

## **BRIEF REVIEW ON THERAPEUTIC POTENTIALS OF KAKAMACHI (*Solanum nigrum* Linn.)**

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### **Abstract**

Kakamachi (*Solanum nigrum* Linn), Solanaceae family, is a prominent herb in Ayurveda which is used as food and medicine since long ago. This article reviews the various references of Kakamachi in Ayurvedic texts regarding its therapeutic uses and different formulations. The review also encompasses the pharmacological activities and various folklore uses of this plant. It is found that this herb is used since Vedic period and widely used as Shakadrayya (vegetable). It is used successfully in the treatment of various ailments like measles, malaria, cancer etc by different folks. Till date this plant has been screened out for activities like anti oxidant, hepatoprotective, anti ulcerogenic, immunomodulatory etc and many more. The present exercise will help the researchers to widen their horizons in the assessment of other activities which are not screened out yet.

**Key words:** Black nightshade; Ethno-medicine; Folklore uses; Hepatoprotective; Kakamachi.

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## INTRODUCTION

In the desire of existence man has always endured for healthy life. In eagerness to obtain healthy and happy life, to achieve happiness and diminish sorrows man has always turned to nature from the time immemorial. He has made continuous effort to know more and more about nature and become most adaptogenic to nature by using eternal treasure for his benefits and so the science of health has flourished. This process is always dynamic and is still in progress. In this process man used many substances as provided by nature; various herbs being the commonest among them. In 21<sup>st</sup> century, developing countries hugely depend on medicinal plants for healthcare.<sup>[1]</sup> Currently, near about 80 % of the world population use herbal medicine and World Health Organisation (WHO) also encourages, recommends and promotes the inclusion of herbal drugs in national health care programs. Because these drugs are easily available at a price within the reach of common man and such are time tested that these are considered to be safer than modern synthetic drugs.<sup>[2]</sup> But one of stumbling blocks in the wider acceptance of medicinal plant drug is lack of or inadequacy of scientific data at hand on the ethno-medicinal aspect of these drugs.<sup>[3]</sup> Nowadays, worldwide interest is increasing in Traditional System of Indian Medicine due to its unique fundamentals and practices.<sup>[4]</sup> It is being adopted, studied and explored widely for its potential of treating wide array of diseases. For this, it is the need of the hour to collect and review more and more information from the ancient literature which may provide a link to researchers to unravel this system.

Kakamachi (*Solanum nigrum* Linn.) is widely described in the Ayurvedic classics and also have references in Vedas. This herb has its own ethno-medicinal importance since it plays a significant role in the treatment of various diseases. It is having both curative and

nutritive values. It is used as single drug and in compound formulations. In this study, review of various uses of Kakamachi is done through Brihat trayees and various Nighantus. It will give an insight into its pharmacological properties, therapeutic or dietary utility as conceived by various authors at different stage of the history.

## MATERIAL AND METHODS

The literature regarding Kakamachi is compiled from Brihat trayees and various Nighantus for its details like synonyms, classification (as Gana/Varga), vernacular names, pharmacological properties, parts used, dose, indications, folklore uses etc. Six volumes of Bharata Bhaishajya Ratnakara<sup>[5]</sup> were screened for different formulations of Kakamachi and they were classified as per the use of Kakamachi in the method of preparation.

In the Vedas description regarding Kakamachi is mentioned in Samaveda; by author Sayana by the name of 'Nitatni'. Its description is also present by the same name in Atharvana Veda (1500 BC), Kaushikasutras and Amarakosha.<sup>[6][7]</sup> Various references of Kakamachi found in Brihat Trayee (Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya) were screened out and are depicted in Tables 1, 2 and 3 respectively. Nighantus has described Kakamachi in form of its Paryaya (Synonyms), Gana / Varga (Classification), Vernacular names, Rasapanchaka (pharmacological properties), Karma (therapeutic actions) and Vyadhiharatva (indications) etc.

