



## REVIEW ON TRIVIKRAMA RASA: A HERBOMINERAL FORMULATION FOR ASHMARI

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## ABSTRACT

*Trivikrama Rasa*, a herbomineral formulation used in *Ashmari*, is the subject of this comprehensive review. The term 'herbomineral' refers to a combination that contains both herbs and minerals as main ingredients. These formulations have a longer shelf life than herbal formulations and when taken internally are more readily absorbed because of the extensive trituration done during preparation. The manufacturing process includes *Shodhana* (Purification), *Mardana* (Trituration), *Marana* (Incineration), and more. This article presents *Trivikrama Rasa* and its likely modes of action using modern and Ayurvedic modalities. The review is meticulously compiled from classical references, provides a *reliable source of information*. The available data is presented systemically, offering a general introduction of ingredients, preparation method of formulation, dose and its probable mode of action. *Trivikrama Rasa* has been reported in all classical texts as an effective means of managing *Ashmari* quickly.

**Keywords:** *Trivikrama Rasa*, *Ashmari*, *Tamra Bhasma*, Kidney Stone

## INTRODUCTION

As per a study published in Feb 2023, the general public has shown a steep rise in the incidence of kidney stones in the past 10 to 15 years, affecting 12% of the global population, and 50% of these cases may lead to renal impairment or loss.<sup>[1]</sup> This alarming trend underscores the urgent need for effective treatments. A kidney stone is a crystal concretion formed usually within the kidneys. Improper diet, drinking less water, exercise (too much or too little), obesity, weight loss, and eating food with too much sugar or salt can increase the risk of developing a stone. Kidney stones consist primarily of calcium or magnesium. However they can also be aggregates of amino acids, cystine, and uric acid which might be associated with urinary tract infections, known as Struvite kidney stones.<sup>[2]</sup> Treatment includes medications in the early stages, whereas surgery is advised when the size of the stone is larger still at times results are not satisfactory, or there is a significant concern regarding recurrence.

In classical texts, Kidney Stones can be correlated with *Ashmari*, which is comprised of two words, 'Ashma' and 'Ari'. 'Ashma' means a stone, and 'Ari' means enemy "A disease of *Mutravaha Srotas* (urinary tract) involves the formation of stone, resulting into severe pain as given by enemy."<sup>[3]</sup> Acharya Sushruta classified it as one of the eight most difficult-to-cure ailments *Ashta Mahagada* in the 33rd chapter of *Sutrasthana*.<sup>[4]</sup> Further explained *Ashmari Lakshana* as pain in *Nabhi* (umbilical), *Basti* (bladder), *Seevani* (perineal raphe), *Mehana* (penis), *Mutrardharana* (obstruction in the flow of urine), *Sarudhiramutrata* (haematuria), *Mutravikirana* (scattering of urine), *Gomedakaprakasa* (passing of urine like *Gomeda*), *Sasikata* (with gravels) and *Visrujati* (turbid) as

**Table No. 1 Contents of Trivikrama rasa**

S.No	Contents	Part
1	<i>Tamra Bhasma</i> (Copper Bhasma)	1
2	<i>Shuddha Parada</i> (Mercury)	1
3	<i>Shuddha Gandhaka</i> (Sulphur)	1
4	<i>Nirgundi Juice</i> ( <i>Vitex Negundo</i> )	<i>Bhawana drava</i>
5	Goat Milk	For <i>Tamra bhasma paka</i>

