

A CRITICAL REVIEW OF RASAUSHADHIES USED IN SHWASA ROGA WITH SPECIAL REFERENCE TO ITS METALLIC CONTENT

Niladri Bhattacharjya^{1*}, Pramod R Yadav², Prajapati PK³

1. PG Scholar, Dept. of Rasashastra and Bhaishajyakalpana, All India Institute of Ayurveda, Saritavihar, New Delhi, India.
2. Assistant Professor, Dept. of Rasashastra and Bhaishajyakalpana, All India Institute of Ayurveda, Saritavihar, New Delhi, India.
3. Head, Dept. of Rasashastra and Bhaishajyakalpana, All India Institute of Ayurveda, Saritavihar, New Delhi, India.

Received: 17-05-2019; Revised: 29-05-2019; Accepted: 31-05-2019

Abstract

Chronic obstructive pulmonary diseases (COPD), bronchial asthma, pneumonia, tuberculosis (TB), are the major respiratory disorders which can be correlated with *Shwasa Roga* in Ayurvedic classics. Traditional system of medicine is gaining its popularity day by day for its holistic and bio-friendly approach. Herbo-metallic, herbo-mineral, metallo-mineral preparations which are classically known as *Rasaushadhies* are said to be boon to the system. However, now-a-days their use is a matter of concern as their safety aspect has become questionable in the scientific society. Therefore, an attempt has been made to compile the *Rasaushadhies* indicated in *Shwasa Roga* and probable justification for the use of their metallo-mineral content. Various classics of *Rasa shastra* and internet database were searched for this study. The combination of content, *Bhavana Dravya*, *Anupana* of these formulations has been found to be logical and scientific as they have multiple established pharmacological actions to control, prevent and manage *Shwasa Roga*. The metals and minerals present in the formulations are in compound form and have different types of herbo-chemical bond; therefore, they act differently than the environmental metals and minerals. Therefore, different novel methods to assess the bioavailability and bio accessibility of herbo-metallic, herbo-mineral and metallo-mineral preparations are to be studied before questioning their safety.

Key words: Rasaushadhies; Herbo-metallic formulation; *Shwasa Roga*; Metallic content; Bio accessibility.

*Address for correspondence:

Dr. Niladri Bhattacharjya,
PG Scholar, Dept. of Rasashastra and Bhaishajyakalpana,
All India Institute of Ayurveda, Saritavihar,
New Delhi, India – 110 076
E-mail: drniladri.007@gmail.com

Cite This Article

Niladri Bhattacharjya, Pramod R Yadav, Prajapati PK. A critical review of Rasaushadhies used in Shwasa roga with special reference to its metallic content. Ayurpharm Int J Ayur Alli Sci. 2019;8(5):46-55.

INTRODUCTION

Indoor and outdoor air pollution, workplace exposure, unwholesome diet, active and passive smoking, urban overcrowding leads to respiratory disease and has become a severe health burden to the society. It accounts for more than 6.4 % total DALYs (disability-adjusted life-years) in India.^[1] Chronic obstructive pulmonary disease (COPD), bronchial asthma, pneumonia, tuberculosis (TB), lung cancer are 5 major component of chronic respiratory disease and globally 4 million of people per year become the victim of it.^[2] In traditional system of medicine respiratory diseases refers to *Shwasa Roga* which is classified into five types as per *Doshika* involvement, severity and prognosis. Due to side effects and lack of curative treatments for several chronic diseases, high cost of the new medicines, microbial resistance developed against different active ingredients as well as lack of empathy experienced by patients during contemporary medical treatments, Traditional system of medicine (TSM) are gaining popularity world wide.^[3]

Traditional Indian system of medicine is the treasure of various formulations depending upon their ingredients and different indications. It was strengthened by ancient scholars, in the medieval period by adding metals and minerals in to the repertoire. Solo metallic, mineral, metalo-mineral, herbo-metallic, herbo-metalo-mineral formulations can be considered as *Rasaushadhies*. *Rasaushadhies* are said to be a boon to the traditional pharmaceutical sciences as they poses quick action, lesser dose, no issue of palatability, long shelf life. Due to these virtues, *Rasaushadhies* occupied a significant place in Ayurvedic therapeutics and has been prescribed routinely all over country.