## Synonyms

Various synonyms of Kakamachi compiled from Nighantus are Bahuphala (having many fruits), Tiktika, Bahutikta (very bitter in taste), Barbarika, Chandraveeni, Dhwanakshimachi, Gucchaphala (Fruits many in bunch),

Swadupaka, Swadupakaphala, Gudakandani, Gudaphala (Fruits are sweet like jaggery), Jaghanephala, Kaakahva (Kills crows), Kaakala, Kakamachi (Fruits consumed by crows), Kaakamata, Kaakasahva, Kaakini, Kaamachi, Kaamata, Kapota, Katvi, Katphala, Katu, Katuphala, Krisnamoola, Kushthagani, Kushthanashini (Cures skin diseases), Machika, Marichikaphala [Fruits are like Maricha (*Piper nigrum* L.)], Matsyakshi, Rasayanavara, Rasayani (Rejuvenator), Sarpamarika, Sarpamari (kills snakes), Sarvatikta, Shakamata (best in vegetables), Sundari, Swarya, Vara, Vayasahva, Vayasi.

### Classification

Kakamachi is classified under Tikta Skandha in Charaka Samhita; Surasadi Gana in Sushruta Samhita, Ashtanga Hridaya; Pippalyadi Gana in Astanga Nighantu; Karaveeradi Varga in Dhanwantari Nighantu, Shodhala Nighantu; Vrikshadi Varga in Shabdachandrika; Guduchyadi Varga in Madanapala Nighantu, Bhavaprakasha Nighantu, Shaligrama Nighantu; Shatavaryadi Varga in Raja Nighantu; Aushadhi Varga in Kaiyyadeva Nighantu; Kantakaryadi Varga in Nighantu Adarsha,<sup>[8]</sup> Shatapushpadi Varga in Priya Nighantu.

### Vernacular names

Hindi: Makoi, Gurakani; Kannada: Kaagehannina gida (Fruits are black), Kaakamache, Kakkehannu; English: Black night shade, Common nightshade, Hound's berry, Garden Nightshade; Telugu: Kanchiponda, Kamanchi-chettu; Tamil: Manattakkali, Thenna takalipullum, Milagetakkali; Marathi: Kaamani, Ghati, Makoi; Malayalam: Manithakkal, Kasumuthi, Karimthakkali; Gujarati: Piludi; Punjabi: Mako; Bengali: Kakamachi, Dudakamai; Tulu: Kaachiponda; Urdu: Makoh.

### Parts used

Usable parts of this plant are Panchanga (whole plant) and they are Phala (fruits), Moola (root), Pushpa (flower), Kanda (stem) and Patra (leaves).<sup>[9]</sup>

### Pharmacological properties

Rasa: Tikta [bitter] (RN, KN, BN, NR, PN), Kashaya [astringent] (SuS), Katu [pungent] (RN, KN, BN). Guna: Snigdha [unctous] (KN, BN, NR, PN), Laghu [light] (KN). Virya: Ushna [hot] (AH, DN, RN, KN, NR, PN), Anushnasheeta (SoN), Natyushnasheeta (CS). Vipaka: Katu (BN).

Actions and indications mentioned by different texts are depicted in Table 4 and 5.

### Dose

Kakamachi is used in the form of Swarasa (juice), Kwatha (decoction), Churna (powder) and Arka (distillate). According to Sharangadhara Samhita, the general dose for the Swarasa is half Pala (24 ml), for Kwatha is two Pala (96 ml) and that of Churna is one Karsha (12 g).<sup>[10]</sup> As per Ayurvedic pharmacopoeia of India, dose of Swarasa is 5 to 10 ml.<sup>[11]</sup> As per Sharma PV, dose of Swarasa is 10 to 20 ml, Phala Churna – 1 to 3 g, Arka – 20 to 50 ml.<sup>[12]</sup> According to Bhavaprakasha Nighantu, dose of Swarasa is 12 to 24 ml.<sup>[13]</sup>

### Formulations

Disease wise classifications of formulations of Kakamachi used for Bhavana (wet trituration) are depicted in Table 6. Other uses and formulations are given in Table 7.