symptoms are quoted.<sup>[5]</sup> Sushruta Samhita classifies *Ashmari* (*Mutrashmari*) as per *dosha pradhanata*, *Vataja Ashmari* (*Kadambapushpawat*), *Pittaja Ashmari* (*Bhallatakasthi pratimama*), *Kaphaja Ashmari* (*Kukkutanda Sama*) and *Shukraja Ashmari* (Only in Adults due to *Shukra Vegavarodha*).<sup>[6]</sup> *Madhavakara* also mentioned it as *Yamopama* - The God of death. Explaining etiology, he said that although *Tridoshas* are involved in forming *Ashmari* (preferably *Mutrashmari*) *Kapha* is *Samavayi karana* of *Ashmari*. The vitiated *Vata* dries up the urine in *Mutravaha srotas* along with *Pitta* by its *Ushna guna* so that *Kapha* present in the urine attains the form of *Ashmari* (supersaturation of urine) gradually like *Gorochana* formed in cow.<sup>[7]</sup> In *Ashtanga Hridaya* *Mutravarodha* (suppression of urge of micturition) is an essential etiology of *Ashmari*.<sup>[8]</sup>

Several formulations are mentioned in classics to manage *Ashmari* effectively. *Trivikrama Rasa* is one commonly employed formulation. It is given to the patient in a dose of 2 *ratti* (250 mg) with *Sehapana* of *Beejpoora* (*Citrus medica*) *Moola* as *Kalka* with water. This dissolves *Ashmari* within a month. So, an attempt has been made to review *Trivikrama rasa's* contents and probable mode of action.

### MATERIAL AND METHODS:

*Trivikrama Rasa* is mentioned in various classical texts, such as *Sharangadhara Samhita*<sup>[9]</sup>, *Rasaratna Samucchaya*<sup>[10]</sup>, *Rasendrasar Sangraha*<sup>[11]</sup>, *Rasendra Chintamani*<sup>[12]</sup>, *Bharata Bhaisajya Ratnakara*<sup>[13]</sup>, and *Rasa Chintamani*<sup>[14]</sup>, for the successful management of *Ashmari*.

**Table no. 2 Rasapanchaka of Trivikrama Rasa Constituents** [15] [16] [17]

Name	Rasa	Guna	Virya	Vipaka	Karma	Sansthanik Karma
<b>Tamra(Copper) Bhasma</b>	Tikta, Kashaya, Katu, Madhura	Laghu, Sara	Ushna	Madhura	Pitta-Kapha Shamaka	Lekhana
<b>Parada (Mercury)</b>	Shadrasayukta	Snigdha, Guru, Sara, Sukshma, Chala, Laghu, Ushna	Ushna	Madhura	Tridoshahara	Yogavahi
<b>Gandhaka(Sulphur)</b>	Katu, Tikta	Laghu, Snigdha, Sara, Ruksha	Ushna	Katu	Kapha-Vata Shamaka	Deepana, Pachana
<b>Nirgundi (Vitex negundo)</b>	Tikta, Katu, Kashaya	Laghu, Ruksha	Ushna	Katu	Kapha-Vata Shamaka	Mutranjana
<b>Goat Milk</b>	Madhura	Laghu, Sara, Snigdha, Chala	Sheeta	Madhura	Vata-Pitta Shamaka	Deepana

**PREPARATION METHOD:**

*Tamra Bhasma* is mixed in equal parts with *Aja Dugdha*, and *Paka* is done until the milk dries completely. *Kajjali* is made of an equal amount of *Shodhita Parada* and *Shodhita Gandhaka*, followed by the addition of *Tamra Bhasma* and *Bhavana* of *Nirgundi* Juice. After thorough *Mardana*, this is placed in *Baluka Yantra*, and *Paka* is done with an appropriate gradual heat pattern. On cooling, it is taken out, and the *Mardana* process is repeated. It is given to the patient at two *ratti* (250 mg) dose with *Shepana* of *Beejpoora* (*Citrus medica*) *Moola* as *Kalka* with water. Hence, this *Trivikrama Rasa* dissolves *Ashmari* within a month. [18]

