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IDENTIFICATION, PHARMACEUTICAL AND COMPARATIVE ANALYTICAL STUDY OF GODUGDH AND GOMUTRA SHODHIT ABHRAK

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ABSTRACT

Rasashastra is a pharmaceutical branch of Ayurveda which mainly deals with the metals, minerals, animal origin products, toxic herbs and their use in therapeutics. There are specific criteria mentioned for identification in ancient texts about the selection of raw material to be taken for drug formulations. As the Identification (i.e. standardization) of raw material is the foundation of quality final product Here in this study, Abhrak was the drug selected for identification. Twelve samples were procured from various pharmacies and markets. These samples were assessed on the basis of organoleptic proforma and special tests. One Grahya and One AgraHYa sample were further assessed with the help of physico-chemical and Instrumental analysis. The findings from ancient literature and modern analytical technique were found to be similar. The standardized sample was then further subjected to Shodhana in two different media i.e; Godugdh and Gomutra. Observational charts were maintained during the procedure. The results of the pharmaceutico-analytical techniques used (SEM-EDC) showed that the Godugdh Shodhit sample showed a 48.46 % reduction in Arsenic compared to the ashuddha abhrak, whereas the Gomutra Shodhit Abhrak showed a 31.90 % reduction in Arsenic as compared to the Ashuddha Abhrak sample. There was more reduction in percent weight of Aluminium, Silica, Iron and Potassium in Godugdh Shodhit Abhrak as compared to Gomutra Shodhit Abhrak. According to present study, it can be concluded that Godugdh may serve as more efficient media for Shodhana of Abhrak as compared to Gomutra.

Key Words: Abhrak Grahyagrahyatva, Abhrak Shodhana, Godugdh Shodhit Abhrak, Gomutra Shodhit Abhrak.

INTRODUCTION

For globalization of Ayurveda, criteria for identification i.e. Grahyagrahyatva of raw material must be studied thoroughly and co-related with modern science. This will be beneficial to set certain norms for procuring authentic raw material, fulfilling the standardization criteria and identity, purity and quality. This will help for worldwide acceptance of the fact that minerals and metals can be used in medicinal preparations more effectively.

This is the rationale behind selecting the area of standardization of raw material for current study. Abhrak has been chosen for this purpose. It keeps its importance in Rasashastra as Maharasa and useful mineral after Parad. It is considered as main drug in many Sanskaras of Parad. Use of Abhrak patra, satva in process of Parad Jarana is found in many texts. Shodhan of Abhrak is essential if it has to be used in preparation of various Rasakalpas. Shodhan is a sanskara where, the doshas are eliminated from the dravya whereas the gunas are enhanced. In ancient classical texts there are many medias mentioned for shodhana of a particular drug, where each media has its special importance with reference to where the drug would be used after

shodhan. The study may find different pharmaceutical properties after analysis of abhrak shodhan done in two separate media.

Abhrak is commonly used in Ayurvedic practice as a constituent in many formulations and also in Bhasma form, which gives Shodhan of Abhrak immense importance. Use of Ashuddha Abhrak bhasma can lead to various ill effects and disorders namely prameha, kshay, pandu. Shodhan of Raw Abhrak eliminates the doshas and it enhances the Gunas. Abhrak becomes Mrudu post shodhana. According to Rasaratnasamuchaya Abhrak shodhan can be done in various media, namely Triphala kwath, Kaanji, Godugd and Gomutra.

AIMS & OBJECTIVES

1. To identify Abhrak as a raw drug.
2. Pharmaceutico-chemical analysis of Abhrak Shodhan in two different media.
3. Authentication of raw abhrak samples.
4. Shodhan of abhrak in Godugd.
5. Shodhan of Abhrak in Gomutra
6. Comparative pharmaceutico-chemical analysis of abhrak after shodhan in two different media.

MATERIAL AND METHODS

Collection and authentication of drugs - Abhrak samples were collected from Pharmacies and local markets from various places in India. Total twelve samples of Abhrak were collected. Quantity of samples ranges from 50 to 200 gm. Random coding of drugs was done from A to L.

Details of Sample Collection

No.	Code	Date	Source	Address	Place
1	A	12/08/19	Local Market	Gopal Lokhande, Phadkehaud	Pune, Maharashtra
2	B	12/07/19	Pharmacy	Punarvasu Aushadhashala	Pune, Maharashtra
3	C	18/06/19	Pharmacy	Vaidya Datarshastri Panch.	Sangli, Maharashtra
4	D	14/06/19	Pharmacy	Ayurved Rasayani	Pune, Maharashtra
5	E	15/09/19	Pharmacy	Vishwarang Pharmacy	Pune, Maharashtra
6	F	18/07/19	Local Market	Ajmera	Rajasthan
7	G	28/11/19	Local Market	Ambadas Kasthaushadhi	Pune, Maharashtra
8	H	7/06/19	Local Market	Divya Trader, Rander Road	Surat, Gujarat
9	I	12/08/19	Local Market	Gopal Lokhande, Phadkehaud	Pune, Maharashtra
10	J	6/10/19	Local Market	Mamta Herbals, Gandhi Nagar	Dombivli, Thane
11	K	16/10/19	Local Market	Laxminarayan Enterprises	Jamnagar, Gujarat
12	L	22/10/19	Local Market	G.Y. Hakim and Sons	Vadodara, Gujarat

For shodhan of standardised Abhrak - Standardized Sample of Abhrak was obtained after analyzing all the collected Abhrak samples after evaluation by experts. Godugd and Gomutra as media were collected from local Gaushala.