Being used for over a long period, for the purpose of prevention, control and treatment these medicines are acknowledged as safe,

which is the ultimate proof for their non - toxic beneficial effects. However, the use of metals and minerals in therapeutics has been questioned and debatable in concern to their safety aspect and heavy metal content in scientific and public domain.

Therefore, in this article, an attempt has been made to compile the *Rasaushadhies* indicated in *Shwasa Roga* in respect to their metallic and mineral content as well as putative justification in favor of their safety.

MATERIAL AND METHODS

Various classics of *Rasa shastra* like *Rasa yogasagara*, *Bharat Bhaishajya Ratnakar*, *Rasatantrasara* and *Siddha Prayoga Samgraha*, *Siddha Yoga Samgraha*, Ayurved Formulary of India were searched. Internet browsing from Google Scholar, PubMed, DHARA database was used to identify and to download abstracts and research papers related to herbo-metallic/mineral drugs by using suitable keywords- Ayurvedic drug + herbometallic / mineral drug + respiratory disease + anti asthmatic + anti-oxidant+ rejuvenating + bioavailability + bio accessibility + metallic content.

OBSERVATIONS AND RESULTS

Observations and results are tabulated as Table 1, Table 2 and Table 3.

DISCUSSION

Rasaushadhies are described as the formulations prepared from the *Rasavargiya Dravyas* (A combination of mercury and mercurial preparations, metalloids, minerals, drugs of animal origin, poisonous medicinal plant and sometimes herbal drugs too). *Rasaushadhies* are considered to be best over herbal medicines. Physicians prefer to prescribe *Rasaushadhies* in chronic and non-responding conditions. There are total 46 *Rasaushadhies* mentioned for *Shwasa Roga*. However, very few of them are being

manufactured by the government and private Ayurvedic pharmacies. Moreover, availability of the raw ingredients, in process difficulties and cost-effectiveness might be some of the reasons.

Rasayoga Sagara, a prominent text having compilation of more than 3900 *Rasaushadhies* has been prolifically referred and taken as the base text for compiling references in the present article. Formulation nomenclature bearing the word “*Shwasa*” as well as those having direct indication in *Shwasa Roga* have only been considered in present compilation. More than 200 formulations having secondary indication in *Shwasa Roga* have been excluded for ease of drawing inferences.

Dosage form is the means by which it can introduce the therapeutic component to the biological system. It is determined on the basis of nature of the ingredients, pharmaceutical processing, palatability, amount of dose, site of action, nature of the disease etc. Every dosage form has its own advantages and limitations. In the present compilation, with respect to *Rasaushadhies* of *Shwasa Roga*, 15 pills, 3 *Parpati* (flakes) and 25 powders has been described. (Table 1) *Pathabheda* of the formulations has not been considered.

In the present compilation, (Table 2) it is observed that *Abhraka* (Biotite), *Vaikranta* (Tourmaline) and *Makshika* (Chalcopyrite) from *Maharasa Varga* has been mentioned as an ingredient in some of the formulations for *Shwasa Roga*. Processed *Abhraka* (Biotite), *Vaikranta* (Tourmaline) and *Makshika* (Chalcopyrite) has been found in 9, 2 and 4 formulations respectively. In classics all of them have been described as a *Rasayana* (rejuvenating agent). Free radical scavenging activity,^[4] cell rejuvenating activity, anti-microbial and anti-fungal activity of *Abhraka Bhasma* has been reported.^[5] *Gandhaka* (Sulphur), *Hartala* (Orpiment), *Manhshila* (Realgar), are the *Dravyas* described under *Uparasa Varga*. In classics,