**TAMRA BHASMA:** *Tamra Bhasma* is a metallic preparation that is widely used to treat a variety of ailments, including ascites, hepatic disorders, and skin diseases. The *Yajurveda Samhita* refers to *Tamra* as *Shyamam* or *Sisam* because of its black colour. *Varaha Purana* mentioned it as the *Shukra* of Lord *Kartikeya* that plummeted to Earth. Minerals and metals are employed in *bhasma* form in *Rasashastra*. *Tamra bhasma* is a critical component of several formulations. In *Bhaisajya Ratnavali*, 221 formulations contain *Tamra Bhasma* directly or

indirectly. Being a highly toxic element, proper *Shodhana* (purification) procedures must be opted for *Tamra*. *Shodhana* ensures the elimination of undesired impurities, reduction or removal of toxicity, transformation of properties and optimisation of efficacy. *Nirvapa*(quenching) for seven times in each media as *Taila*, *Takra*, *Gomutra*, *Aranala* and *Kulattha Kwatha*, respectively, is opted by acharyas for *samanya shodhana* of *Tamra*. [19] Specific *shodhana* methods are also given to remove the blemishes of *Tamra*. Under the SEM data, the particle size gradually increased until the fourth *Shodhana* stage, after which it gradually decreased. However, the form of the particles remained unchanged. [20] After *Shodhana* trituration with specific *dravyas* is done and *Chakrikas* (pellets) are made out of it. Dried *Chakrikas* are enclosed in *Sharava*, and *Samputa* is done. These *Sharavas* are subjected to *Marana* (incineration) by *Putra* method till fulfilment of *bhasma* parameters. Copper was primarily found in its Cupric (II) form in *Bhasma*, as determined by spectrophotometer analysis. During the process of *Putra* in *Bhasma* preparation, copper sulphide is wholly converted to copper oxide. [21]

**PROBABLE MODE OF ACTION:** *Tamra Bhasma* possesses *Tikta, Kashaya, Katu* and *Madhura Rasa, Laghu, Sara Guna, Ushna Virya* and *Madhura Vipaka*. These properties make *Tamra Bhasma* an excellent *lekhana* drug. [22] This is expected to act against vitiated *Kapha Dosha*, i.e., the chief cause of *Ashmari* as *Tamra Bhasma* has *Ushna Virya*, which may suppress vitiated *Vata Dosha* responsible for severe pain in *Ashmari*. In Bhaishajya Ratnavali, *Chandrakala Rasa* is mentioned in *Mutrakricchra Rogadhikara*. It has approx. 8.33% of copper in it. [23] So *Tamra Bhasma* can play a significant role in *Mutrakricchra* associated with *Ashmari*. Heavy metal toxicity is a major issue in *Bhasma* usage. In a study, different doses of *Tamra Bhasma* were given orally to rats to determine LD50. No death was noticed for up to 30 days at a dose of 480mg per 100 gm of body weight. This makes the safety profile for using *Tamra Bhasma* in therapeutics. [24]

**PARADA:** Rasa Shastra's most promising drug is *Parada*. It is found in ores such as Cinnabar (sulphide form) and calomel (chloride form) and combination with antimony and sulphur. *Parada* has many *Doshas* (impurities) as *Naisargika Dosha* (*Visha, Vanhi, Mala*), *Yougika Dosha* (*Naga, Vanga*) and *Aupadhika/ Kanchuka Doshas* (*Parpati, Patini, Bhedi, Dravi, Malakari, Andhakari, Dhwankshi*). [25] Ancient Acharyas have mentioned several kinds of *Shodhana* techniques and *Samskaras* for *Parada*; they enhance *Parada's* pharmacological and therapeutic qualities, simultaneously eradicating its *Doshas*. In a research study, Rasatarangini's method of purifying mercury was used, using lime, rock salt and garlic paste. [26] Trituration with Lime could aid in the removal of mercury's alkaline soluble compounds. Garlic contains approximately 33 sulfur compounds such as alliin, allicin, ajoene, allyl propyl disulfide, diallyl trisulfide, S-allyl cysteine, vinylidithiines, S-allylmercaptocystein, and others. The most active substance that forms numerous bonds with mercury is ajoene. ICP-AES analysis of the raw mercury revealed that it contained 99.97% mercury and no metals like lead, cadmium, or arsenic. Following *Shodhana*, the level of mercury

was reduced to 99.93%, and trace amounts of arsenic and cadmium were found. [27]

