kusta chikitsa.

iv. *Kakamachi* is one of the etiological factor for Kusta.

ii. *Kakamachi* is mentioned

v. *Kakamachi* is mentioned in Tikta skanda.

- vi. Kalka of Kakamachi leaves is mentioned as Kusta chikitsa as a lepa.
- vii. Kakamachi is mentioned as Pathya in Arsha chikitsa.
- viii. Kakamachi is mentioned as Apathya during the intake of Yogaraja in Panduroga chikitsa.
- ix. Kakamachi is mentioned as Pathya in Vataja kasa.
- x. Kakamachi is mentioned as Apathya in Vatarakta chikitsa.
- xi. For lepa, Kakamachi kalka prepared in Gomutra along with other drugs mentioned in Shotha chikitsa.
- xii. Kalka of Kakamachi along with other drugs is mentioned in Kaphaja visarpa as a lepa.
- xiii. Kakamachi kalka is one of the kalka dravya used in the preparation of Mahanila taila, which is mentioned in Shiroroga chikitsa.
- xiv. Kakamachi leaves are mentioned as Pathya in

Urustambha chikitsa.

In Sushrut Samhita.

The following references were found about Kakamachi drug.

- i. Author mentioned the Kakamachi in Viruddha aahara.
- ii. Kakamachi is mentioned under Surasadi gana.
- iii. Kakamachi is grouped under Tikta rasatmaka shakha.
- iv. Leaves of Kakamachi are mentioned in Kaphaja vrana chikitsa as a patradana.
- v. Kakamachi is mentioned as an ingredient in Mahaneela ghrita under Kusta chikitsa.
- vi. Grita prepared with swarasa of Kakamachi and Kakadani is useful in Rat poisoning.
- vii. Kakamachi is mentioned as an ingredient in Amruta sarpi for Sarpavisha.

In Astanga Hrudaya

- i. Author mentioned the

Kakamachi under Shakhavruga.

ii. Kakamachi is mentioned in Viruddha aahara.

iii. Kakamachi is mentioned under Surasadi gana.

iv. Kalka of Kakamachi leaves is mentioned in Kusta chikitsa for Lepa.

v. Taila preparation of Kakamachi along with other drugs is mentioned in Khandoustha chikitsa for external application.

vi. Kakamachi is mentioned as an Apathya while intake of Giriya(Shilajatu) rasayana.

In Nighantu Kala

Dhanvantari Nighantu:

In this, Nighantukara mentioned *Kakamachi* in Karaveeradi varga and enumerated synonyms and *gunakarma* of *Kakamachi*.

Shodala Nigantu

The author mentioned *Kakamachi* in *Karaveeradi varga* and explained *gunakarma* of *Kakamachi*.

Vrunda madhava:

Mentioned fumigation of Kakamachi fruits mixed with ghrita in chikitsa of Netraroga.

Madanapala Nighantu:

Mentioned *Kakamachi* under *Abhayadi varga* and explained about synonyms *gunakarma* in detail.

Raja Nighantu:

In this Nighantu the author mentioned *Kakamachi* under *Shathwadi varga*, explained synonyms and *Gunakarma* of *Kakamachi* in detail.

Kaiyadeva Nighantu:

In this Nighantu The author mentioned *Kakamachi* under *Aoushadi varga* and here he explained synonyms, and Guna karma of *Kakamachi* in detail.

Bhavprakasha Nighantu:

The author mentioned *Kakamachi* under Guduchyadi varga. Explained synonyms and guna karma of *Kakamachi* in detail.

Nighantu Adarsha:

The author mentioned *Kakamachi* drug under *Kantakaryadivarga* and explained *gunakarma* in detail.

Priya Nighantu:

Nighantukara mentioned *Kakamachi* in *Shatapushpadi varga* and explained guna karma in detail with therapeutic indications.

Amarakosha:

Mentioned *Kakamachi* under *Vanoushadhi varga* and enumerated synonyms of *Kakamachi*.

