

A Brief Review of Naga (Lead) through Rasaratna Samucchaya

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Review Article

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Abstract

Background: *Naga Bhasma* is widely-used in various herbo-metal formulation of Ayurveda, indicated specially for urogenital and gastro-intestinal disorders such as *Prameha* (Diabetes), *Pradara* (leucorrhoea), *Atisara* (Diarrhoea), *Grahani* (Malabsorption syndrome), *Arsha* (Haemorrhoids).

Aim: The present work aims to collect and summarize all the information regarding the *Naga Bhasma* from *Rasaratna samucchaya*.

Materials and Methods: Critical review of *Grahyaagrahyatva*, pharmacodynamics properties, *Shodhana*, *Marana* procedures, dose, *Anupana* and formulations of *Naga bhasma* is compiled from *Rasaratna Samucchaya*. Therapeutic efficacy of *Naga bhasma* is discussed on the basis of available data.

Results: After critical review, total 45 formulations were observed in *Rasaratna samucchaya*. In which maximum number of formulations as an ingredient of *Naga bhasma* are mentioned in the management of *Prameha* (13) internally and in the management of *Netraroga* (12) as an *Anjana* form externally. Percentage of *Naga Bhasma* was observed minimum 0.47% to maximum 66.66% in formulations.

Conclusion: This review is expected to refurbish the existing knowledge and give an insight to the researchers in this area of education and research.

Keywords: Ayurveda; Lead; *Naga Bhasma*; *Rasaratna Samucchaya*; Rasashastra

Introduction

Rasa Shastra (subject dealing with Ayurvedic drug manufacturing and confirming their safety and efficacy) is enriched with description of metallic/mineral origin of raw materials, their varieties, characteristics, manufacturing techniques, properties, therapeutic uses, possibilities of developing adverse effects and their management in a comprehensive way. The well-known metals frequently used in Ayurveda include mercury (*Parada*), gold (*Swarna*), silver (*Rajata*), copper (*Tamra*), iron (*Lauha*), tin (*Vanga*), lead (*Naga*), and zinc (*Yasada*) [1]. Various *Samskaras* (processing) like *Shodhana* (preliminary process of eliminating unwanted substances), *Jarana* (roasting with herbs), *Marana* (incineration) etc. converts macro, rocky and toxic metallic/mineral materials into suitable therapeutic dosage form that is popularly known as *Bhasma*, and this assures the safety regarding its intended use to the patients [1]. These formulations are more popular in therapeutics because of its smaller dose, palatability, shelf life, and efficacy [2].

Rasaratna Samuccaya (RRS) a 13th century C.E. alchemical treatise, authored by Vagbhatacharya, throws light on the state of Indian expertise in the field of alchemy regarding the extraction, purification, conversion of metals/minerals into therapeutically suitable forms, various instruments developed for alchemical purposes and treatment of numerous diseases by using herbo-mineral preparations [2]. *Naga Bhasma* (incinerated lead) is widely-used as a medication since long in various herbo-metal formulation of Ayurveda, indicated specially for the diseases of urogenital system such as *Prameha* (Diabetes), *Pradara* (leucorrhoea), and also useful in disease conditions like *Amavata* (rheumatoid arthritis), *Vataroga* (Nervous disorders), *Vrana* (non-healing wounds), *Arsha* (piles), etc [3]. It is one of the vital ingredient in popular formulations like *Garbhapala Rasa*, *Mahayograj guggulu* [4], *Trivanga Bhasma* [4], *Vata Vidhwans Rasa*. In the present review, an attempt has been made to collect and summarize all the information regarding the *Naga's* *Grahyaagrahyatva*, pharmacodynamics properties, *Shodhana*, *Marana* procedures, dose, *Anupana* and formulations from *Suratnojjvala* Hindi commentary of RRS by Ambikadatta Shastri. Collected information was compared with other available literature of *Rasashastra*. Research of modern science was also utilized to explore some facts mentioned by RRS.

