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Comparative Pharmaceutico-Analytical Standardisation of Kaparda Bhasma with Three Different Shodhana Media

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ABSTRACT

Kaparda bhasma[1] is calcium based bhasma, which are extensively used in clinical practice. In the present work kaparda bhasma prepared from kaparda with three different shodhana media. kaparda is the external shell of sea animal cyprea moneta linn. chemically kaparda identified as calcium carbonate(Ca Co3).

Kaparda bhasma was prepared as per standard classical methods. Chemically analyzed all 3 different purification and final product. Physical analysis such as Ph, ash value, acid insoluble ash, water soluble ash, loss on drying and also carried out employing sophisticated instrument techniques such as XRD, FTIR, SEM-EDX. Physico – chemical standards were determined for 3 groups.the data the results of prepared samples are discussed in this paper.

KEYWORDS: *Kaparda, Calcium, Kaparda bhasma, Shodhana*

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INTRODUCTION

Rasashastra & Bhaishajya kalpana is the unique branch of ayurveda dealing with herbal, mineral, herbo-mineral and metallic formulation. *Kaparda*, is categorised under *Sadharana Rasavarga*[2] *and* also under *Sudhavarga* by Rasa scholars. They are treated vigorously through various pharmaceutical procedures and converted into various consumable forms, one of such form is Bhasma**.**

Shodhana is one of the procedure is explained in our classics, in a special manner to remove the visible and invisible impurities in the drug. Different media's are mentioned for Shodhana of same drug. Kaparda is one among the Sadharana Rasa mentioned in the classics It is having Katu Rasa,Ushna Veerya, and considered as best Deepana and Vata Kaphahara. In the present study Kaparda Shodhana with three different Shodhana media are taken and an attempt has made to focus on rationality behind explaining different media for Shodhana of Kaparda[3,4,5].

Marana is a method of converting metals and minerals into Bhasma which is safe, and bio-available. Kaparda bhasma[1] useful in Grahani, Parinama Shoola and Kshayaroga.

As per GMP standards scientific committee prefer evidence based research protocols. If Rasashastra methods are blended with physico-chemical and instrumental gadgets pharmaceutical field can reach global needs. Therefore establishing Pharmaceutico-Analytical properties of Kaparda Bhasma and to evaluate analytical changes occurring by using different media for Shodhana is the need of the hour.

AIMS AND OBJECTIVES:

- To Carry out Preparation of Nimbu swarasa,Kanji[6], Kulattha kwatha.
- To Carry out Preparation of Shodhana of Kaparda By Three different media.
- To Carry out Preparation of Kaparda Bhasma[1].

- To Carry out Analytical study of Kaparda Bhasma.

METHODS

Kaparda (Cowrie shells) were procured from Raw drug shop of Kirana store Mumbai market.

The drug was purified with three different shodhana media as per the mentioned in standard ayurvedic texts. Nimbu swarasa, Kanji & Kulattha kwatha was prepared for the purification process. Fresh alo evera was collected and its juice was used for making cakrikas or pellets to be used in the incineration process of Kaparda. Chemical analysis were carried out employing modern sophisticated techniques such as FTIR, XRD and Scanning Electron Microscope (SEM).

Preparation of Kaparda Bhasma

Shodhana of Kaparda –For shodhana of Kaparda 400gm each group was taken and are tied in a cloth like pottali and it is hang in a dola yantra containing Kanji,nimbu swarasa, kulattha kwatha as liquid media separately later subjected for swedana for one yama. after completion of processing, heating was stopped and left for self cooling. Then the pottali was opened and kaparda pieces were washed thoroughly with hot water and dried.

Table No: 1 Results of Kaparda after shodhana by three different media(N.S.K, Ka.S.K, K.S.K)

FEATURES	Kaparda :Nimbu swarasa(N.S.K)		Kaparda: Kanji (Ka.S.K)		Kaparda:Kulattha (K.S.K)	
	Ashodhita	shodhit	Ashodhita	shodhit	Ashodhita	Shodhit
Color	outer - yellow Inner –violet	Bright White	outer -yellow Inner -violet	Whitish yellow	outer -yellow Inner -violet	Dull white
Luster	Bright	Dull	Bright	Dull	Bright	Slightly shining
Odour	Odorless	Acidic	Odorless	Slightly acidic	Odorless	Slightly acidic
Structure	Massive	Massive	Massive	Massive	Massive	Massive
Taste	Kshariya	slight ksharia	Kshariya	slight kshariya	Kshariya	slight kshariya
Touch	Hard	Soft	Hard	Soft	Hard	Soft
Transparency	Opaque	Opaque	Opaque	Opaque	Opaque	Opaque
Weight	400gms	397gms	400gms	396gms	400gms	396gms

