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A COMPARATIVE STUDY OF CALCIUM COMPOUND IN AYURVEDIC SAMHITA & RASASHASTRA LITERATURE-A REVIEW

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ABSTRACT

Calcium is the most abundant element in human body. which play a significant role in human physiology so calcium requirment can be met through external source using aahar or ausadhi. various ayurvedic compound which are among the sudha varga or shukla varga are rich sources of calcium. A number of calcium compound are found scatterd under different context in the literature of samhita such as charaka samhita, susrut samhita, astang samgraha, astang hridayam, rasa shastra. In charaka samhita and susrut samhita sudha (lime) has been included under "parthiva dravyas". In susrut samhita various calcium compound such as sankha sankhanka sukti sambuka bhalluka and like such other are kosasth animals living in shell catagerize under "kosastha varga".[1] in rasa-sashastra grantha, rasaratnakara and rasarnava have enumerated in "shukla varga". Rasamritam has included these drugs under "sudha vijnaneeyam" based on chemical composition. in rasa sashtra grantha literature calcium compound used as dravak, churna, lepa, pisti, anjana, bhasma, rasa, pottali, to cure various specific disease by external application and internal administration, in both condition therapeutic importance of calcium supplements in calcium deficiency to inhance normal growth and developments and it is also prescribed in disease like jwar, kasa, parinamashula, swasa, hridroga, amlapitta, grahni, pradar, netraroga, karnshul, balaroga, urahkshat.

KEYWORD: compound, sudhavarga, samhitas, rasa shastra.

INTRODUCTION

In ayurveda like samhita, dravya doing classified into three depending upon the Origin viz. jangmam, sthaver, audbhidh and parthiva dravya, although sudha is named latterly but the knowledge of various dravyas, concerned to this group are available since vedic Kala. In athrva veda, shankha and mriga sringa are used as medicine. And in samhita period eighth drugs are recorded like shankha, shukti, mukta, pravala, ajasthi, kukkutandtwak, varatika, and samudraphane. while the rasa shastra is the study of chiefly mercury, metal, mineral and animal origin drug having therapeutic alchemical importance. in rasa shastra grantha, rasa ratanakar(7^{th}century) has grouped kurmaprista, varatika, chuna, shukti in shukla varga. Rasarnava(11^{th}century) has included shankha in it. Rasa tarangini(20^{th}century) has discussed these drugs in three different chapters –manasiladi vignaniyan, shankhadi vignaniyan, and Ratanadi vignaniyan. In Rasamtra Acharya yadavji trikramji firstly named the group of these drugs as sudha varga in which only khatika and godanti were included.

AIM AND OBJECTIVE

1] Relevance of calcium compound in samhita and rasa shastra.

2] Use of calcium compound according to samhita and rasa shastra.

List of sudha varga dravya in different classical text book

S.n.	name	Common name	origin	Chemical constituent	form
1	sudha	Lime	mineral	cao	oxide
2	khatika	chalk	mineral	$Caco_3$	carbonate
3	Godanti	gypsum	mineral	$CaSO4\ 2H2O$	sulphate
4	sankha	Conch shell	Marine	$Caco_3$	carbonate
5	Shambuka	Australian snail	marine	$Caco_3$	Carbonate
6	Mukta shukti	Pearl oyster shell	marine	$Caco_3$	Carbonate
7	kaparda	Cowrie shell	marine	$Caco_3$	Carbonate
8	Kurma prista	Turtle shell	marine	$Caco_3$	Carbonate
9	Samudra phena	Cuttle fish bone	marine	$Caco_3$	Carbonate
10	pravala	coral	marine	$Caco_3$	Carbonate
11	mukta	pearl	marine	$Caco_3$	Carbonate
12	mrigashringa	Dear antiler's horn	animal	$Ca_3[po_4]_2$	Phasphate
13	kukkutandtwak	Hen's egg shell	animal	$Caco_3$	Carbonate
14	ajasthi	Goat's bone	animal	Calcium, Phosphorus etc.	Phasphate

Calcium compound in Charaka samhita[2-9]

S.N.	preparation	Ca- compound Used	Therapeutic Use	Doses/application
1	Gandha tail	Varatika	Karnsool	External
2	Sumanah korkadi vati	Sankha	Netrarog	External
3	Saindhavadi Varti	Sankhnabhi samudraphen	Kaphaj netra Rog	External
4	Sankhapravaladi-varti	Sankha pravala Baidurya	Netra rog	External
5	churnanjan	samudraphen	Kaphaj netra rog	External
6	Sankha varti	Sankha samudraphen	Netrarog	External
7	Ghristiprada varti	Kukkutandtwak	Netrarog	External
8	Muktadi churna	Mukta, pravala, baidurya, sankha	Hikka, swash netrarog	Internal