Materials and Methods

Rasaratna Samuccaya (13th century CE), a well-known comprehensive treatise of Ayurveda authored by

Vagbhatta with *Suratnojjvala* hindi commentary by Kaviraj Ambikadatta Shastri was screened to compile references of *Naga*. The references of characteristics features, properties, *Shodhana* procedures, *Marana* procedures were compiled. In this review, attempt has been made to describe formulations with name and its pharmaco-therapeutic review in the following systematic manner i.e. *Kalpa* (formulations), percentage of *Naga Bhasma*, other metals/minerals/herbs used in formulation, *Adhikara* (prime indication and secondary indication), *Aushadha Kalpana* (Dosage forms), *Anupana* (Vehicle), *Matra* (Dose), *Bheshaja Prayoga Marga* (Routes of drug administration). The classics treatise has given *Naga* formulations comprising of minerals, herbs, poisons and animal products with the view of reaping benefits from these formulations. Only the formulations having as *Naga* are considered for the study. Percentages of *Naga bhasma* are calculated by considering all herbal, metallic and mineral ingredients. Quantity of *Naga bhasma* in few formulations is quoted as "*Sarva dravya samam Nagam*" which means 50% of the formulation will be *Naga Bhasma* (incinerated lead). In other formulations the quantity is calculated in accordance with the solid constituents, where in the ingredients like decoctions (*Kwatha*), fresh juices (*Swarasa*), ghee (*Ghrita*-clarified butter), and honey (*Madhu*) are not taken into consideration. Calculation is based on the raw ingredients taken prior to the pharmaceutical processes. The metallic and mineral ingredients in every formulation are in calcined form except *Parada*, *Gandhaka*, *Haratala*, *Manahshila*, *Rasasindura*, *Tankana*, *Shilajatu* and *Hingula*.

Method of Calculation

Percentage of *Naga Bhasma* (NB) = $100 \times \text{weight of NB} / \text{weight of total solid ingredients (including NB)}$. E.g., in *Dipika Rasa* total weight of all ingredients mineral and herbal is 70 g out of which 10 g is NB. Percentage of NB is $100 \times 10 \text{ g} / 70 \text{ g} = 14.29 \%$. *Bhavana dravyas* like *Jambiri swarasa*, *Meghanada swarasa*, *Ghritakumari swarasa*, *Aja mutra*, *Gomutra* are not considered for calculation.

Observations and Results

Naga Grahya Lakshana

Sample of *Naga* which melt easily on fire (*Drutadravam*), heavy in weight (*Mahabharam*), the freshly cut surface shows a bright black metallic lustre (*Chede Krishna Samujwalam*), emits foul smell while melting (*Putigandham*) and externally black in colour (*Bahihkrishnam*) should be considered genuine variety and preferred for therapeutic purposes [4].

Naga Samanya Shodhana

Samanya shodhana should be carried out by seven times quenching of melted *Naga* in *Tila taila* (oil of *Sesamum indicum*), *Takra* (butter milk), *Gomutra* (Cow's urine), *Kanji* (sour gruel) and *Kulattha kwatha* (decoction of *Dolichus biflorus*) respectively.

Naga Vishesha Shodhana

Method 1: Raw *Naga* should take in the vessel containing *Nirgundi Swarasa* (juice extract of *Vitex negundo*) and this was exposed to sunlight for seven days & left it until it dries completely. Or Raw *Naga* should take in iron pan and subjected to intense heat for melting. After that *Nirgundi Churna* (powder of *V. negundo*) should add to it and roasted for 7 days for *Shodhana*.

Method 2: Raw *Naga* should take in a clean and dry iron pan and subjected to intense heat in charcoal furnace. Subsequently, after melting of *Naga Nirgundimula Churna*, *Nirgundibija Churna*, *Harida Churna* should add to *Naga* in 1/16th part as *Prakshepa dravya* and rubbed with iron ladle. After subsiding the fumes powdered *Naga* should quench in another vessel containing *Nirgundipatra Swarasa*. After self-cooling, *Naga* should be collect from the *Swarasa*, dried and the process of melting, roasting and quenching should repeated for three times. Such *Shodhita Naga* used in therapeutics it's free from adverse effect like *Murchha* (fainting), *Sphota* (eruptions, nodules) etc.

