

Percentage of *Swarna Bhasma* in medicaments of *Ayurveda* to treat disorders of different origin

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Swarna (gold) has been used to enhance strength and potency, promote longevity and combat the aging process in humans. It is used as pure metal, *bhasma* and other dosages form by ancient to the contemporary sciences for therapeutic purposes. In *Brihatrayi*, it was mainly used externally for the formation of *yantra* etc., and after development of *shodhan, maran* (*Rasa Shastra* procedure) process, internal use become possible in wide range of disorders like *Jwara* (Fever), *Yakshma* (tuberculosis), *Prameha* (diabetes), *Vata Vyadhi* (neurological disorders) and diseases of gastrointestinal tracts with varying percentage. These disorders are developed either by pathogens which may be bacteria, virus, fungi etc., or due to disturbances in person immunity. *Swarna* formulations having <10% of *swrana* was used in disorders mainly caused by pathogens like *yakhsma*, diseases of gastrointestinal tracts and formulation having 11-20% of *swarna* for disorders like *Vata vyadhi*, *Prameha* which may be developed mainly due to disturbance of immunity at any stage of disease process. Formulations having <10% as well as between 11% and 20% of *swarna* were indicated in *Jwara* that may occur either pathogens or disturbances in immunity.

Key words: Immunity, pathogen, *swarna*

INTRODUCTION

Plants, animals, metals and minerals^[1] are mentioned as source of medicine in materia medica of *Ayurveda* and advocated in various pathological manifestations. These are used to treat various diseases by converting these in to poly-herbal, herbomineral and metallic formulations by seers. In *Brihatrayi*, frequent references were observed about use of metals and minerals for different purposes including medicinal and nonmedicinal uses.^[2] In due course of time, herbomineral and metallic preparations occupy significant seat in *Ayurvedic* pharmacopeia and routinely used for practices in different parts of India. *Swarna* (Gold) has been used to enhance strength and potency, promote longevity, and combat the aging process in humans. The use of *Swarna* (gold) as pure metal, *bhasma* and other dosages form for different therapeutic applications, in ancient as well as contemporary medicine has been reviewed periodically over the years.^[3] It is widely used as therapeutic agent for several disorders including *Jwara* (fever), *Yakshma* (tuberculosis), *Prameha* (diabetes mellitus) and *Vata vyadhi* (diseases of nervous system).^[4-6]

Besides nutrition, age, and sex,^[7] the following three factors, virulence of pathogen, host genetics, and host immune status are major contributors to the development of diseases; besides this pathogen host interaction is also responsible for that.^[8,9] *Swarna Bhasma* (SB) (gold ash), has been characterized as globular particles of gold may break the etiopathogenesis of diseases may occur due to immunity, pathogen and interaction between them.

MATERIAL AND METHODS

Important manuscripts of *Ayurveda* starting from *Charak Samhita* to *Bhaishjya Ratnavali* (BR) of the main stream and from *Rasarnva* to *Rasa Taragni* of classics of *Rasa Shastra* are the source of various preparation of *swarna*. Among all these classics, BR is comprehensive source of *swarna Yoga*. We searched out formulation of *swarna* also from other classical books of *Ayurveda* and enumerated these according to their indications. In all formulations quantity of SB is calculated according to solid constituent where as ingredient like decoction, fresh juice, *Ghritha* and honey are not taken in to consideration.

Method of Calculation

Percentage of SB in *Yoga* is calculated as under mentioned formula

$$\frac{SB \times 100}{\text{Weight of total solid ingredients (including SB)}}$$

Bhavana dravya are not considered into calculation.^[10]

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RESULTS

In *Brihatrayi*, *Swarna* was mainly used for making various devices, used for different medicinal and nonmedicinal purposes; instead of this very few formulations mentioned for *Rasayan* purposes [Table 1]. After screening the literature, it was observed that maximum formulations of *swarna*, used for treatment of Gastrointestinal disorders (71%) and *Yaksham* (68%) containing <10% of *swarna* as ingredients and formulation containing 11–20% of *swarna* used for treatment of *Prameha* (60%), *Vata Vyadhi* (60%). It was also observed formulations containing <10% as well as in between 11% and 20% of *swarna* was approximately same percentage in case of *Jwara* treatment.

