



A Review Article on the Role of Some Classical Ayurvedic Formulations in the Management of Cancer

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ABSTRACT

Cancer is one of the biggest and most researched causes of death in developed countries. Cancer can be correlated with arbuda in Ayurveda. According to acharya Susruta, the aggravated doshas (balancing elements in the body) vitiate muscles and produce round, firm, large, deep routed, slowly developing, non suppurating and swollen fleshy mass which is known as arbuda. Susrutacharya describes about six types of arbuda which are caused by vata, pitta, kapha, rakta, medas and mamsa. Classical Ayurvedic treatment of arbuda includes samana chikitsa (internal medication) followed by sodhana chikitsa (purification processes). By using Ayurvedic medicines, we can minimise the side effects of chemotherapy and thereby increase the life span of patients. Rasashastra (Ayurvedic Chemistry) has been successful from very early times in using various formulations in preventing or treating arbuda. Some of the important formulations that can be used for treating arbuda in Rasashastra are Roudra rasa mentioned in Rasendra sara sangraha, Arbudahara rasa in Rasaratnasamucchaya, Vajra bhasama in Rasatantra sara, Kanchanara guggulu in Sarngadhara samhita etc. In the present work we are discussing about the role of these formulations in the management of arbuda. The aim of this work is to provide a general outline about arbuda and its management by following the principles of Ayurveda.

Keywords: Rasayogas, Cancer, Arbuda, samana chikitsa.

INTRODUCTION

Cancer is characterized by the rapid and uncontrolled growth of cells that may proliferate throughout the body. For the treatment of such dreadful disease several researches has been conducted on its gene and molecular level but no fruitful result came. Several chemotherapeutic, cytotoxic and immune enhancing agents along with radiotherapy are available for the treatment of cancer. Still we do not find a single ideal anticancerous drug devoid of severe adverse reactions. Thus the emphasis is made over the natural products. Classical medicine that has existed for thousands of years from the time of vedas has described many formulations which not only useful for the treatment but also promote good health and longevity without any side effects to mankind.

Roudra Rasa

This formulation is mentioned in the context of cancer treatment in an ancient Ayurveda book called Rasendra sara sangraha. This is specifically indicated in arbuda (cancer).

Method of Preparation: prepare kajjali (amalgam) by rubbing mercury and sulphur for 12hrs. Then triturate it with liquid media (juice of drugs 3to 7) separately for a day with each. This is subjected to laghu puta (incineration). Dosage of the preparation is 125mg TID (three times a day) with honey.

Table 1: The ingredients of Roudra rasa

SI No	Ingredients	English name/Botanical name
1.	Parada	Purified Mercury
2.	Gandhaka	Purified Sulphur
3.	Pippali	Piper longum
4.	Punarnava	Boerhavia diffusa
5.	Nagavalli	Piper betel
6.	Gomutra	Cow's urine
7.	Meghanada	Amaranthus spinosus

Pharmacological action of Roudra Rasa

Kajjali –Parada (Hg) + Gandhaka (S)

Kajjali has yogavahi (which potentiating the action of the drug as well as carries the drug to its action site) and rasayana (counteracting the effects of age) properties. It acts as GI stimulant locally and also acts as neurochemical irritant for intestinal mucosa. Through its catalytic activity, better absorption of remaining herbal pharmacological molecules is also augmented. The net resultant activity of Kajjali in any khalvi rasayana (medicines prepared by trituration) increases the bioavailability of ingested drugs. In various prospective clinical observations, it is noted that the drug effect is more after the addition of micro quantum of well prepared kajjali. It is also helpful in reducing the dosage of herbal compounds. The effect of Kajjali kalpas may be



multi dimensional - free radical scavenging, antioxidant, antimicrobial, catalytic, proenzymatic, immunomodulator activities. Kajjali complex is also more effective because of its longer stay and timed and sustain release, GI absorption / stimulant and even neuro chemical irritability¹.