Naga Marana

Method 1: *Shodhita Naga* (940 g) is taken in *Bhrashtri Yantra* and subjected to intense heat till complete melting. After melting, *Shuddha Parada* (12 g) is added in it and strongly rubbed with iron ladle. *Arjuna*, *Bibhitaka*, *Aragvadh*, *Dadim*, *Aparmga kshara* (46 g each *kshara*) are also added in this mixture and continuously rubbed with iron ladle for 21 days on *Bhastri yantra*. After that it turns in the red (*rakta*) or grey (*kapot*) coloured fine powder. It

is said to be such *Naga Bhasma* devoid of *Dosha* and having *Rasayana guna*.

Method 2: *Utthapana* literally means *Swarupapadanam* (regaining original state).[4] *Naga Bhasma* which has attained the state of fine *Varitar* (float on water) ash is brought back to its original state by the help of strong heating in sublimation apparatus (*urdhvapatana yantra*) and then again subjected for repeated ten cycles of intense heating. It is said to be such *Naga Bhasma* devoid of *Dosha* and having *Rasayana guna*.

Method 3: *Shodhita Naga* should take in a clean and dry iron pan and subjected to intense heat in charcoal furnace. Subsequently, after melting of *Naga* 1/4th part of *Ashwattha Twaka* and *Chinchtwaka Bhasma* should add to *Naga* as *Prakshepa dravya* and rubbed with iron ladle till convert in fine powder. Thereafter, *Jarita Naga* was mixed with equal amount of *Shuddha Manahshila* and levigation was carried in granite *Khalva Yantra* with *Jambiri Swarasa* or *Kanji*. Pellets were prepared and dried in sun light and kept in *Sharava Samputa*, which was subjected to *Putapaka*. In subsequent *putas* 1/20th part of *Manahshila* added in *Naga* and levigated with *Amla Dravya* (*Jambiri Swarasa* or *Kanji*). Total sixty numbers of *Putas* required achieving desired quality of *Bhasma*.

Method 4: In this method, *Shuddha Naga* is first converted into sheets followed by application of thick layer of *Arka dugdha bhavita Manahshila*, shade dried and subjected to *Putapaka*. The incineration process should be repeated 10 to 15 times (*putas*) to obtain *Niruttha Naga Bhasma*.

Properties of Naga Bhasma

Naga Bhasma possess *Deepana* (gastro-stimulant), *Atiushna* (very hot for internal use) and *snigdha* (unctuous) properties and bitter taste (*Tikta Rasa*) dominant. It alleviates disorders caused by *vata-kapha* and is widely used in the treatment *Prameha* (diabetes), *Amavata* (effective in rheumatoid arthritis) and waterborne diseases.

Naga Formulations

Sr. No.	Formulation	% of Naga Bhasma	Other Metals & Minerals	Herbal Drugs	Anupana	Dose	Prime indication	Secondary indication	Dosage form	Page no.	Reference
1	Dipika rasa	14.29	Parada, Gandhaka, Saidhava lavana, Sauvarchala lavana	Pippali, Chitraka,	Sharkara, Ghrita	3 rati	Sarvajwara	-	Churna	223	12/20-25
2	Sarvajwarari rasa	11.11	Hartala, Tamra, Lauha, Chapala, Tuttha, Abhraka, Kantalauha	Punarnava moola	-	1 (125mg) rati to 3 (375 mg) rati	Sarvajwara	-	Churna	228	12/43
3	Sannipatakut hara rasa	14.2	Vanga, Parada, Manahshila,	Vatsanabha, Chitraka, Trikatu,	Adraka Swarasa,	1 valla (375	Sannipat jwara	-	Churna	242	12/129-130