DISCUSSION

Ayurveda have unique fundamental principle regarding the treatment of various diseases in relation to medicine. *Acharya Charak* describes only two types of medicine, that is, *Urjaskar* (medicine used mainly to enhancement of *Ojas* or *Bala*/immunity) and *Roganuta* (medicine used mainly for treating diseases).^[11] From above it is clear that division of medicine is based on its prominent properties either rising immunity or curing diseases. In the same way it was also describe that etiopathogenesis of diseases mainly depend upon its causative factors as well as immunity of particular patient at that time, and basic concept of *Chikitsa* (treatment) is stay away from of *nidan sevana* specific to diseases.^[12]

Swarna has been used for various purposes in the form of pure metal, combined formulations or *bhasma* along with various *anupana*. In *Brihatrayi*, it was mainly used externally and after development of *shodhan, maran* (*Rasa Shastra* procedure) process, its internal use become possible in wide range of disorders like *Jwara* (fever), *Vata-vyadhi*, *Prameha*, *Yakshma* (tuberculosis). *Jwara* (fever) is most common disease occupied first place in classics of *Ayurveda*. It was observed that there are two groups of formulation which contained different percentage of *swarna*, that is, 40% of formulations containing <10% as well as 40% in between 11% and 20% [Table 2]. As per *Ayurvedic* principle *Jwara* is originated due low digestive power^[13] and substances having *deepan* properties were used for treatment of *jwara*. *Swarna bhashma* having *deepan* properties and indicated in *Visham-Jwara*.^[14] In contemporary science etiopathology of fever include acute infection like typhoid, urinary tract infection etc., and chronic disorders like tuberculosis (*Yakshma*), Rheumatoid arthritis (*Amavata* etc.). Acute infections are mainly caused by bacteria, virus and chronic disorders may be due to either change of acute stage disease or as a result of immune response by our body to foreign invader (include viruses, bacteria, fungi, drugs, or other toxins). These foreign invaders are

Table 1: Indication of Swarna in Brihatrayi

Reference	Formulation/uses	Mode of administration
S. Chi. 28/10	Remove poverty	External
S. Sa. 10/68-69	Used as <i>Medha Verdhak Yoga</i>	Internal
S. Chi. 35/11	Formation of <i>Vasti Netra</i>	External
S. Chi. 28/14	Remove poverty	External
S. Chi. 28/15	Remove poverty	External
S. Chi. 24/13	<i>Jihwanirlekhan</i>	External
S. Chi. 28/20	Destroy <i>Arista</i>	External
S. Chi. 28/21	Used to capture person under him shelf	External
S. Chi. 28/22	Provide <i>Saubhagya</i> (good luck)	External
S. U. 48/19	<i>Nirvap</i> of <i>Swarana</i> was done with water and this water was used in treatment of <i>Trishna</i>	Internal
S. U. 17/84	<i>Shalaka</i> used in <i>Netra Chikitsa</i> is made up of it	External
C. Chi. 1-1/58	<i>Brahma Rasayan</i> II/rejuvenators	Internal
C. Chi. 1-3/23	<i>Lohadi Rasayan</i>	Internal
C. Chi. 1-3/23	<i>Indrokta Rasayan</i>	Internal
C. Chi. 1-3/46	<i>Triphladi Rasayan</i>	Internal
C. Chi. 1-4/22	<i>Apara Indrokta Rasayan</i>	Internal
C. Chi. 4/79	<i>Pana Yoga/Rakta Pitta Hara</i> (bleeding disorders)	Internal
C. Chi. 23/239	<i>Churna Yoga/Visha Hara</i> (anti poison effect)	Internal
C. Chi. 23/240	<i>Churna Yoga</i>	Internal
C. Chi. – <i>Charak Samhita</i> , S. U. – <i>Susrut Uttar Tantra</i> , S. Chi. – <i>Susrut Chikitsa</i> , S. Sa. – <i>Susrut Sarira</i>		