Rasaushadhies were divided into two groups *Sagandha* (with processed sulphur) and *Nirgandha* (without processed sulphur). Out of 46 formulations processed sulphur was found in 29 formulations in which maximum quantity of processed sulphur was found in KSHG formulation (228.18 mg). Maximum quantity of Processed *Haratala* and *Manashila* were found as 62.5 mg in SKKR formulation. *Gouripashana* (white arsenic) and *Hingula* (Cinnabar) from *Sadharana Rasa Varga* are also noted in the ingredients list. *Gouripashana* chemically known as As_2O_3 is reported to have inhibitory effects on asthmatic Th17-IL17 axis and can reduce airway inflammation and mucus hyperplasia in asthmatic rat model.^[6] *Swarna Bhasma* (Incinerated gold), *Rajata Bhasma* (Incinerated silver), *Tamra Bhasma* (incinerated copper), *Louha Bhasma* (incinerated iron), *Naga Bhasma* (incinerated lead) and *Vanga Bhasma* (incinerated tin) were also found as one of the ingredients in *Shwasahara Rasaushadhies*. Among incinerated metals, *Louha bhasma* (incinerated iron) was found in maximum number of formulation (11) followed by *Tamra* (incinerated copper) and *Swarna Bhasma* (Incinerated gold) (9). In ancient literature all of them are described as rejuvenating and revitalizing agent. While immuno-modulatory, anti-cancerous activity of *Swarna Bhasma*,^[7] *Rajata Bhasma*^[8] and antibacterial activity of *Rajata Bhasma*, *Tamra Bhasma*, *Loha Bhasma* has been found.^[9] No hazardous effect of incinerated metals has been found to be reported in acute, sub-acute and chronic toxicological study.^[10] *Mukta* (Pearl), *Pravala* (Coral), *Vaidurya* (Cats eye), *Suryakanta* (Sun stone), of *Ratna-Uparatna Varga* and *Sankha*, *Tankana* of *Shukla Varga* were mentioned by Acharyas. Calcinated marine product like *Mukta Bhasma*, *Pravala Bhasma*, *Shankha Bhasma* are used in the management of pulmonary tuberculosis, bronchial asthma, bronchiectasis in Ayurveda, Siddha and Unani system of medicines.^[11] *Vatsanabha* (*Aconitum ferox* Wall ex Seringe) and

Dhatura (*Datura stramonium* L) are enlisted in Drugs and cosmetic rule 1945, Schedule E1 for their poisonous property. Every poison can be a panacea if it is used wisely. Therefore, after detoxification they are used in the formulation and most of the formulation which having *Vatsanabha* as a part, *Tankana* is also found with it to minimize / eradicate any untoward effects.^[12] Both the drugs have *Yogavahi*, *vyavahi*, *rasayan*, *tridoshaghna* properties and therapeutically potent to cure respiratory disease.^[13] Anti-asthmatic, anti-inflammatory and antispasmodic properties of *Dhatura* has been widely reported.^[14] In present compilation, maximum quantity of processed *Vatsanabha* and *Dhatura* were found as 26.78 mg.

Various mercurial preparations like *Kajjali* (Black sulfide of mercury), *Rasasindoor* (Red sulfide of mercury), *Rasakarpoor* (Mercuric chloride), are described as a solo medicine or as an ingredients of other formulations for *Shwasa Roga*. Most of the formulations had *Kajjali* (Black sulfide of mercury) with different ratio of *Parada* (mercury) and *Gandhaka* (Sulphur). The multidimensional effect of *Kajjali* like free radicals scavenging, antioxidant, anti-microbial, catalytic, pro-enzymatic, immunomodulator activities have been reported.^[15] These mercurial compound enhance the bioavailability, bio-accessibility and potency of other component what are mixed with them by carrying the component into the targeted cell.^[16] A recent study in *Soma Yoga*, combination of *Somlata churna* (*Ephedra gerardiana* Wall. ex Stapf) and *Rasasindura* (Red sulfide of mercury) at a dose of 600 mg (1:20) twice a day showed significant remission of *Shwasa roga* without any untoward effect and biochemical alteration.^[17] In a similar study, *Shwasakuthara Rasa* prepared with *Kajjali* was found to be more effective in experimental and clinical trials in comparison to the formulation prepared without *Kajjali* and only herbal ingredients^[18] and it is well tolerated clinically without any adverse drug

reaction.^[19] A compound formulation consisting of *Abhraka Bhasma* and *Manahshila* is also reported to be safe and effective in clinical trials in management of *Shwasa Roga*.^[20]