**PROBABLE MODE OF ACTION:** Rasashastra texts do not advise a single use of Mercury. *Kajjali* (Black Sulphide of Mercury) is a fundamental ingredient in various formulations. Trituration of purified Mercury and Sulphur until black powder (*Kajal*) forms is called *Kajjalika*. Acharya Sadanand Sharma explained in *Rasatarangini* that *Kajjali* with *anupana bheda* can be used for any disease. Also, the *Yogvahitwa* property has importance in the pharmacokinetics of drugs as it drags whatever is mixed with it towards the target tissue down into the more profound and most inaccessible parts of the system. They become more potent and act in low doses when mixed with other medicines. [28] So, it may also help manage *Ashmari*. Individually, *Parada* is *shadrasayukta, tridoshara* and *yogavahi*. [29] It may alleviate the *tridosha* involved in the pathology of *Ashmari*. *Parada* also has the *srotoshodhana* effect, which may relieve *sangha* in the *Mutravaha srotas*. This way, *Parada* plays a significant role in *Samprapti Vighatana* of *Ashmari*.

**GANDHAKA:** *Gandhaka* stands second in importance to *Parada* in Rasashastra. It is also regarded as a necessary ingredient for several *Parada* processes, including *Murchana* and *Jarana*. *Parada* is mainly administered internally in association with *Gandhaka* because it imparts many desirable properties to *Parada* and reduces its toxic effects. In line with a study, raw *Gandhaka* samples have higher antifungal activity than *Shodhita* samples. Additionally, the study found no difference in the antibacterial activity of *Gandhaka's* raw and *Shodhita* samples when evaluated with different techniques. Since raw and *Shodhita Gandhaka* was shown to have relatively similar antibacterial action, it shouldn't be necessary to perform *Shodhana* of *Gandhaka* seven times for external usage. Only one *Shodhana* is sufficient for *Gandhaka* to be converted into an antibacterial/antifungal ointment. The data

also indicates that *Shodhana* is not required for external use of *Gandhaka*.<sup>[30]</sup>

**PROBABLE MODE OF ACTION:** *Gandhaka* have *Katu Tikta Rasa*, *Laghu Snigdha Sara Guna*, *Ushna Virya*, *Katu Vipaka*. These properties make *Gandhaka Deepana Pachana* and *Kapha Vata Shamaka*.<sup>[31]</sup> Because of these properties, *Gandhaka* is expected to act against the vitiated *Kapha Dosha* responsible for the formation of stones. *Deepana Pachana* properties of *Gandhaka* may contribute to the non-recurrence of *Ashmari* by correcting the *Agni*. *Gandhaka* has *Ushna Veerya*, similar to herbal drugs *Ela*, *Gomutra* (Cow's urine) and *Vana palandu* (*Urginea indica Roxb*) that induces *Mutravirechana*, ultimately helping in the expulsion of *Ashmari*.<sup>[32]</sup>

**NIRGUNDI** (*Vitex negundo* Family: Verbenaceae)

**Synonyms:** *Nirgundi*, *Nirgundika*, *Sugandhika*, *Sinduvara*, *Sinduka*, *Sinduvaraka*, *Shephali*, *Indranika*.

**Parts Used:** Root, Bark, Leaf, Flower, Seed

In *Charaka Samhita*, *Nirgundi* is classified under *Vishaghna* and *Krimighna Mahakashaya*.<sup>[33]</sup> *Bhavaprakasha Nighantu* has included the drug in *Guduchyadi Varga*.<sup>[34]</sup> Prof. PV Sharma grouped *Nirgundi* under *Vedanasthapana Varga* and *Rasayana*.<sup>[35]</sup>