Table 2: showing the Pharmacological action of Roudra rasa

S.No	Ingredients	Pharmacological action
1.	Kajjali	Catalyst,rasayana(immuno modulatory)
2.	Pippali	Antioxidant,immunomodulatory
3.	Punarnava	Antiproliferative,enhance immune response
4.	Nagavalli	Antioxidant,radioprotective,immunomodulatory
5.	Gomutra	Anticancerous
6.	Meghanada	Effective in stomach cancers



Figure 1: Kajjali



Figure 2: Pippali

Pippali

Solid tumor development in mice was inhibited by the alcohol extract of *P.longum* and piperine.Thus it ultimately helps in increasing the life span of mice. The drug also have anti oxidant potential against free radical induced oxidative damage.The pippali fruits also have immuno stimulatory actions which was evaluated by macrophage migration index, phagocytic index etc in mice. Anti inflammatory activity has been reported using carrageenan induced rat edema².

Punarnava

Alcoholic extract of Punarnava inhibited the growth of several cancer cell lines of mouse and human origin and may have anti proliferative (anti cancer) potential which may be due to ursolic acid. In another study, boeravinone G, has been found to inhibit breast cancer resistance protein,a multidrug transporter responsible for cancer cell resistance to chemotherapy. Punarnavin, the alkaloidal constituent of the plant, has been shown to enhance immune response (enhanced natural killer cell activity, antibody dependent cellular cytotoxicity etc) against metastatic progression of melanoma cells in mice³.



Figure 3: Punarnava



Figure 4: Nagavalli

Nagavalli

The radioprotective activity of the ethanolic extract of betel leaf has been studied and proved using rat liver mitochondria which could be attributed to its hydroxyl and superoxide radicals scavenging property along with its lympho proliferative activity. The methanolic extract was studied for the humoral and cellular immune responses on mice and the study proved the immunosuppressive effect of extract on cellular and humoral response in mice. The betel leaves are also reported to possess anti-mutagenic and anticarcinogenic properties particularly against the tobacco carcinogens due to presence of phytoconstituents like hydroxychavicol and chlorogenic acid. Without affecting the normal cells, chlorogenic acid is reported to kill the cancerous cells⁴.

Gomutra

Vajra gomutra yoga which is a combination of vajra bhasma and gomutra was proved to have anticancerous effect on pancreatic cancer cells⁵. Other studies also proved the anti cancerous activity of gomutra^{6,7}.

Meghanada rasa

The plant has a folk reputation for being effective in the treatment of tumours. The leaves have concentrated nitrates in them as they are grown in nitrogen rich soils. Nitrates are implicated in stomach cancers⁸.

Arbudahara Rasa

This formulation is mentioned in Rasaratna samucchaya in the context of cancer treatment⁹.

Table 3: showing the ingredients of Arbudahara rasa

S. No	Ingredients	English name/Botanical name
1.	Parada	Purified Mercury
2.	Meghanada	Amaranthus spinosus
3.	Punarnava	Boerhavia diffusa
4.	Nagavalli	Piper betel
5.	Kumari	Aloe vera
6.	Bala	Sida cordifolia
7.	Gomutra	Cow's urine

Table 4: showing the pharmacological action of Arbudahara rasa

S No	Ingredients	Pharmacological action
1.	Parada	Catalyst, yogavahi, rasayana
2.	Meghanada	Effective in stomach cancers
3.	Punarnava	Antiproliferative, enhance immune response
4.	Nagavalli	Antioxidant, radioprotective, immunomodulatory
5.	Kumari	Antioxidant, chemopreventive
6.	Bala	Anticancerous
7.	Gomutra	Anticancerous

Pharmacological action of Arbudahara rasa

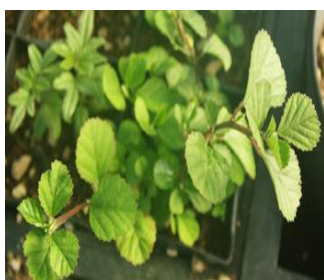
Pharmacological action of meghanada, punarnava, nagavalli and gomutra had already been explained. The remaining are kumari and bala.

**Figure 5:** Mercury**Figure 6:** Kumari**Kumari**

Active principles of Aloe vera exhibited significant prolongation of the life span of tumor-transplanted animals when studied in vivo. As they are one of the indicators of tumorigenesis, A. vera compounds may exert their chemo-preventive effect through modulating antioxidant and detoxification enzyme activity levels¹⁰.

Bala

Anticancer activities of the compounds were studied using bioinformatics tools and it exhibited promising results. Molecular composition of Sida cordifolia was explored through chromatography methods. The resultant molecules were subjected to in silico analysis towards inferring the therapeutic efficacy as anticancer¹¹.