Anupana is considered as a vehicle which has the ability to carry the drug to the targeted cells. It can increase bioavailability of the drugs by its *yogavahi* and *vyavayi* attributes thus, a very low dose of drug can mitigate the ailment. Not only that, it also has *Roghagna* property which adds to synergistic potency to the drugs and can also minimize the untoward effect of the drugs. *Maricha* (*Piper nigrum*. L), *Ardraka* (*Zingiber officinale* Roxb), *Pippali* (*Piper Longum* Linn), *Kantikari* (*Solanum virginianum* L), *Astadashanga Kwatha* (Decoction of 18 herbs), *Haritraki* (*Terminalia chebula*. Retz), *Parna Khanda* (*Piper betle*), *Beejpura Toya* (*Citrus medica* L.), *Bharangi* (*Clerodendrum serratum* (Linn) Kutz), *Pushkara* (*Inula racemosa*), *Karkati* (*Carica papaya* Linn), *Shathi* (*Hedychium spicatum* Buch Ham), *Dhatura* (*Datura stramonium* L), *Bhringaraj* (*Eclipta alba* (L.) Hassk), *Jiraka* (*Cuminum cyminum* Linn), *Sarkara* (Sugar), *Madhu* (Honey), *Dugdha* (Milk), *Sarpi* (Ghee) were found to described as a *Anupana / Sahapana* for administration of *Rasaushadhies* in *Shwasa Roga*. (Table 1) Apart from that, these drugs have proven pharmacological actions like bioavailability enhancer,^[21] anti-asthmatic,^{[22][23]} free radical scavenging activity,^[24] anti-microbial activity,^[25] anti-inflammatory,^[26] detoxification,^[27] antimutation activity,^[28] bronchodialator and anti-allergic activities.^[29] These attributes increase the potency and safety of *Rasaushadhies* prescribed in *Shwasa Roga* and help in targeted action.

The nano-structured and chemically stable metalloids and minerals are the principal factors to potentiate the efficacy of a formulation. Maximum amount of mercury/ its compound, arsenical compound, incinerated

Naga (Lead), *Makshika* (Chalcopyrite), *Tamra* (Copper), were present in *Bhagottara Vati* (428.57 mg), *Shwasakaskarikeshari Rasa* (62.5 mg), *Shwasahari rasa* (75 mg), *Shwaskas chintamani Ras* (21.73 mg), *Panchamrita rasa* (75 mg) and *Muktadi churna* is the *Shwasahara* formulation having maximum quantity of *Swarna*, *Rajata*, *Louha*, *Abhraka*, *Vanga* (571.42 mg each) respectively and *Shwasakuthara Rasa*, *Vrisabhadhwaja Rasa*, *Shwasakaleshwara*, *Tandavbarana Rasa*, *Shwasakaleswara Rasa* are having minimum amount of mercury / its compound (7.81 mg), arsenical compound (7.81mg), *Nag* (11.36 mg), *Makshika* (11.90 mg), *Tamra* (7.24mg), *Swarna* (11.36 mg), *Rajata* (11.36 mg), *Louha* (11.90mg), *Abhraka* (11.90 mg), *Vanga* (11.36 mg) respectively. (Table 2) It is pertinent to mention here that solid contents of *Bhavana Dravya* gets added into the formulation while levigation. Thus, the percentage of individual drug gets reduced in a formulation by considering this fact. Trituration with organic juices also initiates chemical reaction and cyclic process may result into formation of herbo-mineral bonds and formation of organic metal – mineral compounds which are relatively safe.