			Gandhaka, Tamra	Bhringaraja, Hastishundi, Ativisha, Jayapala , Tanduliyaka	Madhu	mg)					
4	Jirnajwarari rasa	10	Vanga, Rasasindura, Tamra, Gandhaka, Tankana, Parada , Manashila , Hartala ,	Vatsanabha	Adraka swarasa	2 rati (250mg)	Jirnajwara	-	Vati	245	12/145-148
5	Sankheswara rasa	22.45	Sankha, Varatika, Tuttha , Gandhaka, Parada , Tankana	-	Pippli, Maricha, madhu, Ghrita	125 to 500 mg	Rajyakshma	-	Churna	271	14/18
6	Vaidhyanatharasa	2.17	Shankha, Varatika, Tuttha , Hartala , Gandhaka, Tankana, Rajata, Parada ,	-	Maricha churna, Madhu, ghrita, tambul patra	1 or 2 gm	Rajyakshma	-	Churna	275	14/47-50
7	Vajra rasa	4.29	Swarna, Kharpara satva, Praval bhasma, Mukta bhasma, Tamra bhasma, Abhraka bhasma, Hartala , Tuttha Tankana, Varatika	Ankola beeja, Kanguni beeja,	½ g Maricha churna, 2 g gandhaka, Madhu applied on tambul patra	2 g	Rajyakshma	-	Churna	277	14/58-67
8	Bhairavanath ee panchamrutaparpati	0.47	Suvarna bhasma, Rajata bhasma, Tamra bhasma, Abhraka Bhasma, Kantalauha Bhasma, Vanga Bhasma, Gandhaka, Parada Manshila , Hartala , Swarnamakshika, Nilanjana, ,	-	Trikatu churna, Ghrita	125mg	Rajyakshma	Visuchika, Prameha, Udarroga, Vaman, Hrida roga, Arsha, Bhagandar, Shoola, Kustha, Vatikajwara, Malavrodha, Grahani, Kaphajaroga, Agnimandhya	Parpati	286	14/80-100
9	Moolakuthara rasa	6.62	Abhraka Bhasma, Tamra Bhasma, Tikshna Lauha Bhasma, Hartala , Gandhaka	-	Ajmoda, chitrakachurna, vidanga ghrita	375mg	Arsha	Plihavridi, Yakritvridhhi, Agnimandya, Gulma, Grahani, Kustha	Churna	294	15/29-36
10	Arkasha rasa	12.5	Parada , Gandhaka, Saidhanva, Samudra, Vida, Tuttha , Sankha Bhasma,	-	Surana, Goghrita	375mg (3 rati)	Arsha	-	Vati	297	15/58-59
11	Nagasundara	5.88	Parada , Abhraka,		Madhu	125 mg	Atisara	Guda	Vati	311	16/32-37

	rasa		Gandhaka					paribhramsha, pravahika			
12	Sarvarogya Vati	1.34	Parada , Gandhaka, Haratala , Manahshila , Swarnamakshika Bhasma, Tikshna Loha Bhasma, Yashada Bhasma, Abhraka Bhasma, Hingula , Shilajitu, Swarna, Rajata	Pippali, Pippalimula, Chavya, Chitrakamula, Shunthi, Maricha, Kayaphala, Mishi, ushira, Vidanga, Tumburu, Bharangi, Rasna, Kankol, Chorpushpi, Kantkarimula, Chirtikta, Dhatturbija , Vatsanabha , Langali	Madhu, Jiraka	250 mg	Grahani	Visuchika, Grahani, Pandu, Shularoga, Gulma, Hikka, Adhamana, Kasa, Shwasa, Arsha, Vidradh	Vati	316	16/57-67
13	Prameha gajasimha rasa	16	Parada , Abhraka, Suvarna, Vanga, Tankana		Madhu	250mg to 500mg	Prameha	-	Churna	346	17/30-31
14	Mahavidhya guti	12.5	Kantalauha, Abhraka, Parada bhasma, Rajavarta bhasma, Swarnagairika bhasma, Manashila , Swarnamakshika bhasma, Mandura bhasma, Raupyamakshika bhasma, Tuttha , Vaikranta, Kasis,		nakuli churna+ 250 gm Dhatri swarasa	250 mg to 2gm 4 gm	Prameha		Vati	346	17/32-36
15	Rasendranag a rasa	50	Parada	Chincha twakakshara,	Taravata (chakramard a)beeja+ madhu	125mg	Prameha	Kustha, vataroga	Churna	350	17/51-53
16	Kasisabaddha rasa	4.76	Kasis, Nilanjana, Gairika, Krishnabhraka, Kantalauha, Swarnamakshika, Shilajita,	Kumbhikashakap atra, Anjira, Amlaki, Khadira, Gokshura, Arimeda, Kshitiruha, Swetagunja moola, Swetagunja beeja , Kapitthaphalamaj ja, Nagakesara, Jambutwaka, Katuki, Bibhitaka, Nagadamni,	Takra	12 gm	Prameha	3 dyas- mutra roga, 7 days- bhranti 15 days- trisha 1 month- 16sarvanga vridhhi	Vati (modaka)	351	17/56-57