**Figure 7:** Bala**Figure 8:** Vajra**Vajra Bhasma (Diamond calyx)**

Shodhana (purification of diamond) : dolayantra swedana (boiling) in kulattha kwatha (decoction of horse gram) for 3 days.

Marana

suddha vajra + suddha haritala(arsenic trisulphide) +suddha gandhaka(sulphur) + suddha hingula(cinnabar) + suddha swarna makshika bhasma (chalcocopyrite calyx) are triturated to obtain homogenous mixture. This mixture is triturated with rajakola drava. Then give 7 bhavana (trituration) with aswattha twak kwatha (decoction of banyan tree bark) and subject to 14 gajaputa (incineration)¹². Its dose is 1/32 to 1/16 ratti (3.9- 7.8mg). Take Vajra bhasma - 1ratti + Swarna bhasma, abhrakabhasma, mukta pishti – 2masha each. Make it into 48 packets. Take 1 packet along with butter daily morning is very effective in the treatment of cancer. Vajra bhasma helps to remove physical and mental weakness and make the body strong like vajra. In the commentary it is said to be effective in arbuda and karkasphota (cancer)¹³. Vajra bhasma has the property to increase immunity power (helpful during chemotherapy) as well as vitality which is important for cancer patients. It is well known for its rejuvenative property. It augments the body strength as it promotes to build all body tissue. It is also the best yogavahi(synergistic).

Kanchanara Guggulu**Table 5:** showing the ingredients of Kanchanara guggulu¹⁴

S No	Ingredients	English name/Botanical name
1.	Kanchanara twak	Bauhinia variegata
2.	Haritaki	Terminalia chebula
3.	Vibhitaki	Terminalia bellirica
4.	Amalaki	Embllica officinalis
5.	Sunthi	Zingiber officinale
6.	Marica	Piper nigrum
7.	Pippali	Piper longum
8.	Varuna	Crataeva nurvala
9.	Ela	Elettaria cardamom
10.	Twak	Cinnamomum zeylanicum
11.	Patra	Cinnamomum tamala
12.	Suddha guggulu	Commiphora wightii

Special method of preparation

Fine powders of all drugs are added to the guggulu and pounded well. Ghrita is added to the extent required when pounded to form a mass. Its dosage is 3g and anupana is mundi kwatha, khadira sara kwatha, haritaki kwatha and hot water. Important therapeutic uses are

gulma, gandamala, apaci, granthi, vrana, kushtha, bhagandara, slipada etc¹⁵.

Table 6: showing the pharmacological action of Kanchanara guggulu

S No	Ingredients	Pharmacological action
1.	Kanchanara twak	Anticancerous
2.	Haritaki	Antioxidant, chemoprotective
3.	Vibhitaki	Inhibit prostate cancer growth
4.	Amalaki	Anticancerous, immunomodulatory
5.	Sunthi	Anticancerous, Antioxidant
6.	Marica	Antioxidant, anti inflammatory
7.	Pippali	Antioxidant, immunomodulatory
8.	Varuna	Antioxidant
9.	Ela	Antioxidant
10.	Twak	Antioxidant
11.	Patra	Cytotoxic to cancer cells
12.	Suddha guggulu	Anticancer activity, anti leukemic action

Kanchanara

The column chromatography of the ethanol extract of *B.variegata* leaves revealed the anticancer activity of the fractions. Treatment of cancer cells with the active fractions for 48 hrs significantly inhibited the proliferation. Both the active fractions I and II significantly induced DNA damage in treated cancer cells¹⁶.



Figure 9: Kanchanara



Figure 10: Amalaki

Haritaki

Aqueous extract of the fruits was found to exhibit significant antioxidant activity, when evaluated by inhibition studies in radiation induced lipid peroxidation in rat liver microsomes by estimating thiobarbituric acid reactive substances¹⁷. Ethanol extract of the plant fruit has been found to possess significant chemoprotective activity against indomethacin- induced gastric ulceration in experimental male Sprague – Dawley rats¹⁸.

Vibhitaki

Oral ingestion of gallic acid (chemical constituent in amalaki) has been shown to inhibit prostate cancer growth and progression to advanced stage adenocarcinoma in TRAMP (Transgenic Adenocarcinoma

of the Mouse Prostate) mice. Gallic acid has also been demonstrated to inhibit in vivo murine leukemia and promote macrophage phagocytosis¹⁹.