Marana of Kaparda:

The Kanji Shodhita Kaparda(Ka.S.K), Nimbu Shodhita Kaparda(N.S.K) & Kulattha Kwatha Shodhita Kaparda(K.S.K) were directly placed in separate sarava samputa (earthen plate) sealed with another sarava and dried. After complete drying it was subjected to Gajaputa and sarava samputas were collect after cooling. After 1st Gajaputa kaparda which became brittle were collected and powdered. The powdered kaparda of all three groups are given bhavana with kumari swarasa separately for 4 hours each. Then chakrikas were prepared and dried. After drying these chakrikas were subjected to second Gajaputa. The process was repeated for 3rd gajaputa for all three groups.after cooling kaparda bhasma was obtained.

Here bhavana refers to the process of grinding the mineral drugs in the liquids like juices or decoction of herbs,cows milk or any such specific liquids.the quantity of liquid should be sufficient to immerse the drug. The grinding was continued, until liquid added dried up and semisolid consistency was achieved.

Dose: 250mg[7]

Organoleptic properties shown in table no:2

Table No: 2 comparative Bhasma lakshana of Kaparda bhasma with three different shodhana media.

Parameters	N.S.K.B	Ka.S.K.B	K.S.K.B
Varna	Crystal white	Swan white	White
Rasa	Alpa kshariya	Alpa kshariya	Alpa kshariya
Sparsha	Soft, smooth	Soft, smooth	Soft, smooth
Gandha	Odorless	Odorless	Odorless
Rekha purnatwa*	Positive	Positive	Positive
Varitaratwa **	Negative	Negative	Negative

Note : N.S.K.B = Nimbu shodhita kaparda bhasma, Ka.S.K.B = Kanji shodhita kaparda bhasma K.S.K.B = Kulattha shodhita kaparda bhasma

Physical analysis results of three groups

Table No: 3 Results of physical tests of Kaparda bhasma with three different shodhana media.

Sample	N.S.K.B	Ka.S.K.B	K.S.K.B
pH	11.10	11.29	11.93
Total Ash	81.39%	80.49%	83.80%
Acid insoluble ash	18.60%	19.50%	16.19%
Water soluble ash	0.45%	0.67%	0.72%
Loss on drying at 110^0C	0.20%	0.29%	0.49%

Chemical analysis:

XRD results:

Table No.4: Showing XRD Results of Kaparda bhasma with three different shodhana media.

Sample	Compound Name	Chemical Formula	Crystal Structure
N.S.K.B	Calcite	$CaCO_3$	Trigonal
Ka.S.K.B	Calcite	$CaCO_3$	Trigonal
K.S.K.B	Calcite	$CaCO_3$	Trigonal

SEM-EDAX Results:

Table No.5: Showing SEM-EDX Results of Kaparda bhasma with three different shodhana media.

N.S.K.B		Ka.S.K.B		K.S.K.B	
Element	WT %	Element	WT %	Element	Wt%
OK	55.19	OK	57.61	O K	50.00
SiK	0.85	Sik	-	SiK	-
SK	0.00	SK	0.00	S K	0.00
KK	0.00	KK	0.00	K K	50.00
CaK	43.96	Cak	42.39	CaK	50.00

FTIR Results:

The obtained peaks of *N.S.K.B, Ka.S.K.B, K.S.K.B* were compared with the standard peaks. It showed the presence of different functional groups like amine, amide, alkene, aromatics, acid, alcohol, alkane, carbonyl, alkyl halide. This shows the presence of organic compounds in all groups. In all three groups comparatively same functional groups are found there is no much significant difference.

Discussion:

As mentioned earlier *Kaparda* has *katu&tiktarasa*, *ushnavirya* and *guru guna*. None of Rasa acharyas have described regarding *vipaka* of *kaparda* but in ocean Of Ayurvedic Pharmaceutics it is mentioned that *Kaparda* has *katu vipaka*. It is cleared that *Kaparda* may be *kapha* and *vata Shamaka* property. It is used for different disease like *grahani, agnimandya, karnasrava, ajirna*etc with suitable vehicle.

In the present work a standard preparation of ***Kaparda bhasma*** with three different shodhana media was made and studied scientifically the significance of purification and incineration processes involved in the preparation of this herbo-mineral formulation. Standards were also determined for this preparation as per Indian Pharmacopeia. Preparation was analysed using sophisticated instruments like XRD, FTIR and SEM.