17	Bheemaparak rama rasa	3.87	Parada , Gandhaka, Kantalauiha, Abhrakasatva, Rajavarta, Shilajita,	Gunjabeeja , Gandhanaakuli, Babbulaniryasa	Jala	750 mg	Prameha		churna	352	17/58-66
18	Sanjeevana rasa	32.05	Parada , Rajavarta, Vanga,	-	Haridra churna, Gandhanakul , Takra	375 mg	Prameha		Churna	353	17/67-70
19	Mehamardana rasa	25	Abhraka, Kantalauiha, Shilajita		Nimbapatrac hurna, Amlaki churna	250mg	Prameha		Churna	353	17/71-74
20	Ramabana rasa	11.43	Vanga, Swarna, Parada , Rajavarta, Vaikranta, Gandhaka, Swarnamakshika,		Guduchi satva, madhu	375 mg to 2gm	Prameha		Churna	354	17/75-79
21	Rajamrugank a rasa	7.18	Suvarna, Rajata, Kantalauiha, Tamra, Vanga, Abhraka satva, Parada , Gandhaka,		Triphla Kwatha	750mg	Prameha	Grahani, pandu, sarvaroga,	Churna	355	17/80-87
22	Mehakuthara rasa	14.28	Parada	Kapitthaniryas, Kappikacchu, Amlaki phala,	Kapittha niryasa, madhu	1 gm	Prameha		Vati	364	17/142
23	Sarveshvara parpati	0.18	Parada , Maharasa Varga, Uparasa Varga, Sadharana rasa Varga, Lauha varga, Ratna Varga	Vtsanabha	Maricha churna, Adraka swarasa	125 mg	Vidradhi	Vridhhi, Kshaya, Pandu, Grahani, Gulma, Pliha, Arsha, Prameha, Yakritroga, Somaroga, Pradara, Udararoga,	Parpati	367	18/2-16
24	Shoolantaka rasa	3.78	Parada , Abhraka, Tamra, Gandhaka, Hartala , Raupyamakshika, Swarnamakshika, Vanga,	Langlikanda , Trivrutamoola,	Adraka swarasa	375mg	Shoola	-	Churna	386	18/25-128
25	Talkeshvar rasa	25	Parada , Hartala		Adraka swarasa	375mg to 1.125 gm	Kustha	Pandu, raktapitta, vipadika	Churna	434	20/70-80
26	Vajradi Vartika	11.11	Vajra, Vaikrantamani, Raupayamakshika, Tuttha, parada , Gandhaka, Swarnamakshika	Vatsanabha		375 mg	Karnaroga		Vati	536	24/2-3
27	Dhatuvaddha rasa Gutika	50	Parada , Hartala			2 gm	Dantaroga		Vati	542	24/31-33

28	RasendraChudamani rasa	8.26	Parada , Suvarna, Abhraka, Vanga, Kantalauha, Swarnamakshika, Raupyamakshika, Vimala		Sharkara, madhu	2 gm	Vajeekaran		Churna	616	27/85-94
29	Chaturtha Loha Kalpa	33.33	Vanga, Mrigashringa bhasma,	Nakulikandabeeja	Mahish takra		Prameha		Churna	634	28/73
30	Panchama Loha Kalpa	1		Triphala, Daruharidra, Nakulikanda, Dhaturamoola	Takra, haritaki, daruharidra, bibhitaka, patha	2 tablet	Prameha		Vati	635	28/74-75
31	Shathama Loha Kalpa	1		Triphala	Krishna loha bhasma	2 tablet	Prameha		Vati	635	28/76

Table 1: Formulations containing *Naga Bhasma* as an ingredient for internal application.