Amalaki

Extract of the fruit significantly inhibited the carcinogenic action of 3, 4-benzo(a)pyrene, a known carcinogen, when given to mice along with this carcinogen in the diet. Again fruit extract inhibited in a dose-dependent manner hepato carcinogenesis induced by –nitrosodiethylamine in animals. The extracts of *E.officinalis* fruit have significant immunomodulatory action. In an adjuvant induced rat model, crude extract of the fruit when administered intraperitoneally showed a marked reduction in inflammation and oedema, indicating an immunosuppressive action²⁰.

Sunthi

Aqueous alcoholic extract of ginger has been demonstrated to exhibit significant anti radiation effect in experimental mice after whole body exposure to gamma radiation. Ginger extracts bestowed significant protection against emesis in healthy mongrel dogs. This chemoprotective activity may be a useful antiemetic adjunct in cancer chemotherapy. Topical application of gingerol half an hour before exposure to the skin tumor promoter attenuated the skin papillomagenesis initiated by the carcinogen. In another study, pre ingestion of gingerol has been demonstrated to delay the onset of tumorigenesis, reduced number of tumors and tumor volume in a mouse skin tumorigenesis induced by the carcinogen benzo(a)pyrene²¹.



Figure 11: Sunthi



Figure 12: Marica

Marica

Ethanol extract of *Piper nigrum* exhibited antioxidant activity and anti-inflammatory activity. Time- and dose-dependent increase in the cytotoxic efficacy of the ethanolic extract against colorectal carcinoma cell lines were also noted²².

Varuna

Acid phosphatase and lipid peroxidation in prostate cancer-induced rats, which was in an increased level showed a significant decreased level of the same after treatment with varuna extract. Also the decreased enzymic and nonenzymic antioxidants were restored to normal values²³.

Ela and Twak

Ela and twak have antioxidant activity and free radical scavenging properties²⁴.

Patra

Methanolic extract of *Cinnamomum tamala* showed significant *in vitro* cytotoxic activity on cancer cell lines with no toxic effect on normal human peripheral blood mononuclear cells, mouse peritoneal macrophages and mouse spleen cells. Patra significantly inhibited tumor growth, arrested the tumor metastasis to major organs and normalized the blood parameters of tumor induced mice, in the fibrosarcoma-induced mouse tumor mode²⁵.



Figure 13: Varuna



Figure 14: Ela

Guggulu

Methanolic extract of the gum-resin exhibited significant anti cancer activity against myeloid leukaemia (in vitro), and it has been shown that these compounds exert their antileukaemic action via apoptosis and differentiation. Z-guggulsterone may prove valuable in the prevention of metastasis of breast cancer cells to bone, as it prevents osteoblast induced migration of metastatic human breast cancer cells and induces their apoptosis *in vitro*²⁶.

CONCLUSION

Rasasastra, one of the pharmaceutico therapeutic branches of Ayurveda, incorporates many of the inorganic, herbo-mineral and metallic preparations. In the field of medicine greater change was observed, when plants and minerals were combined together and produce herbo-mineral formulations. They have better therapeutic qualities like effective in small dosage, tastelessness, quick effectiveness and long shelf life. Rasoushadhis has rasayana effect and thus they help to boost the metabolism, and enhance the regeneration of the body cells and tissues. Also the immunomodulatory effects of rasoushadhis also help to strengthen the cells and boost the immunity. If it is practiced in full earnest can help alleviate dreadful diseases and help in longevity.

