



# Pharmaceutico-Analytical Study Of Arogya Vardhini Gutika Rasa Modified Into Pottali – A Unique Dosage Form

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**Abstract:** *Rasashastra* is a special branch of Ayurveda which deals with processing of mercury and making it therapeutically absorbable in the body. The act of imbuing definite therapeutic properties in purified mercury through various pharmaceutical procedures is known as *Murcchana*. *Arogya Vardhini Gutika Rasa* is a *Khalviya Rasayana Yoga* explained in the *Rasaratna Samucchaya*, *Kushta Rogadhikara*. *Pottali Kalpana* is a consolidated form of mercurial preparation which incorporates the *Pota Bandha* of *Parada*. *Pottali* is also type of *Parada Murcchana* where processing of mineral and herbal drugs is done using *Gandhaka Drava Paka*. Hence an attempt is being made to do pharmaceutical study of *Arogya Vardhini Gutika Rasa* and modify it into *Pottali* and conduct its analytical study. The ratio of the ingredients and *Bhavana Dravya* were according to classical reference and out of 18g of *Kalka*, we obtained 8g of *Pottali*. *Gandhaka* or sulphur helps in forming a hard compact mass of the medicine which is more stable and difficult to break, thus preventing loss/leakage of medicine and its efficacy. There was considerable decrease in loss on drying from *Gutika* to *Pottali* which denoted that *Pottali* may have more shelf-life. *Pottali* may be having faster action as the *Sukshma Churna* obtained by rubbing *Pottali* has faster absorption compared to *Gutika*. Hardness of the *Pottali* is more compared to the *Gutika* which suggest that *Pottali* is more stable compared to *Gutika*. As *Arogya Vardhini Rasa* is prescribed as *Rasayana* for longer duration, *Pottali* form can be a better dosage form compared to *Gutika/Vati*.

**Index Terms** - *Arogya Vardhini*, *Pottali*, *Gutika Rasa*, *Gandhaka Paka*, **hardness**, **micronutrients deficiency**.

## I. INTRODUCTION

*Rasashastra* is a special branch of Ayurveda which deals with processing of mercury and making it therapeutically absorbable in the body. The act of imbuing definite therapeutic properties in purified mercury through various pharmaceutical procedures is known as *Murcchana*.<sup>1</sup> *Arogya Vardhini Gutika Rasa* is a *Khalviya Rasayana Yoga* explained in the *Rasaratna Samucchaya*, *Kushta Rogadhikara* (R.R.S.20.108-114)<sup>2</sup>. *Khalviya Rasayana* is a type of *Parada Murcchana* where all the mineral and herbal drugs are taken in a *Khalva Yantra* and *Bhavana* given with suitable *Drava Dravya*. *Pottali Kalpana* is a consolidated form of mercurial preparation. *Potta*, *Pota*, *Pottam* means binding together, gathering, concising.<sup>3</sup> *Pottali* is also type of *Parada Murcchana* where processing of mineral and herbal drugs is done using *Gandhaka Drava Paka*. Hence an attempt is being made to do pharmaceutical study of *Arogya Vardhini Gutika Rasa* and modify it into *Pottali* and conduct its analytical study.

## II. AIM AND OBJECTIVES

**Aim:** To do pharmaceutical study of *Arogya Vardhini Gutika Rasa* modified into *Arogya Vardhini Pottali* and compare analytically.

### Objectives:

- To review articles/journals, texts related to *Arogya Vardhini Gutika Rasa*.
- To prepare *Arogya Vardhini Gutika Rasa* as per classical reference.
- To do analytical test of *Pottali* and compare with analytical parameters of *Gutika Rasa*.

## III. MATERIALS AND METHODS

**Materials required:** Classical texts, articles/journals, *Khalva Yantra*, measuring jar, weighing machine, iron vessel, sand, poly-ester cloth, thread, steel plates, purified and unpurified sulphur, iron rod, earthen pot, glass bottle, plastic bowls, Steaming vessel.