Table 2: Swarna Kalpa mentioned for treatment of Jwara

Compound name	Reference	Mineral ingredients %
<i>Ratnakarand Rasa</i>	R.R.S. 13/27-32	SB 05
<i>Raj Mriganka Rasa</i>	R.R.S. 14/14-17	SB 12
<i>Chitnamani Rasa</i>	R.S.S. 2/262-263	SB 14
<i>Chunamani Rasa</i>	R.S.S. 2/352-357	SB 11
<i>Bhanu chunamnai Rasa</i>	R.S.S. 2/358-360	SB 16
<i>Ratna Giri Rasa</i>	BR <i>Jwara Chikitsa</i> /562-563	SB 17
<i>Raseshwar Rasa</i>	BR <i>Jwara Chikitsa</i> /787-790	SB 16
<i>Kasturi bhairav Rasa</i>	BR <i>Jwara Chikitsa</i> /813-818	SB 09
<i>Jwarankush Rasa</i>	BR <i>Jwara Chikitsa</i> /949-955	SB 06
<i>Jwarantak Rasa</i>	BR <i>Jwara Chikitsa</i> /1055-1000	SB 10
<i>Jayamangal Rasa</i>	BR <i>Jwara Chikitsa</i> /1061-1069	SB 22
<i>Jwarakunjar paribhdra Rasa</i>	BR <i>Jwara Chikitsa</i> /1073-1075	SB 07
<i>Trayalokya chintamani Rasa</i>	BR <i>Jwara Chikitsa</i> /1114-1117	SB 08
Raj mriganka pottali	R.R.S. 17/87-91	SB 2
Sarva <i>Jwara hara lauha</i>	BR <i>Jwara Chikitsa</i> /1180-1192	SB 10
Visham <i>jwarantak lauha</i>	BR <i>Jwara Chikitsa</i> /1155-1161	SB 08
Apurva vasant malati	BR <i>Jwara Chikitsa</i> 5/1208-1210	SB 08
R.R.S. – <i>Rasa Ratna Samuchayya</i> , R.S.S. – <i>Rasendra Sara Sangrah</i> , BR – <i>Bhaishhya Ratnavali</i> , SB – <i>Swarna Bhasma</i>		

considered fever-producing substances (pyrogens), which trigger the body's immune response and produces fever. SB (Gold nanoparticles: Average size of 56–57 nm)^[15] have

antibacterial^[16,17] and inhibit several strains of influenza virus^[18] which are common etiological factor of fever. Besides this it is widely distributed throughout the body organs like reticulo-endothelial system (RES), especially lymph nodes, having greatest affinity for the same.^[19] The RES plays an important role in the body's innate immune defence,^[20] having phagocytic activity which prevent spread of microorganism in systemic circulation. From above it is clear that fever is originated either pyogens or immunological process and selection of SB formulations might be depend upon etiological factors of fever.

Formulations containing <10% SB as ingredient [Tables 3 and 4] is mentioned for treatment of diseases of gastrointestinal tracts and *Yakshma*. SB, having *Atisar-Grahni nashak* properties and used for treatment of *Antrakshaya* (intestinal tuberculosis). It was reported that uptake of gold (SB) nanoparticles occur in the small intestine by persorption, degrading enterocytes in the process of being extruded from a villus.^[21] It is possible that SB formulations would reach the affected site after oral administration along with other drugs which are supposed be act on gastrointestinal tract. Besides this, gold nanoparticles also acts as significant drug delivery system and capable of encapsulating active substance to reach them at targeting site.^[22] Gold is primarily excreted in the urine and feces and although the rate of excretion varies considerably from patient to patient but the basic pattern remains the same.^[23] Thus we can say that SB travelling from one end of gastrointestinal tract to other end and showing its pharmacological properties on different parts of gastrointestinal tract.