REFERENCE

1. drshriraj.blogspot.com/2009/01/pharmacology-of-kajjali-kalpas.html
2. Kumar Suresh, Overview for various aspects of the health benefits of Piper longum, Journal of Acupuncture and Meridian studies, 4 (2), 134-140
3. Sukh dev, Prime ayurvedic plant drugs, A modern scientific appraisal, New Delhi, Ane books Pvt.Ltd, 2012, p: 156.
4. L.D Pradhan, Golden Heart of the Nature: Piper betle Journal of Pharmacognosy and Phytochemistry, Vol. 1 No. 6, 2013.
5. Sphurti, Pharmaceutico analytical study of Vajra gomutra yoga and its cell line anti tumor activity, Shri BMK Ayurveda mahavidyalaya, Belagavi, July 2015.
6. N. K. Jain; V. B. Gupta; Rajesh Garg; N. Silawat (2010). "Efficacy of cow urine therapy on various cancer patients in Mandsaur District, India – A survey". *International Journal of Green Pharmacy*. 4 (1), 29–35. doi:10.4103/0973-8258.62163.
7. Ben Burrows (13 January 2014), "Pictured: A very few Indian Hindu worshippers drink COW URINE to help prevent cancer". *Mirror*. Retrieved 27 December 2015.
8. <http://www.pfaf.org/user/Plant.aspx?LatinName=Amaranthus+blitum>, assessed on 13/12/17.
9. Tripathy Indradev, Rasaratnasamucchaya, Rasaprabha- Hindi commentary, Varanasi, Chaukhamba Sanskrit bhavan, 2003, p331.
10. H.A. El-Shemy, Antitumor Properties and Modulation of Antioxidant Enzymes' Activity by Aloe vera Leaf Active Principles Isolated via Supercritical Carbon Dioxide Extraction, *Current Medicinal Chemistry*, Vol. 17, No. 2, 2010.
11. Muthuraman Meenakshi Sundaram, Anticancer Activity of Sida cordifolia L, – Insilico approach, Journal of Pharmaceutical Sciences and Research, Vol. 9(8), 2017, 1363-1367.
12. Angadi Ravindra, Rasatarangini, English translation, Varanasi, Chaukhamba Surbharati Prakashan, 2015, 23/15-17.
13. Rasatantrasara va siddhaprayoga sangraha, pratham khand, Ajmer, Krishna gopal Ayurveda bhavan, 2003, p: 173.
14. K.R. Srikanthamurthy, Sarngadhara samhita, English translation, Varanasi, Chaukhamba Orientalia, Reprint 2016, 7/96-98.
15. Ayuvedic Formulary of India – Part I, Govt of India, Ministry of health and family welfare, Dept of Indian system of medicine and Homeopathy, 2003, p:67.
16. Gunalan Gayatri, Anticancer activity of Bauhinia variegata Linn leaf extract on colo 320 cells, Indo American journal of Pharmaceutical research, Mon 4 Dec 2017.
17. Sukh dev, Prime ayurvedic plant drugs, A modern scientific appraisal, New Delhi, Ane books Pvt.Ltd, 2012, p; 622.
18. Sukh dev, Prime ayurvedic plant drugs, A modern scientific appraisal, New Delhi, Ane books Pvt.Ltd, 2012, p; 625.
19. Sukh dev, Prime ayurvedic plant drugs, A modern scientific appraisal, New Delhi, Ane books Pvt.Ltd, 2012, p; 616.
20. Sukh dev, Prime ayurvedic plant drugs, A modern scientific appraisal, New Delhi, Ane books Pvt.Ltd, 2012, p; 338.
21. Sukh dev, Prime ayurvedic plant drugs, A modern scientific appraisal, New Delhi, Ane books Pvt.Ltd, 2012, p;686-687.
22. Prashant A, In vitro anticancer activity of ethanolic extracts of Piper nigrum against colorectal carcinoma cell lines, International journal of applied and basic medical research, 2017 Jan-Mar, 7(1), 67-72.



23. Anticancer activity of the ethanolic extract of *Crateva nurvala* bark against testosterone and MNU-induced prostate cancer in rats. Available from: <https://www.researchgate.net/publication/257708098> _ [accessed Dec 08 2017].
24. Ramya A, Evaluation of the anti tumor activity of the Ayurvedic formulation on Kanchanara guggulu on N-Nethyl-N-Nitrosourea induced mammary tumor in Sprague – Dawley rats, International Ayurvedic Medical Journal, Volume 5; Issue 1, January- 2017.
25. Thanekar Deepavali, Evaluation of antitumor and anti-angiogenic activity of bioactive compounds from *Cinnamomum tamala*: *In vitro*, *in vivo* and *in silico* approach, South African journal of Botany, Volume 104, May 2016, Pages 6-14.
26. Sukh dev, Prime ayurvedic plant drugs, A modern scientific appraisal, New Delhi, Ane books Pvt.Ltd, 2012, p: 261.

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