Sr. No.	Formulation	% of <i>Naga Bhasma</i>	Other Metals & Minerals	Herbal Drugs	Applied with	Prime indication	Secondary indication	Dosage form	Page no.	Reference
1	Garudanjana	3.70	Saindhava lavana, Tuttha , Sphatika, Varatika bhasma, Tamra Bhasma, Lauha Bhasma, Narkapalasthi bhasma, Parada , Tankana, Nilanjana	Rasanjana, Kataka, Trikatu, Musta, Karpura, Samudraphena, Vacha, Triphala, Yastimadhu	Madhu, Goghrita, Godugdha	Netraroga		Churna	527	23/44-45
2	Timirhara anjana	16	Parada , Nilanjana	Karpura	Madhu, Ghrita	Timira		Churna	527	23/46
3	Shambukadi Varti	20	Shambuka, Parada , Kamsya, Rasanjana		Madhu	Shukla arma, Timira Pilla		Varti	528	23/51-52
4	Nagadi Varti	23.08	Parada , Tuttha ,	Karpura	Madhu, Ghrita	Abhishyanda	-	Varti	529	23/59
5	Indradi Varti	20	Tamra, Rasanjana	Karpura, Yashtimadhu	Chandana Kwatha	Vatika Abhishyanda	-	Varti	529	23/60
6	Shulbadi Varti	20	Tamra, Abhraka, Lauha, Nilanjana		Dadhi	Kaphaja Abhishyanda	-	Churna	530	23/61
7	Rasendra Varti	20.98	Parada , Nilanjana	Karpura, Sarjaraja	-	Sannipata Abhishyanda	-	Churna	530	23/62-63
8	Nagadi varti	9.09	Parada , Mukta Bhasma, Rasanjana	Amalaki, Karpura, Pippali, Saindhava Lavana, Jiraka	Sharkara, Madhu, Jala	Pittabhishyanda, Adhimantha		Varti	531	23/65
9	Tamradi Varti	9.09	Tamra, Rajata, Parada , Shankha bhasma, Kamsya	Lodhra, Katurohini Karpura, Pippali	Gogrita, Madhu, Jala	Netraroga		Varti	531	23/66
10	Paradadi varti	16.67	Parada , Rasanjana, Lauha	Mridagamoola, Sarjarasa,	Gogrita, Madhu, Jala	Adhimantha, Timira Armaroga, Pilla, Shuklarma		Varti	531	23/67-68
11	Ektrishang Varti	3.23	Parada , Rasanjana, Praval, Kasisa,	Lodhra, Saptaparna,	Madhu, Jala	Adhimantha	Pilla	Varti	531	23/69-70

			Tamra, Gairika, Saindhava lavana, Tuttha , Mukta bhsama, Panchalavana	Trikatu, Samudraphena, Triphala, Shati, Babbulatwaka, Sweta aparajita, Putrajivaka, Dhaturamoola , Chinchabeeja,						
12	Shadanga Varti	16.67	Anjana, Parada , Lauha	Karpura, Pippali	Madhu	Shukla arm, Kach, Timira		Churna	532	23/72
13	Kalagni rasa	16.67	Parada , Gandhaka, Saindhava lavana, Tuttha	Jeeraka	Tikta Koshataki Kwatha	Bhagandara		Lepa	556	24/114
14	Ekvinsho Loha Kalpa	66.66	Lauha		Jala	Netraroga		Varti	639	28/98

Table 2: Formulations containing *Naga Bhasma* as an ingredient for external application.

Sr. No.	Diseased conditions	No. of time repeated
1	<i>Prameha</i> (diabetes)	13
2	<i>Netraroga</i> (eye diseases)	13
3	<i>Rajyakshma</i> (pulmonary tuberculosis)	4
4	<i>Jwara</i> (fever)	4
5	<i>Arsha</i> (Haemorrhoids)	2
6	<i>Grahani</i> (Malabsorption syndrome), <i>Atisara</i> (diarrhoea), <i>Shoola</i> (all types of pain), <i>Kushtha</i> (skin diseases), <i>Dantaroga</i> (diseases of teeth), <i>Karnaroga</i> (diseases of ear), <i>Bhagandara</i> (fistula in ano), <i>Vajeekarana</i> (aphrodisiacs), <i>Vidradhi</i> (abscess)	1

Table 3: Diseased conditions where *Naga Bhasma* is indicated.