**Table 1: Ingredients.**

Sl. No.	Drug name	Botanical/Chemical name	Parts used	Quantity
1	<i>Shuddha Parada</i>	Purified Mercury (Hg)	-	1 part = 2g
2	<i>Shuddha Gandhaka</i>	Purified Sulphur (S)	-	1 part = 2g
3	<i>Loha Bhasma</i>	Calx of iron (Fe)	-	1 part = 2g
4	<i>Abhraka Bhasma</i>	Calx of mica (K (Mg, Fe) <sub>3</sub> (AlSi <sub>3</sub> O <sub>10</sub> ) (OH) <sub>2</sub> )	-	1 part = 2g
5	<i>Tamra Bhasma</i>	Calx of copper (Cu)	-	1 part = 2g
6	<i>Triphala</i>	<i>Emblica officinalis</i> Linn., <i>Terminalia chebula</i> Retz., <i>Terminalia bellerica</i> Roxb.	Fruit rind	2 parts = 4g
7	<i>Shuddha Shilajatu</i>	Asphaltum	-	3 parts = 6g
8	<i>Shuddha Guggulu</i>	<i>Commiphora mukul</i>	Resin	4 parts = 8g
9	<i>Chitraka</i>	<i>Plumbago zeylanica</i> Linn.	Root	4 parts = 8g
10	<i>Katuki</i>	<i>Picrorhiza kurroa</i> Royle	Rhizome	18 parts = 36g
11	<i>Nimba</i>	<i>Azadirachta indica</i>	Leaves	150ml

Fig. No. 1: Ingredients.



Table 2: Properties of ingredients: (Mineral drugs)

Sl. No.	Name	Rasa	Guna	Veerya	Vipaka	Karma
1	<i>Shuddha Parada</i> <sup>4</sup>	All 6 Rasa	<i>Snigdha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Yogavahi, Drushtibalaprada, Sarvamayahara, Rasayana, Tridoshaghna, Mahavrushya</i>
2	<i>Shuddha Gandhaka</i> <sup>5</sup>	<i>Katu, Tikta</i>	<i>Laghu, Sara</i>	<i>Ushna</i>	<i>Katu</i>	<i>Pittakara, Kanduisarpajit, Kushtaghna, Kshayahara, Pleehakaphavatahara</i>
3	<i>Loha Bhasma</i> <sup>6</sup> (B.B.R.4.6416)	<i>Tikta, Madhura</i>	<i>Sara, Guru, Ruksha</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Lekhana, Chakshushya, Vatahara, Garavishahara, Panduhara, Shothahara</i>
4	<i>Abhraka Bhasma</i> <sup>7</sup> ( <i>Shataputi</i> ) (A.P.2.130-131)	<i>Kashaya, Madhura</i>	<i>Susheeta, Laghu, Teekshna</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Tridoshahara, Vranahara, Kushtaghna, Mehahara, Udarahara, Krimihara, Vishahara</i>

5	<i>Tamra Bhasma</i> <sup>8</sup> (R.R.S.5.53)	<i>Kashaya, Madhura, Tikta, Amla</i>	<i>Sara, Laghu, Sheeta</i>	<i>Ushna</i>	<i>Katu</i>	<i>Pittakaphahara, Lekhana, Ropana, Jwaraghna, Shothahara, Kushtaghna, Pandughna, Amlapittahara</i>
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Table 3: Properties of ingredients: (Herbal drugs)