### Folklore uses

In Gerard's Herbal of 1636 (in great British herbals), Nightshade is documented as useful against Saint Anthony's fire (ergotism /

erysepalas / herpes zoster), the shingles (Herpes Zoster), headache, heart burning or heat of the stomach etc due to its cooling effect. Later, in Culpeper's Herbal of 1649, the black nightshade is described as a "cold Saturnine plant", which was commonly used to cool hot inflammations either externally or internally. In Europe, it has been used as a remedy for convulsions. In Germany, it is used to induce sleep especially in children whereas in Bohemia its leaves are placed in baby's cradle to promote sleep. The bruised fresh leaves used externally by the Arabs to ease pain and reduce inflammation due to burns and ulcers. Leaf juice has also been used for ringworm, gout and earache, while it is also reputed to be a good gargle and mouthwash when mixed with vinegar. In North America, the Houmas Indians use an infusion made from boiled roots of this species to administer to babies with worms, and crushed green leaves mixed with grease to make poultices for sores, while the Rappahannock used a weak infusion to cure insomnia. In South America (southern Ecuador), flowers and leaves are used to calm fever and combat the effects of alcoholic excesses due to their moderate narcotic action. 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. In Konkan, the young shoots are given in chronic skin diseases and used with great success in psoriasis. In Sindh region it is used against Asthma.<sup>[14][15]</sup>

In China leaves are used as a febrifugal or detoxicant drug. Dried aerial parts of plants are used as a diuretic, antihypertensive and

anticancer agent for infections of the urinary system, hypertension and cancer of the digestive system. Fresh leaves are also used to treat wounds. In the Philippines, leaf extracts are apparently used to restore body skin pigment. In East Africa, the raw fruit is chewed and swallowed for treatment of stomach ulcers or for general abdominal upsets. Infusions of leaves and seeds are rubbed onto the gums of children who have developed crooked teeth. Pounded leaves are soaked in water, fermented and used for the treatment of boils, ulcers and swollen glands. Unripe berries are used to treat ringworms. Various parts of the plant are also believed to cure malaria, black fever, dysentery and urinary infection. In Zimbabwe, the plant is used as a remedy for malaria, black water fever and dysenteries, while the juice or decoctions of the herb were formerly made into an ointment for foul ulcers. In Kenya, unripe fruits are applied to aching teeth and squeezed onto babies' gums to ease pain during teething. Leaves and fruits are pounded and the infusion used against tonsillitis. Roots are boiled in milk and given to children as a tonic. Raw roots of were also found to be eaten for abdominal pain in Tanzania.

### **Pharmacological activities**

Till date Kakamachi has been screened for only its anti-nociceptive, anti-inflammatory, antipyretic,<sup>[16]</sup> anticonvulsant,<sup>[17]</sup> antioxidant and anti-hyperlipidemic,<sup>[18]</sup> hepatoprotective,<sup>[19][20][21]</sup> cytoprotective,<sup>[22]</sup> antimicrobial,<sup>[23]</sup> larvicidal,<sup>[24][25]</sup> narcotic, diuretic,<sup>[26]</sup> antispasmodic, CNS depressant,<sup>[27]</sup> anti-ulcerogenic,<sup>[28]</sup> antihyperglycemic,<sup>[29]</sup> immunomodulator,<sup>[30]</sup> anti-proliferative (cancer preventive),<sup>[31][32]</sup> anti-angiogenic<sup>[33]</sup> activities.