Sr. No.	Disease Condition	Anupana	No. of Anupana
1	<i>Prameha</i> (Diabetes)	<i>Haridra</i> (<i>Curcuma longa</i> Linn), <i>Amalaki</i> (<i>Emblica officinalis</i> Gaertn), <i>Nimba</i> (<i>Azadirachta indica</i> A.Juss.), <i>Guduchi Satva</i> (<i>Tinospora cordifolia</i> (Thunb.) Miers), <i>Triphala</i> (<i>Emblica officinalis</i> Gaertn, <i>Terminalia bellirica</i> (Gaertn.) Roxb.), and <i>Terminalia chebula</i> Retz.), <i>Nakuli Churna</i> (<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz), <i>Kapittha Niryas</i> (resins of <i>Feronia linonia</i> Linn.), <i>Haritaki</i> (<i>Terminalia chebula</i> Retz.), <i>Gandhanakuli</i> (<i>Aristolochia indica</i> L.), <i>Daruharidra</i> (<i>Berberis aristata</i> DC), <i>Bibhitaki</i> (<i>Terminalia bellirica</i> (Gaertn.) Roxb.), <i>Patha</i> (<i>Cissampelos pareira</i> L.), <i>Chakramada beeja</i> (seeds of <i>Senna tora</i> (L.) Roxb.), <i>Madhu</i> (honey), <i>Takra</i> (buttermilk).	15
2	<i>Rajyakshma</i> (Pulmonary tuberculosis)	<i>Pippali</i> (<i>Piper longum</i> L.), <i>Maricha</i> (<i>Piper nigrum</i> L), <i>Tambula Patra</i> (<i>Piper betle</i> L.), <i>Trikatu</i> (fruits of <i>Piper longum</i> L, fruits of <i>Piper nigrum</i> L and rhizomes of <i>Zingiber officinalis</i> R), <i>Madhu</i> (honey), <i>Ghrita</i> (ghee)	6
3	<i>Jwara</i> (Fever)	<i>Aamlaki churna</i> or <i>swarasa</i> (powder or juice of <i>Emblica officinalis</i> Gaertn), <i>Adraka Swarasa</i> (juice of <i>Zingiber officinale</i> Roscoe), <i>Madhu</i> (honey), <i>Sharkara</i> (sugar candy), <i>Ghrita</i> (ghee)	5
4	<i>Arsha</i> (Haemorrhoids)	<i>Ajmoda</i> (<i>Trachyspermum roxburghianum</i> (DC.) Craib), <i>Chitraka</i> (<i>Plumbago zeylanica</i> Linn.), <i>Vidanga</i> (<i>Embelia ribes</i> Burm.f.), <i>Ghrita</i> (ghee)	4
5	<i>Vajeekarana</i> (aphrodisiacs)	<i>Madhu</i> (honey), <i>Sharkara</i> (sugar candy)	2

6	<i>Vidradhi</i> (abscess)	<i>Adraka</i> (<i>Zingiber officinale</i> Roscoe), <i>Maricha</i> (<i>Piper nigrum</i> L)	2
7	<i>Shoola</i> (all types of pain)	<i>Adraka Swarsa</i> (juice of <i>Zingiber officinale</i> Roscoe)	1
8	<i>Kushtha</i> (skin diseases)	<i>Adraka Swarsa</i> (juice of <i>Zingiber officinale</i> Roscoe)	1

Table 4: *Anupana* used in various disease condition for *Naga Bhasma*.

Sr. No.	Dosage Form	Internal	External	Total
1	<i>Churna</i> (powder)	18	5	23
2	<i>Lepa</i> (topical application)	-	1	1
3	<i>Parpati</i> (thin flakes)	2	-	2
4	<i>Varti</i> (suppositories)	-	8	8
5	<i>Vati</i> (tablets)	11	-	11
	Total	31	14	45

Table 5: Dosage Form where *Naga Bhasma* is indicated.

