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Review Article

A REVIEW ON THE ANTI-CANCER *(ARBUDAHARA)* POTENTIAL OF CLASSICAL AYURVEDIC HERBO-MINERAL FORMULATION - *ROUDRA RASA*

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ABSTRACT

Arbuda (cancer) is said considered to be the leading cause in the world. Though there are many Ayurvedic formulations mentioned in the classics, there are still various medicines which are underexplored. One of them is *Roudra rasa*. *Roudra rasa* is a herbo-mineral classical Ayurvedic formulation which is mentioned in *Bhaishajya ratnavali* traditionally indicated for the treatment of *Arbuda*. Despite its importance, this formulation has not received much scientific or clinical importance. This review aims to critically analyse the formulation, provide pharmacological evidence supporting the anticancer potential of ingredients present in *Roudra rasa* and discuss the probable mode of action of *Roudra rasa* in the management of *Arbuda*. *Roudra rasa* possess *Tikta* (bitter), *Katu rasa* (pungent), and *Ushna virya* (hot in potency), which help in *Ama pachana* (digestion of toxins) thereby stimulating *Agni* (digestive fire). This helps in *Srotoshodhana* (cleansing the channels) thereby working on the root level to arrest the progression of *Arbuda*. *Roudra rasa* holds promising anticancer effects. Further pharmaceutical standardization and clinical studies are required to validate and use this formulation in cancer care.

INTRODUCTION

In the year 2022, the incidence for cancer cases in India was estimated to be 14,61,427. It is said that one in nine people are likely to suffer from this disease. It is reported that the cases related to cancer is expected to increase by 12.8% in the year 2025.[1] Regardless of the country's state of development, cancer remains to be the main cause of illness and mortality globally. It's interesting to note that ancient Indian texts have referenced illnesses that resemble cancer. Ayurveda is considered as one of the oldest and most traditional systems of medicine that emanated in India. With its thorough and profound classical knowledge, Ayurveda has many untapped formulations that are indicated for the management of *Arbuda*. In this all-encompassing medical system, *Rasoushadhi* (herbo-mineral) formulations are known for their great potency and efficiency. Because these powerful remedies are highly concentrated, they must be taken in smaller dosage forms. This method highlights the great power of *Rasoushadhi* by emphasizing their vital role in the Ayurvedic healing system and their profound influence on therapeutic practices. Among these, *Roudra rasa* is one such special herbo-mineral formulation which is mentioned in the *Bhaishajya ratnavali* that holds a lot of promise for the management of *Arbuda* but has not received enough attention.[2] In current research, *Roudra rasa* has not yet gotten enough clinical validation or scientific attention. There is still much to learn and understand about its potential role in the management of cancer, which focuses on the necessity of methodical research and incorporation into modern oncological procedures.

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MATERIALS AND METHODS

This article attempts to explore anticancer potential and study the probable mode of action of *Roudra rasa* mentioned from the classics of *Bhaishajya ratnavali*.[3] The study began by referring various Ayurvedic classical texts and by screening existing research articles related to the formulation *Roudra rasa* and its individual ingredients. The results obtained from this review are presented below.