Showing the Rasapanchaka of Kakamachi

Sl.No	Name of Ni	Rasa	Guna	Veerya	Vipaka	Prabhava
1.	M.N	-	Snigda,Ushna	Ushna	-	-
2.	D.N	Tikta	-	Ushna	-	-
3.	R.N	Katu,Tikta	-	Ushna	-	-
4.	K.N	Katu,Tikta	Snigda, Laghu	Ushna	Katu	-
5.	B.N	Tikta, Katu	Snigda, Ushna	Ushna	-	-
6.	Ni.A	Katu,Tikta	-	Ushna	Katu	-
7.	P.N	Tikta	-	Ushna	-	-

Doshagnata: Tridoshara

Karma: Vrishya, Rasayana

Rogagnata: Kustha, Hridroga, Prameha, Arsha, Hikka, Chardi, Shotha, Jwara, Netraroga.

Part used: Whole plant

Dosage: Swarasa: 10-20ml

Therapeutic Administration

a) Bahya Chikitsa

1. The eye affected with pitta is fumigated with Kakamachi

fruit mixed with ghee. By this the organisms are expelled immediately (VM.61 243, also BS netra. 546).

2. Siriṣa (bark), karpasa

(flowers), aragvadhā (leaves) and Kakamachi (whole plant)- these are the four pastes beneficial in kushtha.(C.S.Chi.7.96; also SU.3.17)

3. Root of syama, parusaka, priyangu and Kakamachi is pounded separately and the paste applied below umbilicus. It helps delivery of foetus. (VD.13.28)

b) Abhyantara chikitsa

1. Kakamachi promotes strength if used as decoction with jaggery, pippali or maricha. Ghee cooked with Kakamachi juice also acts similarly.(VD.4.3)
2. Ghee cooked with the juice of kakadani and Kakamachi is useful in Rat poisoning. (SS.Ka.7.31)
3. In oedema, suvarcala, grijanaka, patola, Kakamachi, mulaka, vetra and nimba are useful as vegetable. Among cereals old barley and rice are wholesome. (C.S.Ci.27.26-27)
4. Vegetable of Kakamachi, vastuka and other bitters

patola etc. cooked without salt in water and oil are useful in Urustambha. (C.S.Ci.27.26-27)

5. Vastuka, Kakamachi etc. are useful as vegetable in cough caused by vata.(C.S.Ci.18.81-82)

Vishista yogas :Kakamachi Arka, Kalakuta Rasa, Hridayavarana Rasa

Botanical review of Kakamachi :

Solanum indicum. Linn.

Solanaceae

Scientific Classification:

Kingdom : Plantae

Sub kingdom : Viridiplantae

Devision : Tracheophyta

Subdivision : Spermatophytina

Class : Magnoliopsida

Super order : Asteranae

Order : Solanales

Family : Solanaceae

Genus : Solanum L.

Species : S. nigrum L.

Botanical description of *Solanum nigrum*. Linn.

Solanum nigrum is a variable annual herb.

Stem: Erect, glabrous or more or less pubescent, much divaricately branched.

Leaves: Numerous, 2.5-9 by 2-5 cm., ovate-lanceolate, subacute or acuminate, glabrous, thin, entire sinuate toothed, tapering into the petiole; petioles 2 cm. long.

Flowers: Small, in extra-axillary subumbellate 3-8-flowered cymes; peduncles 6-20 mm. long, slender; pedicels 6-10 mm. long, very slender.

Calyx: 3 mm. long, glabrous or nearly so; lobes 5, oblong, obtuse, 1.25 mm. long, not enlarged in fruit.

Corolla: 4-8 mm. long, divided more than 1/2 -way down into 5 oblong subacute lobes.

Filaments: short, flattened, hairy at the base; anthers 2.5 mm. long, yellow, oblong, obtuse, notched at the apex.

Ovary: globose, glabrous; style cylindrical, hairy.

Berry: 6 mm. diam., globose,

usually purplish black, but sometimes red or yellow, smooth, shining.

Seeds: discoid, 1.5 mm. diam., minutely pitted, yellow.

Habitat:

The species related to the black nightshade are widely distributed in various habitats throughout the world, from tropical to temperate regions and from sea level to altitudes exceeding 3500 m.