A study was conducted on animals treated with paracetamol-induced kidney damage to observe the nephroprotective effect of methanolic extract of *Vitex negundo* linn. Treatment with paracetamol induced a significant elevation in the levels of serum urea, creatinine, and total protein, which indicates kidney damage and affects nephrotic structural integrity. Normalisation of serum markers was seen after the administration of methanolic extract of *Vitex negundo*. This suggests that *Nirgundi* conditions the tubular brush borders and protects the tubular membrane integrity by an accelerated regeneration of parenchyma cells. In this study, daily pretreatment with methanolic extract of *Vitex negundo* for 14 days conferred maximum nephroprotection in 400 mg/kg

dose. This may be due to the presence of isolated flavonoids in *Nirgundi*.<sup>[36]</sup>

**PROBABLE MODE OF ACTION:** *Nirgundi* has *Katu*, *Tikta*, *Kashaya Rasa* and pacifies *Vata* and *Kapha*. Its *Guna* is *Laghu*, and *Veerya* is *Ushna*.<sup>[37]</sup> The antimicrobial activity of essential oil of *Vitex negundo* Linn leaves was tested against pathogenic microorganisms such as *S.aureus*, *E.coli*, *K. pneumoniae*, *B. subtilis*, *M. luteus* and *Candida albicans* and compared with the standard, the essential oil showed good antimicrobial activity.<sup>[38]</sup> So it may treat the infection associated with kidney stones. The analgesic activity of *Vitex negundo* leaf extract (VLE) [500 and 1000 mg/kg] was studied using acetic acid induced writhing test in mice for assessing peripheral analgesic effect and tail immersion test in mice to evaluate central analgesic effect. VLE significantly increased the reaction time and decreased the writhing movements in mice in acetic acid-induced writhing test. There was a significant increase in the reaction time in the tail immersion test. VLE have both central and peripheral analgesic action, which may act over pain induced by Kidney Stones.<sup>[39]</sup> *Nirgundi* is also known to be *Mutranjana*, which may help flush out the infection and the gravel of kidney stone.<sup>[40]</sup>

#### **AJA DUGDHA**

Goat milk has been cited in several classical literatures as a potentiating agent/levigation media (*Bhawana dravya*) to enhance the therapeutic action of formulations stipulated in various clinical disorders. Compared to cow's milk, it has 13% more calcium, 47% more vitamin A, and 25% more vitamin B6. Moreover, it is more alkaline, digestible, and stabilising than milk from other animals. Classical texts indicated it in the management of *Atisara* (diarrhoea), *Jwara* (fever), *Rajayakshma* (tuberculosis), *Kshaya*, *Shosha* (atrophy) etc.<sup>[41]</sup> Lysozyme, lactoperoxidase, and serum albumin are minor proteins in goat's milk. These proteins serve a variety of roles, including immune system command and antibacterial action. Casein is the most abundant protein found in goat milk. Certain caseins, including  $\alpha$ -casein, have been found to have anti-inflammatory effects. Alpha-casein inhibits angiotensin-converting enzyme (ACE), which regulates blood pressure and inflammation.  $\alpha$ -casein inhibits ACE, which may



lessen inflammation. Lactoferrin, another protein found in goat's milk, has anti-inflammatory qualities. Milk proteins have been found to produce antimicrobial peptides, with lactoferrin-derived peptides being the best acknowledged.<sup>[42]</sup>

**PROBABLE MODE OF ACTION:** *Aja dugdha* has *Kashaya Rasa*, which acts upon the chief cause of *Ashmari*, *Kapha Dosha*. It also does *Pitta Shamana* due to *Madhura Rasa* and *Sheeta Veerya*, which may help relieve the burning micturition associated with infection-induced kidney stones.

## DISCUSSION

Kidney stones are prevalent nowadays, affecting 12% of the world's population. In Ayurveda, they can be correlated with *Ashmari*, preferably *Mutrashmari*. Symptoms include nausea, vomiting, fever, and chills. If an infection is present, sometimes sharp pain radiating towards the lower abdomen and groin of fluctuating intensity.

The principal ingredients of *Trivikrama Rasa* are *Tamra Bhasma*, *Shuddha Parada*, and *Shuddha Gandhaka*. It is extensively documented in classical texts in the context of *Ashmari*.