RESULTS

Table 1: Ingredients and quantity according to different Ayurvedic classics

Classical texts	Ingredients	Botanical Name/English name	Quantity
Bhaishajya ratnavali [4]	*Shodhita parada*	Purified mercury	1 part
	Shodhita gandhaka	Purified Sulphur	1 part
	Nagavalli patra	*Piper betel*	Quantity sufficient
	Meghanada (Panchanga)	*Amaranthus spinosus*	Quantity sufficient
	Punarnava (*Moola*/*Patra*)	*Boerhavia diffusa*	Quantity sufficient
	Gomutra	Cow's urine	Quantity sufficient
	Pippali	*Piper longum*	Quantity sufficient
Bharat bhaishajya ratnakara [5]	*Shodhita parada*	Purified mercury	1 part
	Shodhita gandhaka	Purified sulphur	1 part
	Nagavalli patra	*Piper betel*	Quantity sufficient
	Meghanada (Panchanga)	*Amaranthus spinosus*	Quantity sufficient
	Punarnanva (Panchanga)	*Boerhavia diffusa*	Quantity sufficient
	Gomutra	Cow's urine	Quantity sufficient
	Pippali phala	*Piper longum*	Quantity sufficient
Rasendra chintamani [6]	*Shodhita parada*	Purified mercury	1 part
	Shodhita gandhaka	Purified sulphur	1 part
	Nagavalli patra	*Piper betel*	Quantity sufficient
	Meghanada (Panchanga)	*Amaranthus spinosus*	Quantity sufficient
	Punarnava (Panchanga)	*Boerhavia diffusa*	Quantity sufficient
	Gomutra	Cow's urine	Quantity sufficient
	Pippali phala	*Piper longum*	Quantity sufficient
Basavaraajeyam [7]	*Shodhita parada*	Purified mercury	1 part
	Shodhita gandhaka	Purified sulphur	1 part
	Nagavalli patra	*Piper betel*	Quantity sufficient
	Meghanada (Panchanga)	*Amaranthus spinosus*	Quantity sufficient
	Punarnava (Panchanga)	*Boerhavia diffusa*	Quantity sufficient
	Gomutra	Cow's urine	Quantity sufficient
	Pippali phala	*Piper longum*	Quantity sufficient

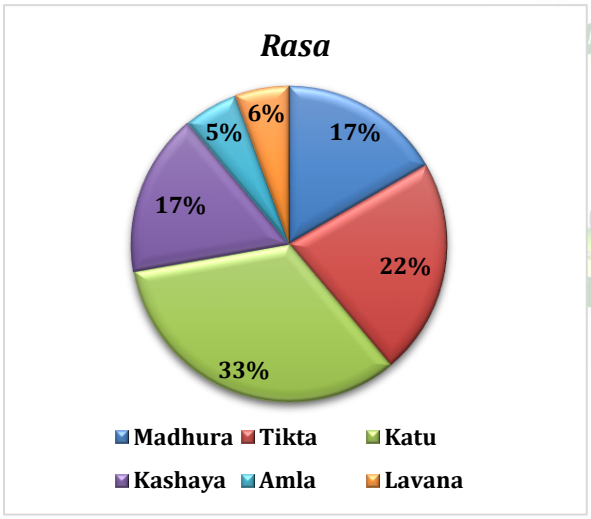
Table 2: Showing *Anupana* (adjuvant) and dose of *Roudra rasa* according to different Ayurvedic classics.

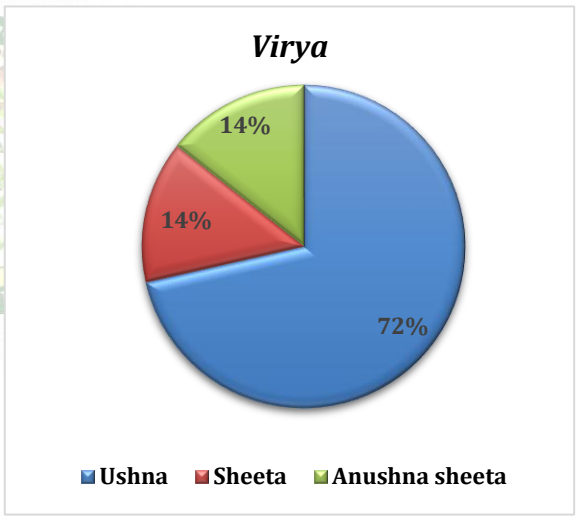
Classical texts	*Anupana*	Dose
Bhaishajya ratnavali [8]	*Madhu* (honey)	125 mg
Bharat bhaishajya ratnakara [9]	*Madhu*	125 mg
Rasendra chintamani [10]	*Madhu*	125 mg
Basavaraajeyam [11]	Internally- *Madhu* Externally- *Roudra rasa* + *Musta* (*Cyperus rotundus*) + *Kasamarda patra* (*Cassia occidentalis* L) + *Nimba patra* (*Azadirachta indica*) all together are rubbed well with *Parijata swarasa* (*Nyctanthus arbortristis*) Linn), made into fine powder and applied.	Internally, 1 *Gunja* (125 mg)