### **DISCUSSION AND CONCLUSION**

The references regarding Kakamachi are available since Vedic period and detailed description of Kakamachi is found in the

Ayurvedic literature at various places. It is described under Shaka (vegetable) Varga and it seems that it was used widely in those days as food as well as drug. It was used in the form of vegetable, external application (Lepa), juice, decoction etc. and has been contra indicated with some specific combinations (like Kakamachi and jaggery, Kakamachi with Honey etc.). In Bhaishajya Ratnavali, it has been indicated in Netraroga (eye diseases) and contra indicated in Grahani (malabsorption syndrome), Atisara (diarrhea).<sup>[34]</sup> Some of its synonyms like Kakahva, Sarpamarika etc point towards its toxic nature. The toxicity is mainly attributed to glycoalkaloids like solamargine, solasonine and solanine and nitrates occurring in different parts of this plant. Glycoalkaloids are most concentrated in unripe green berries.<sup>[35]</sup> Some studies have reported human and livestock fatalities after consumption of unripe berries and plant.<sup>[36][37]</sup>

Fever, sweating, vomiting, abdominal pain, diarrhea, confusion and drowsiness are the initial symptoms of toxicity and the death results from cardiac arrhythmias and respiratory failure.<sup>[38][39]</sup> The fact also should be noted that the toxicity can vary considerably according to where the plant is grown and the species that is being grown.<sup>[40]</sup> Nonetheless ripe berries and cooked leaves are edible and are being used successfully over the ages for culinary as well as medicinal uses. Though there are controversies on its toxicity in some parts of the world like Africa and North America this plant is cultivated as a food crop, both for its fruit and its leaves. Some other synonyms like Vara (superior), Shakamata (mother of all vegetables), Swadupakaphala (taste of fruits is sweet) etc. points out the above fact.

Kakamachi in the form of juice is mainly used as Bhavana Dravya in many Ayurvedic herbo-mineral formulations. After exclusive review on its therapeutic uses through Ayurvedic literature reveals that it has been used to cure

many ailments like Kushtha (Skin diseases), Visarpa (Erysipelas), Shotha (edema / inflammation), Yakrit vikara (Liver disorders), Pandu (anemia), Kamala (jaundice), Vrana (Wound healer), Karnashoola (Ear ache), Hridroga (heart diseases), Prameha (Diabetes), Udararoga (Ascitis), Vrishanashotha (orchitis), Mukha-Karna-Nasa-Netraroga (Diseases of E.N.T.), Shwittra (vitiligo), Atisara (diarrhoea), Chhardi (emesis), Arsha (hemorrhoids), Jwara (fever), Pleeharoga (diseases of spleen), Vatarakta (Gout), Kasa-Shwasa (coughing and Asthma), Kshaya (debility/tuberculosis) etc.<sup>[41]</sup> Many Acharyas have emphasized on its Rasayana (rejuvenator) property. In this regard, water extract of Kakamachi possesses strong anti oxidative activity in vitro since it contains several anti oxidants like gallic acid, PCA, caffeic acid, catechin and epicatechin, rutin etc.<sup>[42][43]</sup>

Review of different folklore uses of Kakamachi establishes its potential ethno-medicinal importance. It is being successfully used in the treatment of convulsions, cancer, measles, abdominal upsets, psoriasis, ringworms, dysentery, hypertension, liver enlargement, splenomegaly, malarial fever, tonsillitis, burns and ulcers etc.<sup>[44]</sup> Different extracts of fruits (berries), leaves of Kakamachi have been screened for various pharmacological activities.<sup>[45][46][47]</sup>

From this review it can be concluded that Kakamachi is being used successfully since centuries and have potential to treat a wide array of diseases. It is the traditional remedy immensely useful for the treatment of abdominal ailments, liver and spleen disorders, ulcers, wounds etc. Taking a note of different Ayurvedic and folklore uses, it can be established that it is safe and highly useful herb with wide therapeutic potential.