Propagation

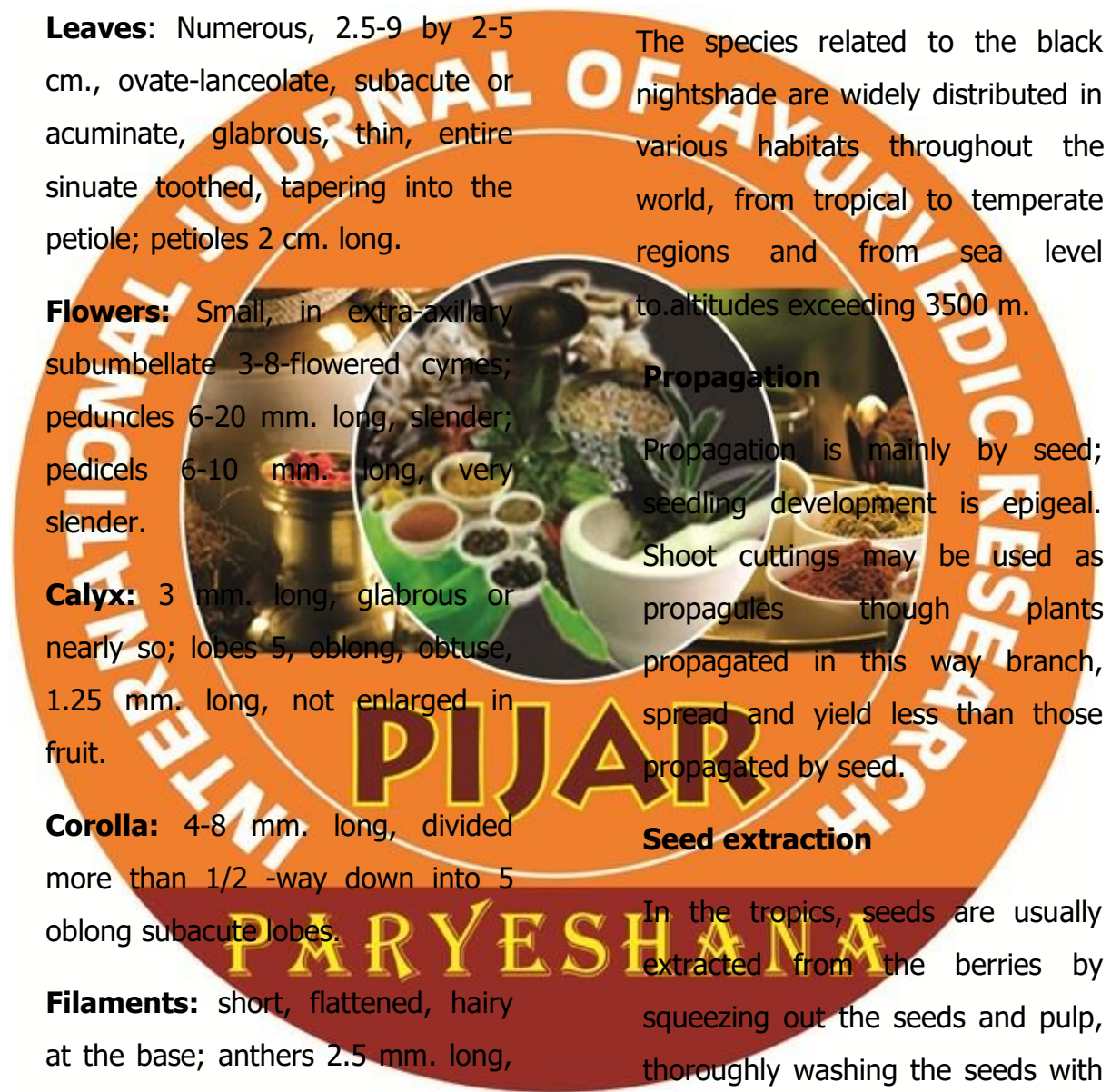
Propagation is mainly by seed; seedling development is epigeal. Shoot cuttings may be used as propagules though plants propagated in this way branch, spread and yield less than those propagated by seed.