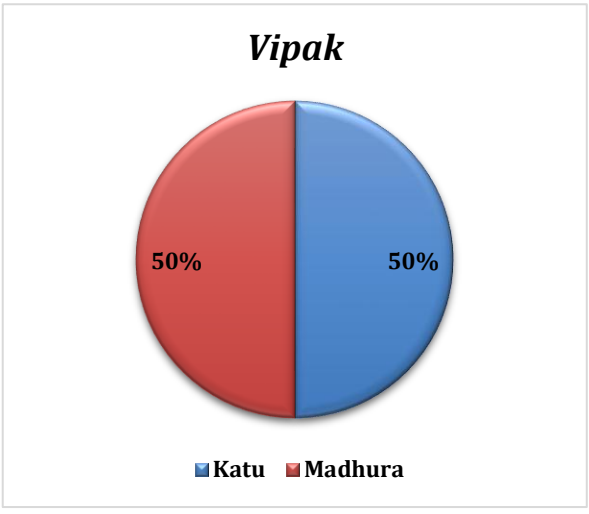
Table 3: Presenting *Rasapanchaka* of ingredients present in *Roudra rasa*

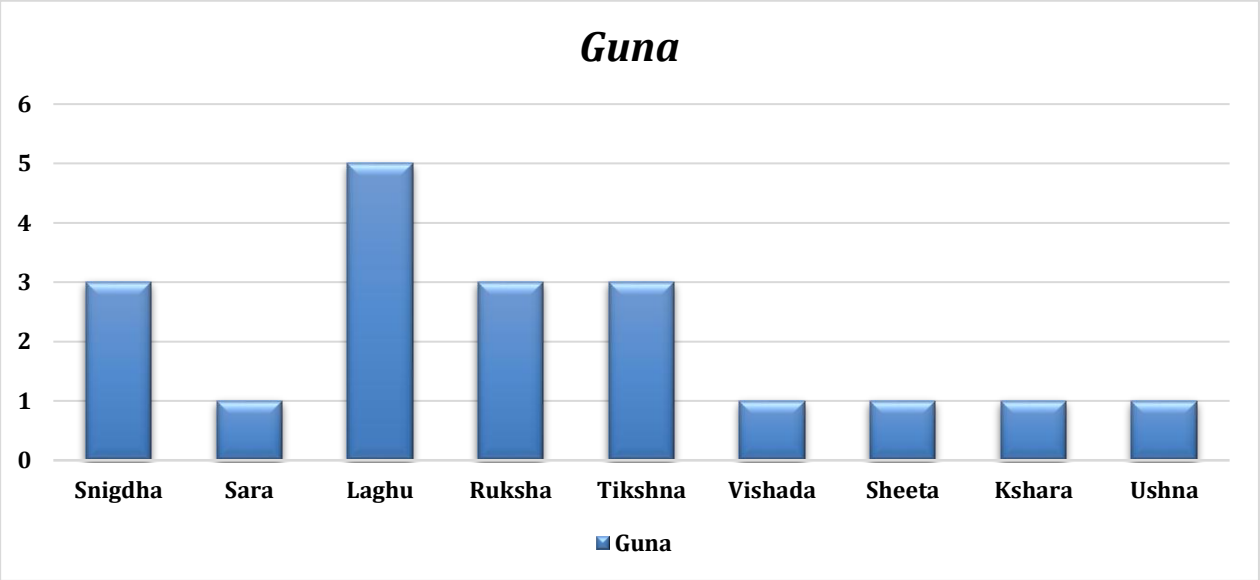
Dravya	***Rasa***	***Guna***	***Virya***	***Vipaka***	***Karma***
Parada [12]	*Shad rasa*	*Snigdha, Sara*	*Ushna*	*Madhura*	*Yogavahi, Rasayana, Balya, Tridoshahara, Pushtikaraka, Agni vardhaka, Deepana, Vrishya*
Gandhaka [13]	*Katu, Madhura*	*Laghu, Snigdha*	*Ushna*	-	*Kapha-vatahara, Vishaghna, Krimighna, Rakta shodhaka*
Nagavalli [14]	*Katu, Tikta*	*Laghu, Ruksha, Tikshna, Vishada*	*Ushna*	*Katu*	*Shothahara, Jwaraghna, Kaphaghna*
Punarnava [15]	*Madhura, Tikta, Kashaya*	*Laghu, Ruksha*	*Ushna*	*Madhura*	*Shothahara, Lekhana, Rasayana, Vishaghna, Tridoshashamaka*
Meghanada [16]	*Katu*	*Laghu, Sheeta, Ruksha*	*Sheeta*	*Katu*	*Ruchya, Deepana*
Pippali [17]	*Katu*	*Laghu, Snigdha, Tikshna*	*Anushna sheeta*	*Madhura*	*Rasayana, Deepana*
Gomutra [18]	*Katu, Tikta, Lavana*	*Ushna, Kshara, Tikshna*	*Ushna*	*Katu*	*Rasayna, Kapha-vatahara, Rakta shodhaka, Lekhana, Vishaghna*