**Table 1: Different references of Kakamachi and their details from Charaka Samhita<sup>[48]</sup>**

References and their details		
1	Sutra 3/17	Paste of leaves made with buttermilk applied on Kushtha (skin diseases)
2	Sutra 26/84	Viruddha Ahara Dravya (dietetic incompatibility): Kakamachi and Honey (Samyogaviruddha), Paryushita (stale) Kakamachi
3	Sutra 27/89	Described in Shakavarga with properties like Tridosha Shamani (pacifies the three Dosha), Vrishya (aphrodisiac), Rasayana (rejuvenator), Sheetavirya (cool by potency), Nati Ushna (not much hot in potency), Bhedani (penetrator) and Kusthaghni (destroys skin diseases)
4	Nidana 5/6	Its excessive usage leads to Kushtha
5	Vimana 8/143	It is classified under Tiktakandha
6	Chikitsa 14/124	It is Pathya (indicated) in Arsha (haemorrhoids)
7	Chikitsa 16/84	It is Apathya (contra indicated) during the intake of Yogaraja in the treatment of Panduroga (anemia).
8	Chikitsa 18/81	Vayasi Shaka as a Pathya in Vataja Kasa (cough due to Vata)
9	Chikitsa 29/52	It is Pathya in Vatarakta (gout).
Utilization in therapeutics		
1	Chikitsa 7/96	For Lepa (external application) along with Shirishatwak (bark of <i>Albizia lebeck</i> ), Karpasapushpa (flowers of <i>Gossypium herbaceum</i> ) and Aragwadha Patra (leaves of <i>Cassia fistula</i> ) Kushtha (skin diseases)
2	Chikitsa 12/73	It triturated in Gomutra (cow urine) along with other drugs Shopha (edema)
3	Chikitsa 21/90	For Pradeha (external application) Kaphaja Visarpa (Erysipelas due to Kapha)
4	Chikitsa 26/269	As a Kalka (paste) Dravya in Mahanila Taila – Pana (internal administration), Nasya (nasal administration), Shira Abhyanga (application on scalp) Chakshushya (good for eyes), Aayushya (increases life), Shiroroga (diseases of head)
5	Chikitsa 27/27	To be taken internally Urustambha

**Table 2: Different references of Kakamachi and their details from Sushruta Samhita<sup>[49]</sup>**

References and their details		
1	Sutra 20/13	Viruddha Ahara - Kakamachi along with Pippali ( <i>Piper longum</i> L.) and Maricha ( <i>Piper nigrum</i> L.), Kakamachi with Guda (jaggery)
2	Sutra 38/18	Classification of Kakamachi under Surasadi Gana
3	Sutra 46/262	Grouped under Tikta Rasatmaka shaka
4	Kalpa 7/310	Ghee cooked with the juice of Kakamachi and Kakadani is useful in rat poisoning.
Utilization in therapeutics		
1	Chikitsa 1/115	Leaf of Kakamachi Kaphaja Vrana (wound due to Kapha Dosha)
2	Chikitsa 9/35	As an ingredient in Mahanila Ghrita Kushtha

**Table 3: Different references of Kakamachi and their details from Ashtanga Hridaya<sup>[50]</sup>**

References and their details		
1	Sutra 6/74	Classified under Shakavarga with properties like Tridosahara, Kushthahara, Vrishya, Ushna, Rasayana, Sara, Swarya.
2	Sutra 7/35	Combination of Kakamachi and Guda is Viruddha (incompatible)
3	Sutra 15/30	It is classified under Surasadi Gana
Utilization in therapeutics		
1	Chikitsa 19/63	Lepa Kushtha
2	Uttara 22/2	Taila for Abhyanga on Sadyovrana (fresh wound) Khandoshtha (laceration of lip)

**Table 4: Different Karma (actions) and Vyadhiharatwa (indications) of Kakamachi according to different authors** [48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60]