Swedana is one of the *shodhana* procedures which are used for *shodhana* of many *Rasadravyas.* In the process the drug is boiled in the liquids which are either *ksharas, amlas* or both and herbal juices, with the help of *Dolayantra.* Diffusion process may occur in this kind of *shodhana.* Here the impurities may move from the drug to the *shodhana* liquids and some organic qualities of liquids move from the liquids to the drug resulting in purification and potentization of the drug. And also it may be helpful in reducing the hardness of the drug as heat is given continuously through boiling liquids. Reduction in hardness may help in further processing of the drug.

XRD report after *shodhana* of 3 groups is orthorhombic crystal structure is changed to trigonal crystal structure after *bhasmikarana* in all three groups, it shows the importance of *bhasmikarana.* There is no much significant difference when it compare to each other. The occurrence of nano crystalline compounds in the final product thus light is thrown on the importance of purification process. By XRD study this can be revealed that all 3 groups are in calcium carbonate form.

In SEM-EDX Variation in the percentages of elements may be due to organic compounds which were used

for pharmaceutical procedure or these elements might have got imparted due to the minor contaminations during various processes like *shodhana*and *bhavana*. The additional elements are in trace level i.e below permissible limits. In all three groups comparatively same elements are detected there is no much significant difference found.

In FTIR The obtained peaks of *N.S.K.B, Ka.S.K.B, K.S.K.B* were compared with the standard peaks. It showed the presence of different functional groups like amine, amide, alkene, aromatics, acid, alcohol, alkane, carbonyl, alkyl halide. This shows the presence of organic compounds in all groups. In all three groups comparatively same functional groups are found there is no much significant difference.

Conclusion:

Kaparda is aquamarine medicinal molecule, occupied major place in clinical prescription.

Here comparative study of kaparda bhasma with three different shodhana media used. Shodhana of kaparda is an essential step before usage, which will modify the raw drug into safe, bio-active, therapeutic form. After shodhana To get good quality of bhasma, three gajaputa are needed for kaparda for all 3 groups.

XRD peaks of N.S.K.B, Ka.S.K.B & K.S.K.B samples which were compared with standard angle 2 JCPDF values confirmed that presence of calcite in trigonal shape. SEM-EDX study reveals major,minor& trace elements. FTIR analysis of N.S.K.B, Ka.S.K.B & K.S.K.B shows it contains organic functional group like Amine, Amide, Alkene, Aromatics, Acid, Alcohol, Alkane, Carbonyl, Alkyl halide.

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[1] Shri Sharma Sadananda. Rasa Tarangini. Edited by Pandit Kashinath Shastri. 11thEdition. Varanasi: Motilal Banarasidas Publication; 1979, 12thTaranga, Verses91-93, 300-301pp**.**

[2] Vagbhattacharya, Rasa Ratna Samuchaya, vignana Bodhini Teeka, Professor. Dharmananda Sharma, New Delhi, Motilal Banarasidas, 1999, Verse 527, 55pp.

[3] Shri Sharma Sadananda. Rasa Tarangini. Edited by Pandit Kashinath Shastri.11thEdition. Varanasi: Motilal Banarasidas Publication; 1979, 12th Taranga, Verses 90,300pp.

[4] Ibid, 12th Taranga, verse 87, 300pp.

[5] Ibid, 12th Taranga, verse 88, 300pp.

[6] Anonymous. Ayurvedic Formulatory Of India. Second Revised English Edition New Delhi: Controller of publications. Civil lines; 2003, Part-1, Paribhasha, 348pp.

[7] AFI (The Ayurvedic Formulary of India) Part – I, Second Revised English edition, New Delhi, Ministry of Health and Family Welfare, Department of Indian System of Medicine and Homeopathy, Government of India, 2003, 233pp.