Sl. No.	Name	Rasa	Guna	Veerya	Vipaka	Karma
1	<i>Amalaki</i> <sup>9</sup>	<i>Pancharasa (Lavana varjitha)</i>	<i>Guru, Sheeta</i>	<i>Sheeta</i>	<i>Madhura</i>	<i>Rasayana, Vayasthapana, Sarvadoshaghna, Dahahara</i>
2	<i>Haritaki</i> <sup>10</sup>	<i>Pancharasa (Lavana varjitha)</i>	<i>Laghu, Rooksha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Lekhaniya, Shothanut, Pachana, Rasayana.</i>
3	<i>Vibhitaki</i> <sup>11</sup>	<i>Madhura, Kashaya</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Madhura</i>	<i>Kaphapittanut, Kasahara, Netrahita, Keshya, Bhedana, Krimihara.</i>
4	<i>Shilajatu</i> <sup>12</sup>	<i>Katu, Tikta</i>	<i>Ushna, Teekshna</i>	<i>Ushna</i>	<i>Katu</i>	<i>Rasayana, Chedana, Yogavahi, Kaphahara, Medohara, Ashmarihara, Unmadahara, Kushtaghna, Shothahara</i>
5	<i>Guggulu</i> <sup>13</sup>	<i>Tikta, Kashaya</i>	<i>Vishada, Ushna, Sara, Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Pittakara, Bhagnasandhanakrut, Svarya, Rasayana, Deepana, Balya, Medohara, Apachihara, Kushtaghna,</i>
6	<i>Chitraka</i> <sup>14</sup>	<i>Katu, Kashaya</i>	<i>Ruksha, Ushna, Laghu</i>	<i>Ushna</i>	<i>Katu</i>	<i>Deepana, Pachana, Grahanihara, Grahi, Kushtaghna, Kasahara, Arshaghna, Vatakaphahara, Shothahara</i>
7	<i>Katuki</i> <sup>15</sup>	<i>Tikta</i>	<i>Rooksha, Laghu</i>	<i>Sheeta</i>	<i>Katu</i>	<i>Kaphapittahara, Krimighna, Kushtaghna, Deepana</i>
8	<i>Nimba</i> <sup>16</sup>	<i>Tikta, Kashaya</i>	<i>Laghu, Rooksha</i>	<i>Sheeta</i>	<i>Katu</i>	<i>Krimihara, Vranahara, Pittakaphahara, Kushtahara</i>

**Method of preparation:**

There are mainly 3 steps in method of preparation:

1. *Purva Karma*
2. *Pradhana Karma*
3. *Pashchat Karma*

**Table 4: Method of preparation**

	<i>Arogya Vardhini Gutika Rasa (AVGR)</i>	<i>Arogya Vardhini Pottali (AVP)</i>
<b><i>Purva Karma</i></b>	All the ingredients are weighed and made into fine powder + Extraction of <i>Nimba Patra Swarasa</i> for <i>Bhavana Dravya</i>	
<b><i>Pradhana Karma</i></b>	<i>Bhavana</i> of the fine powder using <i>Nimba Patra Swarasa</i> → rolled into <i>Vati form</i>	<i>Bhavana</i> → made into <i>Shikhakara</i> form → Heating with <i>Gandhaka Drava Paka</i>
<b><i>Pashchat Karma</i></b>	<i>Vati</i> dried, weighed and stored in an air-tight container	Assess <i>Pottali Siddha Lakshana</i> → weighed and stored in an air-tight container

***Purva Karma:***

- All the ingredients are made into fine powder separately.
- Extraction of *Nimba Patra Swarasa*: (*Swedana method*)
  1. *Nimba Patra* is washed thoroughly and kept over *Swedani Yantra* for about 1 hour.
  2. After *Swedana*, *Nimba Patra* is placed in *Khalva Yantra* and pounded to form *Kalka*.
  3. *Nimba Patra Kalka* is collected in a Kora cloth and *Swarasa* is squeezed out.
- *Shuddha Guggulu* and *Shuddha Shilajitu* are taken and soaked in *Nimba Patra Swarasa* to make it soft for half an hour.

***Pradhana Karma: (For both Arogya Vardhini Gutika Rasa and Pottali)***

All the fine powders of herbal drugs and mineral *Bhasmas* are added to the *Khalva Yantra* and *Bhavana* is given by adding *Nimba Patra Swarasa*. *Bhavana* is given for 2 days.

***(For Arogya Vardhini Gutika Rasa)***

After 2 days of *Bhavana*, the mixture which is now in *Kalka* form is rolled into *Vatis* of uniform size of about 250mg.