Sr. No.	Text	Actions	Indications
1	Charaka Samhita	Medohara (antihyperlipidemic), Rasayana, Vrishya	Kushtha
2	Sushruta Samhita	Rasayana, Vayasthapana (anti ageing)	Kushtha
3	Ashtanga Hridaya, Dhanvantari Nighantu, Shodhala Nighantu	Rasayana, Sara (purgative), Swarya, Vrishya	Kushtha
4	Kaiyyadeva Nighantu	Rasayana, Sara, Swarya, Vrishya, Hridya (cardiotonic)	Arsha, Aruchi (dyspepsia), Cchardi (emesis), Hikka (hiccough), Hridroga (cardiac diseases), Jwara (fever), Kasa (cough), Kushtha, Prameha (diabetes), Shopha, Shwasa (breathlessness)
5	Bhavaprakasha Nighantu	Netrya (good for eyes), Rasayana, Shukrala (spermatogenic), Swarya Dhatuvardhaka (nutritive to Dhatus of body), Hridya, Netrya,	Cchardi, Hikka, Hridroga, Jwara, Kushtha, Prameha, Shopha
6	Shaligrama Nighantu	Rasayana, Sara, Swarya, Vrishya	Kushtha
7	Madanapala Nighantu	Rasayana, Sara, Swarya, Vrishya, Vishanashaka (destroyer of poison)	Arsha, Jwara, Kushtha, Prameha, Shopha
8	Adarsha Nighantu	Bhedini (penetrating), Rasayana, Swarya, Vrishya	Kushtha
9	Priya Nighantu	Balya (gives strength), Hridya, Mutrala (diuretic), Rasayana, Yakriduttejaka (liver enhancer)	Kushtha, Shopha, Yakrita Roga (liver disorders)
10	Rajanighantu	--	Arsha, Kandu (itching), Kushtha, Shoola (pain), Shopha, Swara Vikara (diseases of affecting voice)
11	Brihat Nighantu Ratnakara	--	Atisara (diarrhea), Hikka, Hridroga, Jwara, Kandu, Karnakeeta (worms in ear), Kasa, Kushtha, Prameha, Shoola, Shopha, Shwasa

**Table 5: Disease wise classification of the formulations of Kakamachi as a Bhavana Dravya**

Sr. No.	Indication	Formulation	Reference
1	Karnaroga (diseases of ear)	Indu Vati Makshikadi Vati Sarivadi Vati	BR BR BR
2	Kushtha (skin diseases)	Kushthanikruntana Rasa Chandarudra Rasa, Chandrashekhara Rasa, Charmantaka Rasa	RR RKD
3	Pandu, Kamala (jaundice)	Chandrasuryatmaka Rasa Paniya Vatika Vishweshwara Rasa	BR, RSS, RaRaSu BR, RaRaSu BR, RSS, RaRaSu, RaChan
4	Jwara (fever)	Vishamjwarantaka Lauha (Brihat) Shankari Jwarankusha Sheetajwarari Rasa Loknatha Rasa Sarvajwarahara Lauha (Brihat)	RSS RaRaSu RaChi 9 RaChi 9 BR, RSS, RaRaSu
5	Arsha (haemorrhoids)	Piyushasindhu Rasa	RaChi 9, RaChan, RaRaSu, RKD
6	Baalaroga (paediatric diseases)	Baalarasa Baalarogantaka Rasa	RSS, RR, RaChan, RaRaSu BR
7	Vatatisara (diarrhea due to Vata Dosh)	Maharasa	RaRaSu, BNR

8	Yonivyapat (disorders of female reproductive system)	Nashtapushpantaka Rasa	BR
9	Stiroga (gynaecological diseases)	Ratnaprabha Vatika	BR
10	Vridhhiroga (inguino scrotal swelling)	Rasarajendra	BR
11	Sutikaroga (puerperal diseases)	Rasashardula Rasa	RRS, RaRaSu
12	Pleeharoga (diseases of spleen)	Loknatha Rasa (Brihat)	BR, RaRaSu, RSS, Ra Chi 9
13	Vatavyadhi (diseases due to Vata Dosha)	Vataraja Vati Vyadhigajakeshari Rasa Rasaraja	RaRaSu RaChan, BNR BR
14	Shwitra (leucoderma)	Swachchhandanayaka Rasa Shwitrebhasinha Rasa, Shwetari Rasa	RR, RKD BYT 120
15	Hridroga (cardiac disorders)	Hridayarna Rasa Shankar Vati	RSS, RR, BR, YR, RaRaSu, RaChan, RKD, RaChi 9 BR
16	Kshaya (tuberculosis), Kasa	Swayamagni Rasa	Ra Chi 11, BNR, RKD, RR, Sha Sam MK 2/12
17	Kasa-Shwasa (cough and breathlessness)	Agnikumara Rasa	RPS 8
18	Rasayana (rejuvenator)	Siddhayogeshwara	Ra Chi 8
19	Sarvarogahara (cures all diseases)	Rasashardula Rasa	Ra Chi 8