Photos

RAW KAPARDA

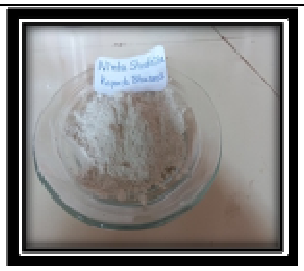
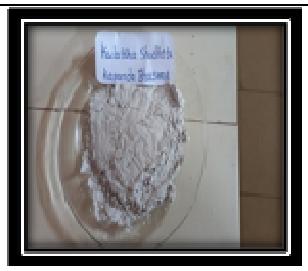
POTTALI

KAPARDA SHODHANA

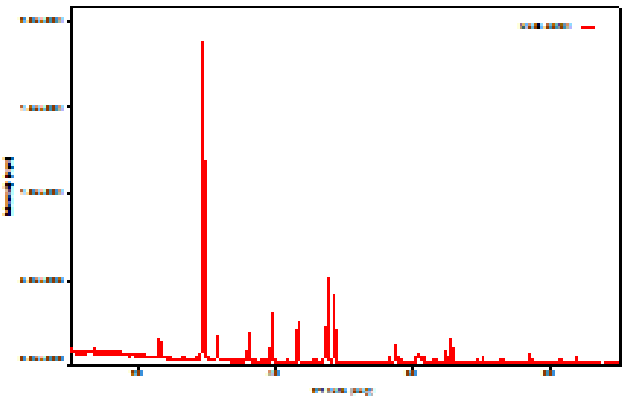
NIMBU SHODHITA KAPARDA

KANJI SHODHITA KAPARDA

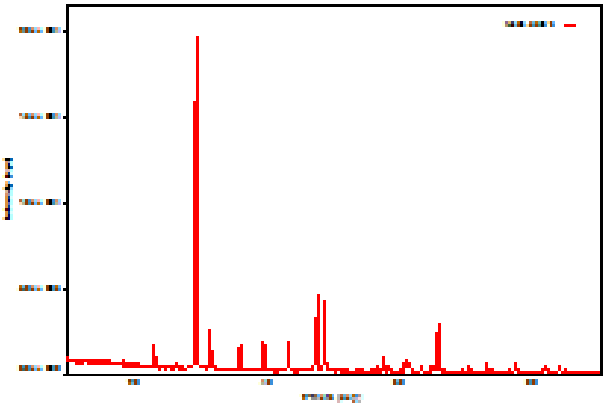
KULATTHA SHODHITA KAPARDA

 GAJAPUTA	 BHAVANA WITH KUMARI SWARASA	 CHAKRIKAS
 NIMBU SHODHITA KAPARA BHASMA	 KANJI SHODHITA KAPARA BHASMA	 KULATTHA SHODHITA KAPARA BHASMA

GRAPHS



XRD OF N.S.K.B



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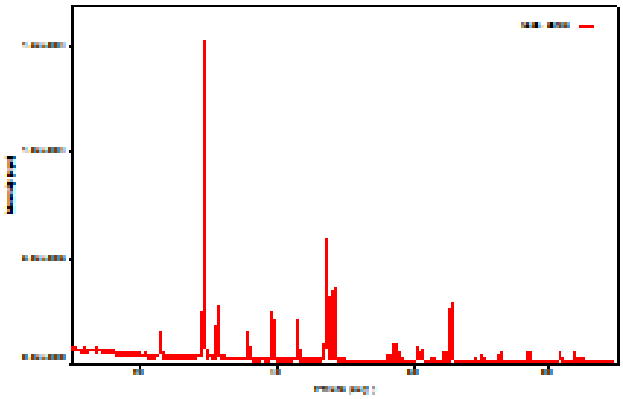
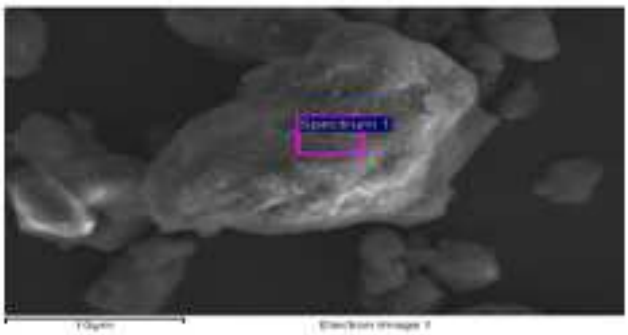
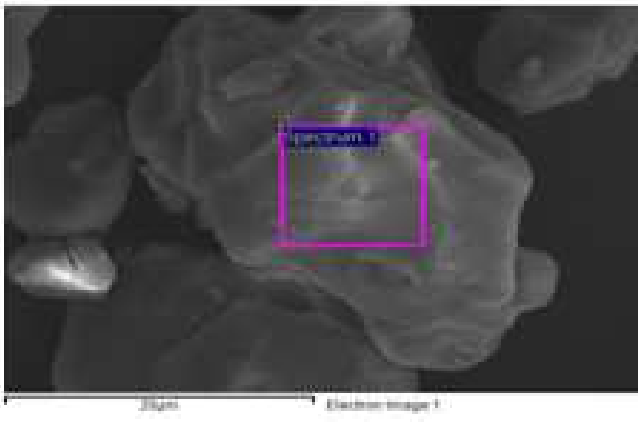