Sr. No.	Origin	Drug	Total
1	Herbal	<i>Vatsanabha</i> (<i>Acontium ferox</i> Wall. Ex Ser)	4
		<i>Jayapala</i> (<i>Croton tiglium</i> Linn)	1
		<i>Dhattura</i> (<i>Datura metal</i> Linn)	2
		<i>Gunja</i> (<i>Abrus precatorius</i> Linn) bhwwq	2
		<i>Langali</i> (<i>Gloriosa superba</i> Linn)	2
		<i>Bhanga</i> (<i>Cannabis sativa</i> Linn.)	1
2	Mineral	<i>Parada</i> (Mercury)	34
		<i>Hingula</i> (Cinnabar)	2
		<i>Haratala</i> (Arsenic trisulphide)	11
		<i>Manahshila</i> (Arsenic disulphide)	6
		<i>Tuttha</i> (Copper sulphate)	12

Table 6: Schedule E(1) drugs used in Formulations.

Discussion

Naga bhasma is incorporated as an ingredient in various formulations which are used internally as well as externally. Most of the references found for *Naga bhasma* are of internal use only. *Naga Bhasma* is found as an important contain in 45 formulations of a total 950 formulations of the RRS. Percentage of *Naga Bhasma* was observed minimum 0.47% to maximum 66.66 % in formulations. Most of the formulations containing *Naga Bhasma* are indicated in *Prameha* (13), *Netraroga* (13), *Rajyakshma* (4), *Jwara* (4) etc. (Table no.2). *Naga bhasma* is also administered externally in forms of *Anjana*, *Lepa*, in disease conditions like *Netraroga* and *Bhagandara* respectively. *Shodhana vidhi* and *Marana vidhi* of *Naga bhasma* is also described.

RRS mentions thirty one formulations for the internal applications which contain up to 50% *Naga bhasma*. Maximum percentage of *Naga bhasma* (50%) is observed in *Rasendranaga rasa* while minimum percentage in *Bhairavanathee panchamruta parpati* (0.47). In which,

Shankheshwara Rasa has typical method of preparation like *Lokanatha Rasa*. *Varnaga* is used instead of *Naga Bhasma* in *Mulakuthara rasa*. For *Varanag* preparation, equal part of *Teekshna Loha* and *Neelanjana* are taken in crucible and heated in controlled temp till the soft metal obtained as *Varnaga*. *Rasendranaga Rasa* is prepared with *Jarita Naga* but for internal administration it should be always used after proper *Marana* procedure. *Naga Bhasma* containing maximum formulations are indicated in *Prameha* and advised to administrate along with various antidiabetic herbs like *Haridra*, *Amalaki*, *Nimba*, *Guduchi* etc. Recent researches show that *Naga Bhasma* possesses anti hyperglycemic effect in several experimental models [4,5]. The action of drugs depends largely upon the *Anupana* i.e. the vehicle for the drug. Appropriate selection of *Anupana* and *Sahapana* enhances the efficacy of *Naga bhasma* and also avoids complications.

Naga bhasma is also used as an external application in the form of *Anjana* (corrylium) in the various eye diseases. Lowest proportion of *Naga bhasma* is found in *Ektrishang Varti* that contain 3.23% while highest proportion in

Ekvinsho Loha kalpa i.e. 66.66 %. In the remaining formulations, percentage of *Naga bhasma* ranges from 3.70% to 23.08% when used for external application. Total five different dosage form of *Naga Bhasma* containing formulations were found in RRS. Among them *Churna* (23) form were used in maximum formulations followed by *Vati* (11), *Varti* (8) [6-13].

Conclusion

In *Rasaratna Samuchchaya*, about 45 formulations of *Naga bhasma* are reported with five different dosage forms in almost 14 different disease conditions in the form of internal as well as external administration. Most of the formulations of *Naga bhasma* are not available in the market and no research work has been performed on the safety of these formulations. Thus, there is an urgent need to conduct research on safety and efficacy of formulations of *Naga bhasma*.

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