***Gandhaka Paka Method: (For Arogya Vardhini Pottali)***

- After *Bhavana*, the mixture was made into *Shikhakara* or *Lingakara Pottali* and it is dried in sunlight. Later it was placed over *Shuddha Gandhaka Churna* which was spread over a clean square poly-ester cloth.
- Cloth was closed over the *Pottali* after adding sufficient amount of *Shuddha Gandhaka Churna* around it and tied tightly with a thread suspending over an iron rod.
- Iron vessel was taken and an earthen pot was placed in the middle. Rest of the space was filled with sand/*Valuka* till the surface covered the neck of the pot. *Valuka Yantra* was placed over the stove and heating was started at mild fire.
- *Ashuddha Gandhaka Churna* was added till it fills half of the pot. The *Pottali* was placed inside the pot and remaining *Ashuddha Gandhaka Churna* was filled upto neck of the pot.
- Heating was given for 8 hours with intermittent switching on and off the stove to prevent excessive evaporation of molten *Gandhaka*.

***Pashchat Karma: (For Arogya Vardhini Gutika Rasa)***

*Vatis* are dried under sunlight and stored in an air tight container.

***Pottali Siddha Lakshana: (For Arogya Vardhini Pottali)***

- Molten *Gandhaka* will turn into *Vyoma Varna* (dark blue).
- *Pottali* produced metallic sounds when hit with a hard object.
- *Pottali* when rubbed over a hard, rough surface should leave out a trace of its contents.
- The obtained *Pottali* is stored in an air tight container.



Fig. No. 2: *Nimba Patra*



Fig. No. 3: *Nimba Patra Swarasa*



Fig. No. 4: Soaking *Shuddha Shilajitu* in *Nimba Patra Swarasa*.



Fig. No. 5: Soaking *Shuddha Guggulu* in *Nimba Patra Swarasa*.



Fig. 6: Adding of *Kajjali*



Fig. 7: Adding of *Tamra Bhasma*



Fig. 8: Adding of *Abhraka Bhasma*



Fig. 9: Adding of *Triphala Churna*



Fig. 10: Adding of *Chitraka Churna*



Fig. 11: Adding of *Loha Bhasma*



Fig. 12: Adding of *Katuki Churna*



Fig. 13: Adding of *Nimba Patra Swarasa*



Fig. 14: Weighing after *Bhavana*



Fig. 15: Mixture made into *Lingakara Pottali*



Fig. 16: Final product of AVGR



Fig. 17: *Pottali* placed in poly-ester cloth



Fig. 18: Adding *Ashuddha Gandhaka*



Fig. 19: *Pottali* is placed in the iron pot



Fig. 20: Molten *Gandhaka* after heating



Fig. 21: Molten *Gandhaka* changes to *Vyoma Varna*



Fig. 22: Final product of AVP

## IV. OBSERVATION AND RESULTS:

Table 5: Results of *Bhavana* with *Nimba Patra Swarasa*

Particulars	Quantity
Initial quantity of all the <i>Churna</i> mixed	72g
Quantity of <i>Nimba Patra Swarasa</i> taken	150ml
Final quantity obtained after <i>Bhavana</i> for 2 days	162g
Loss/gain of <i>Kalka</i> obtained	55.5% gain

Table 6: Number, Weight and shapes of *Pottali* prepared  
(Total number of *Pottali* prepared is 6)

Shape	Initial Quantity per <i>Pottali</i>	Number
<i>Lingakara</i> *	24g	3
<i>Dandakara</i>	24g	2
<i>Shikharakara</i> **	18g	1

\*One is used for analytical study. \*\*used in present pharmaceutical study.

Table 7: Results of procedure of AVGR.

Weight of <i>Kalka</i> taken for AVGR	24g
Total weight after drying	18g
No. of <i>Vatis</i> made	74
% of Loss	25%
Weight of each <i>Vati</i>	243mg

Table 8: Results of procedure of AVP.