Figure 01 and 02: Presenting *Rasapanchaka* of overall drugs and compositional profile of included drugs









DISCUSSION

Arbuda endures to be one of the most serious global health issues. The ancient knowledge of Ayurveda provides insightful information that are being recognized for their synergistic potential, even though contemporary medicine continues to make advancements in cancer treatment. *Roudra rasa* is a very unique and powerful herbo-mineral formulation among various other classical formulations indicated for *Arbuda*. By combining both herbal and mineral substances with classical pharmaceutical processing adhering to *Rasashastra* (Ayuvedic alchemy) principles, it can increase the efficacy of the drug yet *Roudra rasa* still remains unexplored in both classical application and contemporary scientific validation, despite its intriguing profile.

This review has attempted to compile and critically analyse available literature related to *Roudra rasa*. According to *Bhaishajya ratnavali*, *Roudra rasa* is prepared by taking purified *Parada* and *Gandhaka* in equal parts. It is triturated to make *Kajjali* (black sulphide made from mercury and sulphur). To this *Kajjali*, *Nagavalli patra swarasa* (leaf juice of *Piper betel*), *Meghanand panchang kwatha* (decoction of whole plant of *Amaranthus spinosus*), *Punarnava moola* or *Patra swarasa* (juice of root or leaf part of *Boerhavia diffusa*), *Gomutra* (cow's urine) and *Pippali kwatha* (decoction of *Piper longum*) is added and each drug is triturated for three hours. The final product is made into *Chakrikas* (pellets) and placed in a *Sharava samputa* (earthen plates). It is closed with a cloth treated with mud, dried and *Laghu puta* (mild incineration) is given. The final product obtained is triturated into fine powder.[19]

Pharmacological evidence supporting the anticancer potential of *Roudra rasa* ingredients

***Kajjali*:** Sharma V, Sahabjada S et al intended to evaluate anti-leukemic effect on K562 chronic myeloid leukemia cells and study revealed that *Kajjali* demonstrates strong cytotoxic activity against chronic myeloid leukemia (K562) cells. In a dose-dependent manner it induces apoptosis and also a significant reduction was seen in cell viability. Especially for leukemia, it shows promising potential as an anticancer agent.[20]

***Nagavalli patra*:** Rao AR studied the aqueous leaf extract in hamsters that had benzo(a)pyrene-induced mouth tumors. The results revealed that the extract successfully stopped early and complete tumour development, both in short-term (10 days) and long-term (6 months) treatments.[21] Another experiment by Bhide et al showed that ethanol extract of betel leaves decreased mammary tumors in rodents caused by chemicals and viruses by 75% and tumor size by more than 90%.[22]

***Meghanand panchang*:** In EAC bearing mice, *Meghanand* has shown substantial anticancer effects. To confirm cytotoxicity, the lethality assay for brine shrimp was used. Increased splenocyte proliferation in mice is indicative of its immunomodulatory potential.[23]

***Punarnava panchang*:** *Punarnava's* antioxidant qualities are thought to protect against cancer. It contains compounds like punarnavosides, punarnavine, rotenoids, starch, sugars lignans and boeravinones. By preventing the drug-resistant protein BCRP/ABCG2 and causing cell death and S-phase arrest, boeravinones G and H regulate abnormal cell growth. [24]