Vata vyadhi and *Prameha* required long-term treatment for their remission and also required constant plasma concentration of drugs. It was reported that serum gold concentrations reaches a plateau^[24] and absorbed gold either from tissues or the gastrointestinal tract, approximately 95% bound to albumin or globulin where it can remain within the plasma for several months.^[25,23] Once gold treatment is established, a dynamic equilibrium is set up in the body with gold moving between the blood, body stores, urine, and faces.^[26] So that after discontinuation of treatment plasma concentration of gold remains constant for several months and produces their action even after stoppage of therapy. It was observed that maximum formulations used for the treatment of *vata vyadhi* and *prameha* having 11–20% of SB [Tables 5 and 6]. *Vata vyadhi* mentioned in *Ayurveda* is corresponding to neurological disorders in contemporary sciences.^[27] It was reported that minute quantity of gold reaches in to nervous system after injection of gold^[28] and only 1% of injected gold is absorbed when given orally,^[29] So that if formulations containing low percentage of gold (SB) then only small quantity of gold reaches in to

Table 3: *Swarna Kalpa* indicated in *Yakshma*

Compound name	Reference	Mineral ingredients %
<i>Raj Mriganka Rasa</i>	R.R.S. 14/14-17	SB 12
<i>Lokeshwar Rasa</i>	R.R.S. 14/14-17	SB 05
<i>Tralokyachintamani Rasa</i>	R.S.S. 2/264-266	SB 10
<i>Brihat Kanchhabhra Rasa</i>	R.S.S. 2/65-69	SB 07
<i>Kumudeshwar Rasa</i>	R.S.S. 2/71-72	SB 12
<i>Chnadramrita Rasa</i>	R.S.S. 2/74-79	SB 09
<i>Kshyakeshari Rasa</i>	R.S.S. 2/88-86	SB 04
<i>Kshayari Rasa</i>	R.S.S. 2/97	SB 20
<i>Nityodaya Rasa</i>	R.S.S. 2/100-107	SB 14
<i>Mrigank Rasa</i>	R.S.S. 2/3-7	SB 09
<i>Kanak Sundar Rasa</i>	R.S.S. 2/27-33	SB 03
<i>Sarvang Sundar Rasa</i>	R.S.S. 2/37-43	SB 03
<i>Kanchhabhra Rasa</i>	R.S.S. 2/60-64	SB 10
<i>Swalpa Mrigank Rasa</i>	R.S.S. 2/59	SB 50
<i>Kashya Keshari Rasa</i>	BR 14/91-99	SB 04
<i>Vrihat Chndramrita Rasa</i>	BR 14/111-116	SB <01
<i>Maha Mrigank Rasa</i>	BR 14/	SB 03
<i>Chudamani Rasa</i>	BR 14/202-205	SB 20
<i>Ratna garbh pottali</i>	BR. 14/182-187	SB 09
<i>Lokeshwar pottali</i>	R.S.S. 2/20-26	SB 05
<i>Hema garbh pottali</i>	BR 14/178-181	SB 16

R.R.S. – *Rasa Ratna Samuchaya*, R.S.S. – *Rasendra Sara Sangrah*, BR – *Bhaishjiya Ratnavali*, SB – *Swarna Bhasma*

Table 4: *Swarna Kalpa* indicated in diseases of gastrointestinal tracts

Compound name	Reference	Mineral ingredients %
<i>Grahani Shardula Rasa</i>	R.S.S. 2/43-47	SB 05
<i>Grahani Kapat Rasa</i>	R.S.S. 2/80-84	SB 12
<i>Nrip Vallabh Rasa</i>	R.S.S. 2/141-145	SB 08
<i>Vrihat Grahni Kapata Rasa</i>	BR 5/1237-1244	SB 16
<i>Sangrahni Kapat Rasa</i>	R.R.S. 17/124-129	SB 09
<i>Raja Nripai Ballabh Rasa</i>	BR 8/371-380	SB 04
<i>Grahani Keshari Rasa</i>	R.R.S. 16/73-83	SB 02
<i>Swarna parpati</i>	BR 8/454-457	SB 02
<i>Vijay parpati</i>	BR 8/461-484	SB 06