Weight of <i>Kalka</i> taken for AVP ( <i>Shikharakara</i> )	18g
weight after drying	15g
No. of <i>Pottalis</i> made	6
Final weight of single <i>Pottali</i>	8g
% of Loss	66.6%

**Table 9: Organoleptic characters of AVGR and AVP.**

	<b>AVGR</b>	<b>AVP</b>
Colour	black	Black
Consistency	hard	very hard
Taste	<i>Tikta, Kashaya</i>	<i>Tikta, Kashaya</i>
Touch	coarse	Coarse
Odour	<i>Guggulu Gandha</i>	<i>Guggulu Gandha</i>

**Table 10: Total duration and amount of Gandhaka used.**

Total duration of practical	8 hours
Total <i>Shuddha Gandhaka</i> used	120g
Total <i>Ashuddha Gandhaka</i> used	1838g

**Table 11: Time and temperature pattern of AVP**

<b>Sl. No.</b>	<b>Time</b>	<b>Event</b>	<b>Temperature</b>
1	8:00 AM	Fire is ignited and kept mild	0°C
2	8:30 AM	-	40°C
3	9:00 AM	Moisture getting evaporated	90°C
4	9:30 AM	<i>Ashuddha Gandhaka Churna</i> starts melting	120°C
5	10:00 AM	Melting of <i>Ashuddha Gandhaka</i> is complete	160°C
6	10:20 AM	Golden brown colour of <i>Gandhaka Drava</i> is observed	195°C
7	11:00 AM	<i>Gandhaka</i> vapours started to appear	230°C
8	11:25 AM	<i>Gandhaka</i> vapours is increased. Stove is switched off	295°C
9	12:00 PM	Thin layer of scum started to appear. Stove is again switched on	210°C
10	12:30 PM	Colour of <i>Gandhaka</i> becomes dark brown.	220°C
11	1:10 PM	<i>Gandhaka</i> fumes started again. Stove is switched off once again.	260°C

12	1:45 PM	<i>Gandhaka</i> fumes started reducing. Stove is switched on again	206°C
13	2:30 PM	<i>Gandhaka</i> fumes started again. Stove is switched off once again.	270°C
14	3:00 PM	Scum formed. Fumes reduced. Stove is switched on again	190°C
15	3:25 PM	Bluish black ( <i>Vyoma</i> ) colour of <i>Gandhaka Drava</i> is observed	235°C
16	4:05 PM	Metallic sound heard, <i>Pottali</i> is removed	210°C

**Table 12: Therapeutic action and dosage of AVGR and AVP**

<b>Dose</b>	250mg to 500mg twice or thrice daily <sup>17</sup>
<b>Indication</b>	<i>Mandala Kushta, Tridoshaja Jwara, Pachana, Deepana, Hridya, Medovinashini, Sarvarogahara, Malashuddhikara.</i>
<b>Anupana</b>	<i>Ghrita, Goksheera, Takra, Guda, Dashamoola Kwatha, Punarnavadi Kwatha, Ardraka Swarasa</i>
<b>Shelf life</b>	5 years
<b>Route of administration</b>	Oral

#### IV. ANALYTICAL STUDY

**Table 13: Analytical results of AVGR (with SDL reference range) and AVP.**

Sl. No.	parameter	AVGR	AVP	SDL Reference of AVGR
1	Loss on drying	15.7%	9.3%	Not more than 10%
2	Total ash	15.3%	22%	Not more than 15%
3	Acid insoluble ash	2.59%	10%	Not more than 10%
4	Acid soluble ash	12.71%	12%	-
5	Alcohol soluble extractive	23.82%	7.45%	Not less than 15%
6	Water soluble extractive	31.40%	8.67%	Not less than 25%
7	Disintegration time	> 1 hour	-	Not more than 1 hour
8	Friability	0.1%	0%	Not more than 1%
9	Hardness	7 kg/cm <sup>2</sup>	14 kg/cm <sup>2</sup>	Not less than 2 kg/cm <sup>2</sup>