Seed extraction

In the tropics, seeds are usually extracted from the berries by squeezing out the seeds and pulp, thoroughly washing the seeds with water and drying the seeds in the shade for a day.

Seed viability

These *Solanum* seeds can remain viable for several years, depending



on the storage conditions and the seed moisture content. They are known to retain their viability for long periods of time in the soil, with their subsequent germination causing problems in succeeding seasons of crop growth for many years.

Optimal conditions for germination

Temperature

The optimum germination temperature for these species lies between 15 and 30°C.

Moisture

A seed moisture content of 35-40% to be a necessary contributory factor for optimal germination.

Pests and diseases

Black aphids may cause a considerable reduction in harvest. Large numbers of the aphids can infest the underside of the leaves causing leaf curl, while the young apices of similarly infested plants can fail to develop.

Fungal diseases do not seem to be a serious problem in these species. However, plants can

become infected with *Cladosporium oxysporum*. The leaves subsequently dry out and die. This pathogen can be controlled by regular spraying with an appropriate fungicide.

Heavy damage to ripe fruits can be caused by the variegated grasshopper (*Zonocerus variegatus* (L.)), but regular sprays with appropriate insecticides may control the damage from such pests

Flowering and Fruiting

Greater part of the year.

Harvesting

This is usually 4-5 weeks after seedling emergence and before flowering begins. At the first harvest.