Metals and minerals undergo different type of process e.g. *Shodhana* (purification / detoxification), *Jarana* (oxidation), *Marana* (incineration, calcination), *Patana* (sublimation) before using in the formulations. Mercury and other metals and minerals which are used in the formulation get converted into different compound form during processing and safety of these mercurial compounds^{[30][31]} and metalo-mineral compounds^{[32][33]} are already reported. However, in recent era, presence of metalloids and minerals in the formulations become debatable in the scientific society in relation to their hazardous effects. According to contemporary science metallic element with high atomic weight (e.g., mercury, chromium, cadmium, arsenic, and lead) which can damage living things at

low concentrations and tend to accumulate in the food chain (EPA, 2000) is defined as heavy metals. WHO, FDA, USEPA, IPCS and other reputed agencies have set a safety limit for these heavy metals (JECFA 1989, US Environmental Protection Agency (USEPA) 2006). (Table 3)

The amount of metals and minerals which are detected through sophisticated instruments are relatively lower in concentration than the amount which is gravimetrically added as a part of formulation. (Table 3) Conversion of metals and minerals into particular compound form and limitation to detect different species of metals and minerals may be one of the causes. Bio-accessibility of metals and minerals depends upon chemical species, physico-chemical properties and herbo-chemical bond. Therefore, bio-accessibility of metalloids and mineral are varies from formulation to formulation.^[34]

CONCLUSION

Present review gives an insight into the available literature citing various *Rasaushadhies* used in *Shwasa Roga*. It is evident that very few are prepared today and still fewer are prevalent amongst practicing physicians. This gives an immense scope for exploring these drugs for their *Shwasahara* activity. *Parada* and *Gandhaka* in form of *Kajjali* or *Hingula* forms base of most number of formulations. It indicates towards bio-enhancing property of *Kajjali*. It also contributes towards imparting stability to herbal components. Mica (*Abhraka*), Arsenical compounds (*Manahshila*, *Haratala* and *Malla*) and its compounds are also frequently used in most of the formulations. The percentage of metals/minerals varies according to formulation. But they cannot be deemed to be toxic by mere presence of higher percentages of these metal / minerals. Concept of speciation, bioavailability, bio-accessibility and novel methods for bio assessing needs to be in place before questioning their safety.

Table 1: Rasaushadhies indicated in *Shwasa roga*^{[35][36][37][38][39]} (Abbreviation of name of drugs are mentioned in Annexure I)