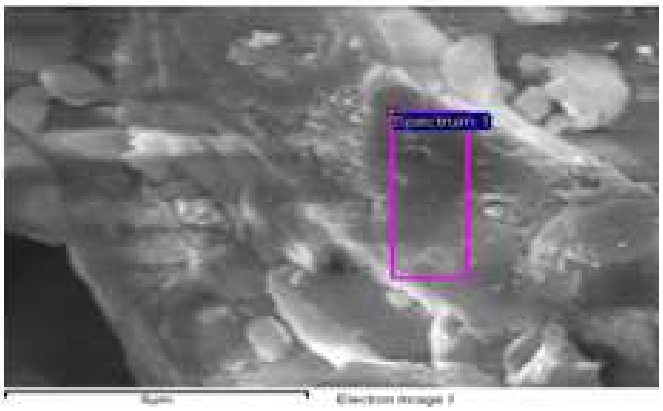
XRD OF Ka.S.K.B



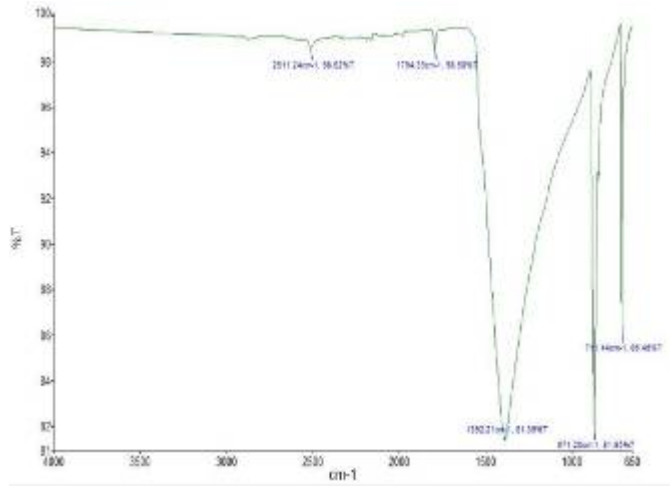
SEM N.S.K.B



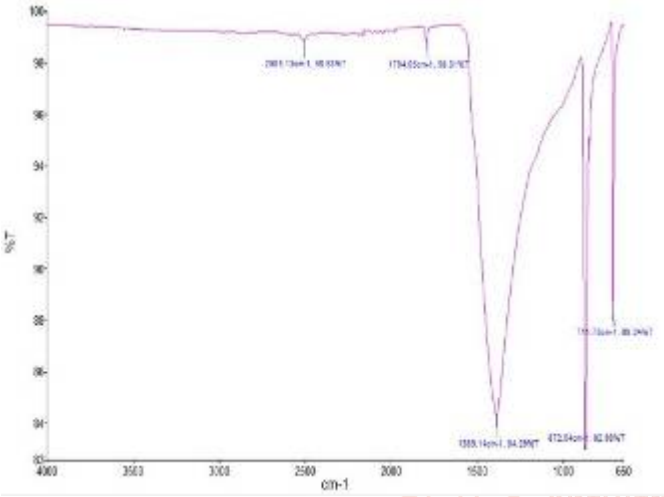
SEM Ka.S.K.B



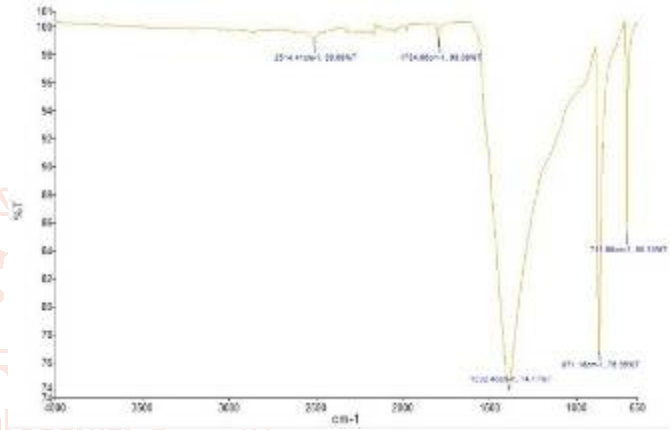
SEM K.S.K.B



FTIR Ka.S.K.B



FTIR N.S.K.B



FTIR K.S.K.B