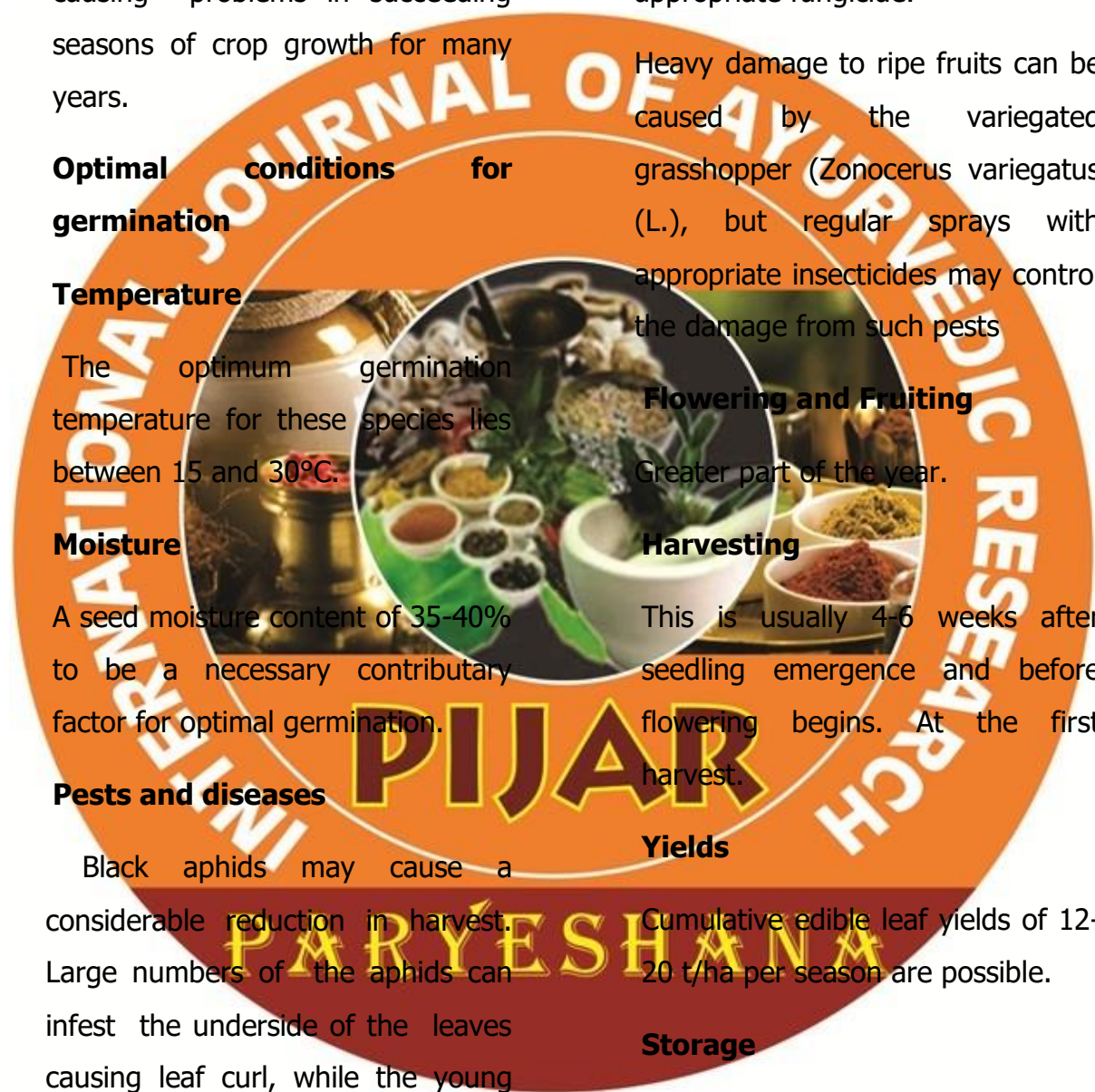
Yields

Cumulative edible leaf yields of 12-20 t/ha per season are possible.

Storage

The quality of the leaves deteriorates within 4 days of harvest if stored at ambient temperatures.

Substitute And Adulterants



Leaves of *Solanum nigrum* sometimes occurs as an adulterant of Indian belladonna; they can be distinguished from belladonna microscopically.

Folklore uses:

- In Europe, it has been used as a remedy for convulsions.
- In India, it used to treat cardiac pain and gripe and noted for its antiseptic and anti-dysenteric properties. To treat the abdominal upset in infants, an infusion of the plant is used as an enema. It is reported to have emollient, diuretic and laxative properties and its decoction is used as both antispasmodic and narcotic. Freshly prepared extract of the plant is effective in the treatment of cirrhosis of the liver and also serve as an antidote to opium poisoning.
- In Bengal, the berries are employed in fever, diarrhea, eye diseases, hydrophobia etc.

Phytochemistry:

Leaves: Protein 5.9, fat 1, mineral 2.1, carbohydrate 8.9 percent; calcium 410, phosphorous 70, iron 20.5mg/100gm. Rivoflavin 0.59, nicotinic acid 0.92, vitamin c 11 and p- carotene 0.74 mg./100 gm. solamargine, solasonine.

Raw green Fruits : Four stiroidy glycol-alkaloid, solamargine, solasonine, solanigrine A and B. Total alkaloid is 0.101 -0.431 percent.

Ripe Fruits: Glucose and fructose(15-20%), Vitamin C and p-carotene.

Pharmacological

action:Antioxidant and Anti-hyperlipidemic, Hepatoprotective, Diuretic, CNS depressant, Anti-ulcerogenic, Anti-tumor, Anti-angiogenic.

Discussion:

Plants are vital natural resorces. Kakamachi is one among them which is used as food and medicine. Kakamachi is a *Solanum nigrum*. Linn.belongs to Solanaceae family. It has abundant reference since from Samhita to Nighantu.It is

having Tikta Rasa, Laghu Ruksha Guna, Ushna Veery, Katu Vipaka and it has Properties such as Tridoshashamaka, Rasayana, Swarya, Kusthaghna, Arshoghna, Pramehahara, Netrya, Hikkanigrahana, Chardinigrahana. Kakamchi is highly beneficial or used in Tvak vikara and used as Raktashodhaka because of its Tikta Rasa and has synonym like Tiktkka, Sarvatikta which indicate that it is rich in Tikta Rasa.

Conclusion:

Kakamachi is one of the commonly used leafy vegetable and also important Traditional Indian medicine used in Kusta, Shotha, etc. It has phytochemicals such as Cardiac glycosides, Saponin glycosides, Tannins, Flavonoids, Steroids. It has Pharmacological actions such Antioxidant and Anti-hyperlipidemic, Hepatoprotective, Diuretic, CNS depressant, Anti-ulcerogenic, Anti-tumor, Anti-angiogenic.

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