Sl.No.	Name of drugs	Dose (mg)	Dosage form	Bhavna Dravya	Anupana
1.	KSAR	375	Pill	<i>Sudha rasa</i>	<i>Sarkara</i>
2.	KSHG	375-750	Pill	<i>Snuhi ksheera</i>	-
3.	GA	NM	Powder	-	<i>Maricha</i>
4.	KR	NM	Powder	<i>Guda</i>	-
5.	TVR	375	Pill	<i>Bhanga, Ardraka, Dhatoora Swarasa</i>	<i>Kantikari, Astadashanga Kwatha, Ardraka Swarasa</i>
6.	TS	NM	Powder	<i>Raktakarpas Swarasa</i>	<i>Haritaki</i>
7.	NR	375	Pill	<i>ArdrakaSwarasa</i>	<i>Ardraka Swarasa</i>
8.	PPT	375	<i>Parpati</i> (Flakes)	-	-
9.	PR	375	Pill	-	<i>Pippali, Madhu</i>
10.	PV	NM	Pill	<i>Parna rasa, Ardrak rasa</i>	-
11.	KR	250	Powder	-	<i>Parna khanda</i>
12.	PK	NM	Linctus	-	-
13.	PL	250	Powder	-	<i>Madhu</i>
14.	BGV	12000	Pill	<i>Aprasuta gomutra, Rakta mulik swaras</i>	-
15.	BV	125	Pill	<i>Kadalimool, Chitrak, Dhatoormoola</i>	-
16.	MY			-	-
17.	MV	NM	Pill	<i>Gulab jala</i>	<i>Dugdha</i>
18.	MCh	96000	Powder	-	<i>Madhu, Sarpi</i>
19.	MBY	NM		-	<i>Beejpur rasa</i>
20.	MAR	250	Powder	-	<i>Haritaki, Pippali, Bharangi, Pushkar, Karkati, Shathi</i>
21.	RKR	NM	Powder	<i>AmlavetasaRasa</i>	<i>Madhu, Sarpi</i>
22.	RPT	750	<i>Parpati</i> (Flakes)	<i>Vasaka, Tulasi, Kshudrika, Triphala, Meghnada, Kumari</i>	<i>Ardraka, DhatooraRasa</i>
23.	RS	125-250	Powder	<i>Kumari</i>	<i>Trikatu, Bharangi, Madhu Pippali, Bhringaraj</i>
24.	MS	30-60	Powder/ Pill	<i>Kumari swaras</i>	<i>Madhu, Pippali</i>
25.	RDPT	250	<i>Parpati</i> (Flakes)	<i>Vatari, Ardrak, Bhringaraj, Kakmachi</i>	<i>Bhringaraj, Madhu</i>
26.	VDR	375	Powder	<i>Agastya, Bharangi, Chitraka, Indravaruni, vasaka, Nirgundi, Tambulika, Eranda, Jiraka, Tulasi</i>	-
27.	SCR	3000	Powder	-	<i>Madhu</i>
28.	SDR	375	Powder	<i>Chitraka, DhatooraRasa</i>	<i>Jirak, Bhringaraj, Madhu</i>
29.	SKLR	250	Powder	-	<i>Ardrak rasa</i>
30.	SKKR	NM	Powder	<i>Vasak, Trikatu drava</i>	
31.	SKCR	250	Pill	<i>Kantikari, Aja dugdha, Yashtimadhu, Parnapatra</i>	<i>Pippali, Madhu</i>
32.	SKSR	750	Powder	<i>Vatsanabha</i>	-
33.	SKR	125	Powder	-	<i>Parnakhanda, Madhu, Ushnaddak</i>
34.	SGKR	750	Pill	<i>Gomutra</i>	-
35.	SWR	375	Powder	<i>Agastya swaras</i>	-
36.	SAR	375	Powder	<i>Karir, Ardrak, Nimbu swaras</i>	-
37.	SAKR	NM	Powder	<i>Jambir swaras</i>	-
38.	SRGR	125	Pill	<i>Nagvalli rasa</i>	<i>Madhu, sarkara+ Dugdha/Ghrita</i>
39.	SWL	750	Powder	-	<i>Madhu</i>

40.	SDCh	500	Powder	-	Madhu, Ghrita
41.	CR	375	Pill	Vasaka Swarasa	-
42.	AKCR	125	Powder	Bhringaraja	-
43.	SY	625-1250	Powder	-	Madhu, Abhraka bhasma, Bhagottar vati, Chandramrita Rasa
44.	SPR	60-250	Powder	Tulsi, Kumari Rasa	Nagvalli, Ardrak rasa, Madhu
45.	PSR	60	Powder	-	Madhu, Ardrak, Tulsi, Yashti Bibhitaki, Vasak
46.	LTS	125	Pill	Lavangadi Kwatha	Adrakh swaras, nagvalli swaras, madhu

Table 2: Rasaushadhies indicated in Shwasa Roga with its metallic/Mineral/Poisonous plant in approx. Quantity (mg)