## V. DISCUSSION

*Arogya Vardhini Pottali* is a *Sagandha*, *Sagni*, *Bahirdhooma*, *Gandhaka Jaarita*, *Kajjali Bandha Pottali Murchana* containing important *Bhasmas* such as *Loha*, *Abhraka* and *Tamra*. Other herbal drugs like *Triphala*, *Chitraka*, *Katuki*, *Guggulu* and *Nimba* possess *Kaphapittahara* and *Pachana* properties that makes the formulation having wide therapeutic efficacy and may act as *Rasayana*. The loss on drying is considerably reduced from 15.7% in AVGR to 9.3% in AVP. This shows that there is reduction in moisture content and thus increases the shelf life of the final product. As the process is *Sagni* (with fire), there is considerable loss of water soluble and alcohol soluble extractives from AVGR to AVP. But *Agni Samskara* mainly increases the therapeutic efficacy and stability of the product. There is considerable raise in the total and acid-insoluble ash in AVP compared to AVGR. It shows that AVP has a greater number of metallic salts, oxalates, carbonates, phosphates, silicates. Disintegration time is high in *Gutikas* as it may delay the therapeutic action due to slow absorption and assimilation. In *Pottali*, medicines are administered in *Sukshma Churna* form with suitable *Anupana* and hence may have better absorption and quick action. Friability is the tendency of a solid substance to break into smaller pieces when stressed or rubbed. *Gutikas* have greater tendency to break compared to *Pottali*. Hence *Pottali* is easier to transport from one place to another with no leakage of medicine. Hardness is a measure of the force needed to break it. It's used to ensure that the dosage form is durable enough to withstand handling during manufacturing, packaging, and transportation. Hardness is more in *Pottali* compared to *Gutika*. Hence *Pottali* is a better dosage form compared to *Gutika*. Nutrient sufficiency is the basis for good health, productive, and longevity of life. Approximately 1.7 million (2.8%) of deaths worldwide are attributed to micronutrients deficiency caused by lower consumption of fruits and vegetables that is regarded as top 10 selected risk factors for global mortality.<sup>18</sup> Iron, Potassium, Magnesium and Copper are some of the important micro-nutrients which are required by the body for various enzymatic reactions and maintenance of vitality of organs. Since AVGR or AVP are rich in such minerals, it can be used by people for longer duration without any adverse drug reactions.

## VI. CONCLUSION

*Arogya Vardhini Pottali* is a better dosage form compared to *Gutika* for administration of medicines for a longer period (*Rasayana*) with lesser dose having better absorption and assimilation.

## VII. FURTHER SCOPE:

Animal experimentation is needed for toxicity study and comparative Clinical study can be done to assess therapeutic efficacy and its effect on consuming for longer duration. Any scope for reduction in the dose of medicine in *Pottali* form compared to *Gutika* along with its standardization is required.

## VIII. REFERENCES:

1. Sumedhan Varsha, P Ratheesh, P P Meghna. A review on *Pottali Kalpana*. Journal Of Ayurveda and Integrated Medical Sciences; July-Aug 2018: vol 3(4), Pg. No. 96
2. Acharya Vagbhata, Tripathi Indradeva, Giri Kapildev. Rasaratna Samucchaya. Varanasi: Chaukhambha Samskruta Samsthana; 2009: 20<sup>th</sup> chapter, Pg. No. 252
3. Sumedhan Varsha, P Ratheesh, P P Meghna. A review on *Pottali Kalpana*. Journal Of Ayurveda and Integrated Medical Sciences; July-Aug 2018: vol 3(4), Pg. No. 97
4. Bhavamishra, Shastri Dvivedhi Vishwanatha. Bhavaprakasha Nighantu. Delhi: Motilal Banarasidas publications; 1998, 4<sup>th</sup> ed: Pg. No. 372
5. Ibid, Pg. No. 373

6. Ibid, Pg. No. 365
7. Ibid, Pg. No. 375
8. Ibid, Pg. No. 363
9. Ibid, Pg. No. 9
10. Ibid, Pg. No. 3
11. Ibid, Pg. No. 8
12. Ibid, Pg. No. 370
13. Ibid, Pg. No. 107
14. Ibid, Pg. No. 19
15. Ibid, Pg. No. 46
16. Ibid, Pg. No. 180
17. Ayurveda Formulary of India (Part – 1). Delhi: Controllers Publications of India; 2003, 2<sup>nd</sup> ed: Pg. No. 665
18. Narwal Ram Phal, Malik R. S., Malhotra S. K., Ram Singh Bal. Micronutrients and Human health. Delhi: Encyclopaedia of Soil Science; 2017 March, 3<sup>rd</sup> ed: Pg. No. 1443-48