**Table 6: List of formulations containing Kakamachi as an ingredient from Bharata Bhaishajya Ratnakara – for external application (Lepana)**

Sr. No.	Name	Reference	Indication	Remarks
1	Chaturangulparnadi Lepa	GN, VM	Kushtha	Leaves of Kakamachi are bruised in buttermilk for external application
2	Chandraprabha Guti	GN	Netraroga	Rubbed with Kakamachi Swarasa for Anjana (to be used as collyrium) – for treatment of Kamala
3	Ankolabeejadi Lepa	VMR (Patala 17)	Kushtha	Triturated with Kakamachi Swarasa for external application
4	Aaragvadhadi Lepa	VM	Visarpa (erysepalas)	For external application

**Table 7: Uses of Kakamachi as Bhavana for Parada Shodhana and to Kajjali and other uses**

Sr. No.	Name	Reference	Indication
<b>As Bhavana for Parada Shodhana</b>			
1	Mahakalpa Rasa	RKD	Vatarakta
2	Rasendra Gutika	BR	Rajayakshma (tuberculosis)
3	Rasendra Gutika (Brihat)	BR	Rajayakshma
4	Suryasiddha Rasa	Ra Chi 2	
5	Rasaparpati	RPS	--
6	Rasabhasma Vidhi	Ra Chi 1	--
<b>As Bhavana to Kajjali</b>			
1	Rudra Parpati	RR, RKD, BNR	Kasa
2	Vajrashekhara Rasa	RRS 20	--
3	Varisagara Rasa	Ra Chi, RaRaSu, RKD, RR	Jwara
<b>For Gandhaka (sulphur) Shodhana for preparation of Parpati</b>			
1	Gandhashma Parpati Rasa	RKD	Grahani
<b>Swedana (boiling) (in form Swarasa)</b>			
1	Putraprada Rasa	RSK (Ullasa 4)	Vandhyatva (infertility)



As Kwatha Dravya (decoction material)			
1	Mahaneela Ghrita	GN	Kushtha
2	Mahavishagarbha Taila	BNR, YR	Vatavyadhi
3	Amruta Ghrita	GN, Vangasen	Garavisha, Visha (poison)
Swarasa as Anupana (adjuvent)			
1	Someshwara Rasa	RaRaSu, RKD	Kushtha
2	Hridayarava Rasa	RSS, RR, RaRaSu, BR, YR, RaChan, Ra Chi, RKD,	Hridroga

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## Abbreviations of different texts used

AH: Ashtanga Hridaya, BR: Bhaishajya Ratnavali, BN: Bhavaprakasha Nighantu, BNR: Brihat Nighantu Ratnakara, BYT: Brihat Yoga Tarangini, CS: Charaka Samhita, DN: Dhanvantari Nighantu, Dhany: Dhanvantari, GN: Gadanigraha, KN: Kaiyyadeva Nighantu, NR: Nighantu Ratnakara, PN: Priya Nighantu, RN: Rajanighantu, RR: Rasaratnakara, RKD: Rasakamadhenu, RSS: Rasendrasarasamgraha, RRS: Rasaratnasamuchchaya, RaRaSu: Rasarajasundara, RPS: Rasaprakashasudhakara, RaChan: Rasachandamshu, Ra Chi: Rasa Chintamani, RSK: Rasasamketkalika, SuS: Sushruta Samhita, SoN: Shodhala Nighantu, Sha Sam MK: Sharangadhara Samhita Madhyama Khanda, VM: Vrinda Madhava, VMR: Vaidyamaniratnamala.

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