Calcium compound in Susrut samhita[10-14]

S.N.	*preparation*	*Ca- compound Used*	*Therapeutic Use*	*doses/application*
1	mustanjan	samudraphen	Netrarog	External
2	baiduryanjan	Baidurya Sphatic mani		
3	lekhyanjan			
4	bhadrodayanjan	Baidurya Mukta Pravala Kukkutandtwak	Netrarog	External
5	sankhadanjan	Sankhanabhi Samudraphen Pravala, mukta	Netrarog	External

Calcium compound in Astang hridayam[15-20]

S.n.	preparation	Ca- compound Used	Therapeutic Use	Doses/appli-Cation
1	Nyagrodhadi lep	Mukta, sankha, pravala	Visarp	External
2	Danta varti	Sankha, mukta, samudraphen	Netraroga	External
3	churnanjan	Sankha, baidurya, Mukta	Netraroga	External
4	bhaskeranjan	samudraphen	Netraroga	External
5	Shatmakshik yog	samudraphen	Netraroga	External
6	Drakshadi varti	Sankha	Netraroga	External

Calcium compound in Astang samgraha samhita[21-27]

s.n.	preparation	Ca- compound used	Therapeutic Use	Doses/application
1	Dhatryadi lep	Sankha		External
2	Prasannjal yog	Mukta Sankha Baidurya	Raktapitta	Internal
3	Muktadi churna	Mukta Pravala Baidurya Sankha	Swasa	Internal
4	Kanak-kshiri tail	Pravala	Kusth	External
5	Lekhani varti	Samudraphen Sankha	Netraroga	External
6	Drstiprada varti-	Samudraphen kukkutandtwak	Timir	External
7	Churnanjan	Sankha	Netraroga	External
8	bachadianjan	Pravala sankha	Lutapratishedh	External

A number of calcium compound under sudha varga in different textbook of rasa shastra.

List of sudha varga dravya according to different authers.

S.N.	Name	Rasarnava rasaratnakara	Anand-kanda	rasamritam	Ayurvediya Rasashastra s-mishra	Rasashastra-the mercurial system
1	sudha	+	-	+	+	+
2	khatika	-	-	+	+	+
3	godanti	-	-	+	+	+
4	sankha	+	+	-	+	+
5	Kshudra shankha	-	+	-	+	+
6	Mukta shukti	-	+	-	+	+
7	baratika	+	-	-	+	+
8	kurmaprista	+	-	+	+	+
9	surmasaphed	-	-	+	-	-
10	pravala	-	-	-	+	+
11	mukta	-	-	-	+	+
12	mrigashringa	-	-	-	-	+
13	kukkutandtwak	-	-	-	+	+
14	ajasthi	-	-	-	+	-
15	badarashma	-	-	-	+	-
16	Vamshalochna	-	-	-	+	-
17	swetanjana	-	-	-	-	+
18	hastidanta	-	-	-	-	+

Shodhana and maran dravya of calcium compound

S.N.	*Sudha dravya*	*shodhana dravya*	*Marana Dravya*	*Puta*
1	khatika	_		
2	godanti	Nimbu/dron Puspi swarasa	Kumari or Nimba patra swarasa	One
3	swetanjan		Ghritkumari swarasa	One
4	surmasaphed			
5	mrigshringa		Kumari swarasa	Three-five
6	shukti	Amla dravya	Ghrit kumari swarasa	One
7	shambuk	Nimbu	Ghrit kumari	One
8	samudraphena	Nimbu swarasa	__	_
9	kurmaprista	takra	Ghrit kumari swarasa	One
10	kukkutandtwak	vinegar	Ghrit kumari swarasa	Five kg cow dung cake

Formulations containing sudha varga dravyas according to rasa shastra

1: Shodhnarth churnodaka.

2:Churna khatikadi churna, dashan samskar churna, samudraphen churna, loothavishanashak agad.

3:Drava sankha drava.

4:Pisti pravala and mukta pisti.

5:Vati/gutika trirekha vati, mahasankha vati.

6 : Peya khatikadi peya.

7: Lepa samudraphenaj, shothagna lepa.

8: Parpati sudha parpati.

9:Pottali grahanikapat rasa, kaphaketu rasa, ratnagarbha Pottali rasa, hiranyagarbha pottali rasa.

10:Bhasma kasisa godanti bhasma, godanti bhasma Sankh bhasma, mukta bhasma, kukkutandtwak bhasma, pravalapanchamrit rasa.

11: Rasa mugdha rasa, agnikumar rasa.