R.R.S. – *Rasa Ratna Samuchaya*, R.S.S. – *Rasendra Sara Sangrah*, BR – *Bhaishjiya Ratnavali*, SB – *Swarna Bhasma*

Table 5: *Swarna Kalpa* indicated in *Vatavyadhi*

Compound name	Reference	Mineral ingredients %
<i>Vata Gajankush Rasa</i>	R.S.S. 2/10-12	SB 14
<i>Vata Nashni Rasa</i>	R.S.S. 2/15-17	SB 10
<i>Vata Kantak Rasa</i>	R.S.S. 2/25-28	SB 14
<i>Chintamani Rasa</i>	R.S.S. 2/33-37	SB 11
<i>Chaturmukha Rasa</i>	R.S.S. 2/38-44	SB 05
<i>Yogendra Rasa</i>	BR 26/160-166	SB 14
<i>Dwadshyash Rasa</i>	BR 26/54-58	SB 09
<i>Vatachindamani Rasa</i>	BR 26/145-148	SB 12
<i>Chintamani Chaturmukha Rasa</i>	BR 26/141-144	SB 11
<i>Vasant tilak</i>	BR 37/116-120	SB 12

R.S.S. – *Rasendra Sara Sangrah*, BR – *Bhaishjiya Ratnavali*, SB – *Swarna Bhasma*

Table 6: Swarna Kalpa indicated in Prameha

Compound name	Reference	Mineral ingredients %
<i>Mehantak Rasa</i>	BR 37/152-153	SB 03
<i>Meha Keshari Rasa</i>	BR 37/149-151	SB 20
<i>Mehakunjar Keshari Rasa</i>	BR 37/139-145	SB 11
<i>Anand Bhirav Rasa</i>	BR 37/133-134	SB 33
<i>Harishankar Rasa</i>	BR 37/131-132	SB 15
<i>Prameha Chintamani Rasa</i>	BR 37/187-190	SB 12
<i>Kamdhenu Rasa</i>	BR 88/27-29	SB 11
<i>Vidhya Vaghish Rasa</i>	R.S.S. 2/13-14	SB 25
<i>Mehahar Rasa</i>	R.R.S. 17/100-107	SB 15

R.R.S. – *Rasa Ratna Samuchayya*, R.S.S. – *Rasendra Sara Sangrah*,
BR – *Bhaishhya Ratnavali*, SB – *Swarna Bhasma*

nervous system and it might be possible that, this amount of gold was insufficient to show their effect on neurological disorders due to this reason our *Acharya* mentioned those formulation which have higher percentage of gold to treat this type of disorders. Advanced stages of diabetes with metabolic disturbances associated with loss of immunity, correlates with type 2 diabetes that progressed in to insulin dependent diabetes and also correlate with hereditary form of type 1 diabetes.^[30] Low amounts of gold compound are bound to plasma proteins through SH radicals and never affect RES before they are excreted.^[31] Higher dose of gold have direct effect on immune system.^[32] Probably for that reason our *Acharya* mentioned formulations containing higher percentage of SB to treat advanced stage of diabetes.

CONCLUSION

Formulations containing <10% of SB as ingredient was used for treatment of gastrointestinal disorders and *Yakshma* and 11–20% for *Vata Vyadhi* and *Prameha*. But formulations having <10% as well as 11–20% of SB was used in treatment of *Jwara*. It is also concluded that percentages of SB play major role in treatment of disease depending upon etiopathology of disease, pharmacological properties and bio distribution of SB.

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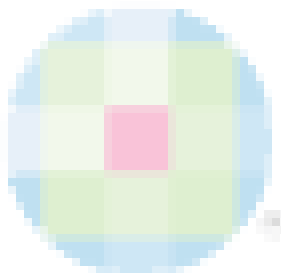
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