Sl.No.	Metal/minerals	No of formulations	Maximum quantity present in single dose (mg)	Minimum quantity present in single dose (mg)
1.	Parada (Mercury)	31	428.57 (BGV)	7.81(SKR)
2.	Abhraka (Biotite)	9	571.42 (MCh)	11 (RPT)
3.	Vaikranta (Tourmaline)	2	83.33 (SCR)	-
4.	Makshika (Chalcopyrite)	4	21.73 (SKCR)	20.83 (TVR)
5.	Gandhaka (Sulphur)	29	228.18 (KSHG)	11.90 (SKLR)
6.	Hartala (Orpiment)	8	62.5 (SKKR)	20.83 (TVR)
7.	Manashila (Realgar)	6	62.5 (SKKR)	7.81(SKR)
8.	Hingula (Cinnabar)	3	34.08 (VDR)	11.90 (SKLR)
9.	Swarna (Gold)	9	571.42 (MCh)	11.36 (VDR)
10.	Rajata (Silver)	3	571.42 (MCh)	11.36 (VDR)
11.	Tamra (Copper)	9	75 (PR)	11.90 (SKLR)
12.	Louha (Iron)	11	571.42 (MCh)	11.90 (SKLR)
13.	Naga (Lead)	4	75 (SWR)	11.36 (VDR)
14.	Vanga (Tin)	2	571.42 (MCh)	75 (PR)
15.	Tankana (Borax) Varsanabha	8	107.42 (KSHG)	7.81 (SKR)
16.	(Aconitum ferox Wall ex Seringe)	5	26.78 (SAR, PSR)	7.81 (SKR)
17.	Dhatura (Datura stramonium L)	1	26.78 (SAR)	-

*Quantity of the metals / minerals / poisonous plants has been calculated by dividing the fraction of ingredients from the quantity of single dose mentioned in formulations. Quantity of *Bhavna dravyas* (media for levigation) added in the formulations has not considered here.

Table 3: Amount of Mercury and Arsenic detected through ICP-OES/AES/MS/AAS and their safety limit^{[40][41][42]}

	Rasa Parpati	Panchamrita Parpati	Shringrabhra	Swasanti Yoga	Shwasakuthar Rasa	Sameer Pannag Rasa	Malla sindura	Accepted daily intake concentration (mg / weak)	Safety limit mgkg bw_1 day_1
Hg	13,483-28,258 mg/kg	13,266-25711 mg/kg	20 mg/kg	200 mg/kg	65 mg/kg	53400-362400 mg/kg	808, 500 mg/kg	0.84	2
As	-	-	0.8 mg/kg	118 mg/kg	66 mg/kg	200-323, 700 mg/kg	661300 mg/kg	*0.126 *0.90 *1.26	*0.3 *15 *3

(*Different species of inorganic Arsenic)

Annexure 1: Abbreviation of name of the drugs

1. Kasashwasabadhano Ras- KSAR
2. Kasashwashari Gutika- KSHG
3. Gandhak anupana- GA
4. Kanark Ras- KR
5. Tandavaran Ras- TVR
6. Talsindoor- TS
7. Naga Ras- NR
8. Panchamruta Parpati- PPT
9. Panchamruta Ras- PR
10. Paradadi Vati- PV
11. Kaphantak ras- KR
12. Pippladi Khanda- PK
13. Pippaladi Louha- PL
14. Bhagottar Vati- BGV
15. Bhairavi Vati- BV
16. Malla Yoga- MY
17. Malladi Vati- MV
18. Muktadi Ch- MCh
19. Muktabhasma Yoga-MBY
20. Meghadambar Ras- MAR
21. Ratnakaranda Ras- RKR
22. Rasa Parpati- RPT
23. Rasa sindura- RS
24. Malla sindura- MS
25. Rudra Parpati- RDPT
26. Vrishabhadhwaja Ras- VDR
27. Sankhachur Ras- SCR
28. Sankhadora Ras- SDR
29. Shwaskaleshwar Ras- SKLR
30. Shwaskas karikeshari Ras- SKKR
31. Shwaskas chintamani Ras- SKCR
32. Shwaskasari Ras- SKSR
33. Shwaskuthar Ras- SKR
34. Shwasgajankush Ras- SGKR
35. Shwashari Ras- SWR
36. Shwankush Ras- SAR
37. Shwasantak Ras- SAKR
38. Shwasrogantak Ras- SRGR
39. Shwasari Louha- SWL
40. Shwasdaman Churna- SDCh
41. Chandramruta Ras- CR
42. Ashwakanchuk Ras- AKCR
43. Somyoga- SY
44. Sameerpannag Ras- SPR
45. Panchasoot Ras- PSR
46. Lavangadi talsindoor- LTS

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Source of Support: Nil

Conflict of Interest: None Declared