***Gomutra*:** The main components of *Gomutra* are 95% of water, 2.5% of urea, and a mixture of salts, minerals, hormones, and enzymes. Uric acid and allantoin, which have potent antioxidant and wound healing properties, are known for its anticancer effect. Urine that is voided in early morning is more nutrient-rich and sterile, which when used in the drug may increase efficacy. *Gomutra* delays aging and helps manage cancer by

reducing lymphocyte apoptosis through free radical scavenging, while aurum hydroxide increases immunity. [25]

***Pippali*:** Piperine, an active ingredient in *Pippali*, reduces COX-2 expression via the NF-κB and AP-1 pathways, thereby preventing tumor growth and metastasis. It also shows antioxidant activity by neutralizing free radicals. Another compound known as piperlongumine, blocks the enzyme GSTP1, which promotes cancer cell proliferation, and increases ROS levels, resulting in oxidative stress and the death of cancer cells. Both substances have strong immune-modulatory and anti-tumor effects.[26]

Probable mode of action of *Roudra rasa*

Ayurveda states that vitiation of all three *doshas*, especially the *Kapha* and *Vata doshas*, is the cause of *Arbuda*. *Roudra rasa* is one such herbo-mineral formulation which can pacify these *Doshas* and target the underlying pathogenesis of the disease. Here, *Parada* and *Gandhaka* are used to make *Kajjali*. *Parada* is *Tridoshaghna* (pacifies all the *Doshas*). It acts as a powerful bioenhancer due to its *Yogavahi* (penetrates deep into the tissues) property. *Gandhaka* is *Kapha-vatahara*. It possesses *Vishaghna* (antitoxic), *Rakta shodhaka* (blood purifier) and *Krimighna* (antimicrobial) actions. When it combines with *Parada* to form *Kajjali*, it allows to potentiate the drugs therapeutic efficacy while maintaining its own effectiveness, which lowers the dosage and onset time. *Kajjali* possess *Yogavahi* property thus it helps in increasing bioavailability. It contains free sulphur which is an essential component of antioxidant biomolecules such as taurine, glutathione, methionine, and cysteine.[27] These are essential for detoxification and safeguarding against cell damage brought on by oxidative stress, which is a key component of the pathophysiology of cancer. Herbs such as *Nagavalli*, *Punarnava*, *Meghanada* possess *Katu, Tikta rasa* which helps acts as *Deepana* (appetizer) and *Pachana* (digestant) thereby promoting *Jatargagni* (digestive fire) and *Dhatvagni* (metabolic fire). This helps in removing the *Ama* (toxins) in the body. *Gomutra* and *Kajjali* possess *Rakta shodhaka* property. This will help to remove all the toxins from the body and enhance the metabolism by undergoing purification of the body. *Vishaghna* property present in *Gomutra*, *Punarnava* and *Gandhaka* help in breakdown of *ama*. This reduces Reactive Oxygen Species (ROS) and stops abnormal cell proliferation. The *Ushna virya* of the drugs helps in *Srotoshodhana* (cleansing bodily channels). *Punarnava, Parada, Pippali* and *Gomutra* possess *Lekhana karma* (scrapping quality) and *Rasayana* property. *Lekhana karma* helps to scrape out excessive *Kapha* and *Meda* (fat tissue) thereby helping in tumor size reduction. *Rasayana* property promotes *Ojasvardhana* (promotes immunity) which enhances *Vyadhikshamatva* (disease resistance), and supports *Dhatu poshana* (nourishes the tissues), thereby helping in the management of *Arbuda*.

The formulation is made by adopting *bhavana* (levigation), *Mardana* (trituration) and *Marana* (incineration) techniques with a focus to potentiate the drug by reducing particle size and increase its bioavailability. The prepared formulation is administered with *Madhu* which is used as an *Anupana*. This serves as an excellent *Shleshmahara* (alleviates *Kapha*) property, thereby enhancing absorption of the drug more rapidly and helps regulating *Kapha*.

CONCLUSION

Roudra rasa is still not widely used in Ayurvedic oncology, despite its encouraging potential. It has little visibility in peer-reviewed research and is rarely produced commercially. More pharmacological, toxicological, and clinical research needs to be done to ensure its safety, efficacy, and appropriate dosage. Working together, Ayurvedic specialists, contemporary researchers, and business people may be able to introduce this useful formulation as a safe, all-encompassing alternative to classical cancer treatments.

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