It is administered with the *Sehapana* of *Beejapoor Moola Kalka* and water, with the intent of crushing *Ashmari* within a month.

Most of its constituents possess *Agnideepana*, *Ama Pachana*, *Lekhana*, *Vrana Ropana*, and *Shothahara* properties, essential for the successful destruction of *Ashmari*.

*Tamra Bhasma* is widely used in a variety of ailments. *Tamra Bhasma* is mentioned in 221 formulations of *Bhaisajya Ratnavali*, either directly or indirectly. *Tamra Bhasma* has been investigated for its anti-ulcerogenic, antioxidant, and antihyperlipidemic properties. Here in *Trivikrama Rasa*, *Tamra Bhasma* is used as it possesses *Tikta*, *Kashya*, *Katu* and *Madhura Rasa*, *Laghu*, *Sara Guna*, *Ushna Virya*, and *Madhura Vipaka*. *Tamra Bhasma*'s qualities make it a powerful *Lekhana* medication that is supposed to function against vitiated *Kapha Dosha*, the primary *hetu* of *Ashmari*. *Tamra Bhasma* has *Ushna Virya* so that it could mitigate the vitiated

*Vata Dosha* responsible for *Ashmari*'s severe pain. *Kajjali*, the second principal component in the formulation, addresses almost all ailments when combined with distinct *Anupana* and *Sehapana*. *Parada* is *Shadrasayukta*, *Tridoshara* and *Yogavahi*. It may alleviate the *Tridosha* involved in the pathology of *Ashmari*. *Parada* also has *Srotoshodhana* effect which may relieve *Sangha* in the *Mutravaha Srotasa*. Further *Gandhaka* have *Katu Tikta Rasa*, *Laghu Snigdha Sara Guna*, *Ushna Virya*, *Katu Vipaka* and is *Vata Kapha Shamaka*. These properties make *Gandhaka Deepana Pachana* and *Kapha Vata Shamaka*. Additionally, it is anticipated that *Gandhaka* will combat the vitiated *Kapha Dosha* that causes stones to form. The *Deepana Pachana* qualities of *Gandhaka* could be a factor in *Ashmari*'s non-recurrence. *Nirgundi* has *Katu*, *Tikta* and *Kashaya Rasa* and pacifies *Vata* and *Kapha*. Its *Guna* is *Laghu*, and *Veerya* is *Ushna*. Studies have demonstrated that *Nirgundi* possesses anti-inflammatory, analgesic, and antibacterial qualities that help cure kidney stone pain and infection. *Nirgundi* is also *Mutrajanana*, may act as a diuretic and help flush out the infection and the gravel of kidney stones. *Aja dugdha* and *Beejpooraka* does *Pitta Shamana* due to *Madhura Rasa* and *Sheeta Veerya* which may help in relieving the burning micturition associated with infection induced due to kidney stones.

In a clinical study conducted on patients of *Mutrashmari*, it has been seen that there is 80% relief in pain, 70% relief in dysuria, 69% relief in burning micturition and 87% relief in vomiting when administered *Trivikrama Rasa*. Highly significant results were obtained in Haematuria. There was a decrease in the size of calculi, and in some cases, calculi were broken into smaller pieces. A significant result was seen in the calculus of single composition rather than triple phosphate calculus. The number of calculi has been reduced by 68%. Collectively, *Trivikrama Rasa* gives significant relief to all *Ashmari* symptoms.

## CONCLUSION

*Trivikrama Rasa* is a widely documented formulation in the context of *Ashmari*. Today, when surgery is advised for every large-sized kidney stone, a conservative approach with fewer side effects is needed. *Trivikrama Rasa* can become an option for this. Clinical studies and classical texts prove that it works tremendously in *Mutrashmari*. Some studies have demonstrated that it can manage *Pittashayagata Ashmari* too. Still further research is needed to establish more data on *Trivikrama Rasa's* mode of action.

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