Analysis(organoleptic characters) of calcium compounds

Varna/colour-white

Rasa/test- testless

Sparsh/ touch - soft

Gandha/odour – odourless

EVALUATION FOR CALCIUM COMPOUNDS

EVALUATION on classical parameters

1 varitara: varitara test, applied to study lightness and fineness of bhasma is floating character of bhasma on stagnant water surface. this test is based on law of surface tension. little amount of bhasma is taken in between index finger and thumb, and sprinkled It slowly on stagnant water surface from a short distance properly incinerated bhasma will float on water surface.

Rekhapurnata: this test is applied to study fineness of bhasma, bhasma particle should be of minimum size for easy absorption and assimilation in body. bhasma should be so fine that it can fill furrows of finger tips. a little amount of bhasma is rubbed in between index finger and thumb to observe whether particles can fill furrows of finger tips.

Evaluation on modern parameters

the following sophisticated instrumental method of analysis were selected.

1: fourier transform infrared spectrometry(FTIR)

2: X RAY diffraction

3: particle size analysis

4: inductively coupled plasma spectrometry

1: Fourier Transform Infrared Spectrometry (F.T.I.R.)[28]

FTIR Relies on the fact that most of the molecules absorb light in the infrared region of the eletromagnetic spectrum and this absorption Corresponds specifically to the bonds present in the molecule. with infrared spectrometers absorption spectra of compounds is obtained that are a unique reflection of their moleculer structure. The resulting spectrum represents the molecular absorption and transmission creating a moleculer fingerprint of the sample fourier transmission is a mathematical technique performed by computer for decoding and analysing the frequency spectrum. the most commonly used resion of IR spectrum in organic chemistry is the resion corresponding to 4000- 400 cm- 1 FTIR offers quantitative and qualitative analysis for organic and inorganic sample. FTIR detects functional groups and characterizes covalent bonding information.

2: X RAY diffraction

X- ray scattering techniques are non- destructive analytical techniques which reveal information about the crystallographic structure, chemical composition, and physical properties of materials and thin film. Powder X-RD is used to identify any new chemical transformation occurred ofter shodhana process. Powder X-RD (x- ray diffraction) is perhaps the most widely used X-Ray Diffraction technique for characterizing materials. The data usually includes minral (common) name of the substance, chemical formula, crystalline system, and reference pattern number from the ICDD international database. every crystalline substance scatters the X- ray in its own unique diffraction pattern and produces a fingerprint of its atomic and moleculer structure as per composition with ICDD international database.

3: Particle size analysis:the purpose of particle size analysis is to obtain quantitative data on mean size. particle size distribution (PSD) and shape of the compounds to be used in pharmaceutical formulation the particle size analysis is also required to assure the quality of the final dosage forms and drug delivery system. laser diffraction is a preffered standard method for particle sizing in the pharmaceutical industry, due to its short analytical time, robustness, high precision reproducibility, wide measurement range and flexibility of operation using liquid, spray dry dispersion attachments and it gives effective measering Range : 0.5 to 1000 micrometer and most Representative PSD is volume weighted.

4: inductively coupled plasma spectrometry (I.C.P.)

it is a type of emission spectrometry that uses the inductively coupled plasma to produce excited atoms and ions that emit eletromagnetic radiation at wavelenths characteristic of a particular element. the sample which must be in a liquid form, is pumped at 1 ml/min into a nebulizer where it is converted into a fine aerosol with organ gas at about 1 l/min. the fine droplets of the aerosol, Which represent only 1 to 2% of the sample are separated from larger droplets using a spray chamber. the fine aerosol then emerges from exit tube of the spray chamber and is transported into the plasma torch via a sample injecter the plasma torch is used to generate positively charged ions rather than photons an ion detector converts the ion into an electrical signal. This electronic signal is then processed by the data handling system and converted into analyte concentration using ICP-MS calibration standards.Samples are decomposed to neutral elements in high temperature argon plasma and analyzed based on their mas to charge ratios.

CONCLUSION

The purpose of this study use of calcium compound to compare during samhita and rasa shastra period by several preparation used churna, lepa, anjan, bati, pottali etc. and also "sushrut was the first person who used calcium compound as niruh basti dravya in the sansaman of pittaj jwar"[29] that indicate use of calcium preparationis more advanced in samhita period than modern era but in present time ayurvedic bhasma generaly not used as basti dravya, and also purpose of shodhana and marana is to reduce the particle size and to convert inorganic metals and minrals into organic vital form which is evident in the light of modern sophisticated instrumentation techniques, Calcium compound bhasma is odourless, tasteless, varitara, rekhapurnata and without Any chandrika.

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