Pharmaceutical Source - The Shodhan of raw Abhrak in Godugd and Gomutra was performed at Shree Shivayogeeshwara college pharmacy. The Pharmaceutico-analytical changes occurred after performing Shodhan in two different media were noted and recorded in form of charts and tables.

Analytical Source

1. Alarsin Pharmaceuticals Pvt. Ltd. Plot No. A-32 Street No 3 M I D C Marol, Mulgaon, Andheri East, Mumbai, Maharashtra 400093.
2. College of Engineering, Pune, Maharashtra.
3. Rasashastra and Bhaishajya Kalpana, Department of Shivyogeeshwar Rural Ayurvedic Medical College and Hospital, Inchal, Belagavi, Karnataka.

OBSERVATIONS**Regarding Special Test – Agnipariksha of Abhrak**

Parameter	A	B	C	D
W1 (before heat)	7.63	16.18	15.20	10.11
W2 (After heat)	7.23	16..15	15.18	10.7
Red Hot Stage (°C)	585 0C	670 0C	628 0C	611 0C
Time	27 sec	6 min 55 sec	5 min 37 sec	6 min 55 sec
Effect of Heat according to classics	Dala-vimunchan	Vanhisaha	Vanhisaha	Vanhisaha
Effect of heat according to Modern science	Foil separation Colour changes to shiny silver	Shine + Slight Fragment separation	Shine ++ Brittleness +	Metallic shiny grey
Observation of Cooling	Flakes do not return to original after cooling	Complete cooling in 20 min	Complete Cooling in 17 min	20 min

Parameter	E	F	G	H
W1 (before heat)	14.80	12.80	12.20	6.32
W2 (After heat)	14.60	12.70	11.90	6.32
Red Hot Stage (°C)	701	638	540	620
Time	5 min 50 sec	6 min 10 sec	2 min 14 sec	5 min
Effect of Heat according to classics	Vanhisaha	Vanhisaha	Dal-vimunchan	Vanhisaha
Effect of heat according to Modern science	Effects of heat according to modern science	Metallic shine Brittleness blackness ++	Metallic Shiny +++ Brittle+++	Foil Separation Shiny + Brittle
Observation of Cooling	Complete cooling in 15 min	Complete cooling in 15 min	Flakes donot return to original after cooling 5 min 10 sec to cool down	Cools in 20 min

Parameter	I	J	K	L
W1 (before heat)	10.60	7.20	15.30	10.60
W2 (After heat)	10.58	7.00	15.26	10.56
Red Hot Stage (°C)	749	685	635	656
Time	6 min 10 sec	5 min 10 sec	2 min 14 sec	6 min 10 sec
Effect of Heat according to classics	Vanhisaha	Dalavimunchan	Vanhisaha	Vanhisaha
Effect of heat according to Modern science	Shiny ++ Brittle ++	Foil separation Metallic shiny	Shiny ++ Brittle ++	Shiny ++ Brittle ++
Observation of Cooling	Complete cooling in 35 min	Cools in 15 min	Cools in 20 min	Cools in 20 min

Instrumental Analysis for assessment of Grahya and Agrahya Samples**EDS (X-ray Dispersive Spectroscopy)**

No.	Element	Sample I (Grahya Sample)	Sample G (Agrahya Sample)
1	Oxygen	46.24	49.23
2	Silica	17.05	19.43
3	Aluminium	6.99	15.28
4	Potassium	7.30	7.25
5	Iron	7.22	4.82
6	Calcium	1.03	2.79
7	Magnesium	12.31	0.64
8	Sodium	0.22	0.56
9	Arsenic	1.63	0.00

Abhrak Shodhan in Godugd

No. of Nirvap	Temp. At Red Hot stage	Total time taken to reach red hot stage	Weight before Nirvap (gm)	Weight after Nirvap (gm)	Weight Loss (gm)
1	785	7 min 30 sec	50	49.70	0.30
2	760	6 min 45 sec	49.70	49.50	0.20
3	790	6 min 40 sec	49.50	48.90	0.60
4	768	5min 36 sec	48.90	48.30	0.60
5	763	5 min 30 sec	48.30	47.80	0.50
6	754	4 min 10 sec	47.80	47.00	0.80
7	752	4 min 30 sec	47.00	46.20	0.80
Average	767.42	6 min 1 sec	-	-	Total -3.8 g

Organoleptic Examination of Abhrak before and after Shodhan in Godugd

Parameters	Before Shodhan	After Shodhan
Colour	Shiny Greyish Black	Shiny silver
Odour	Odourless	Odourless
Taste	Sour	Sour
Texture	Hard crystalline smooth	Shiny brittle

Physio-chemical examination of Abhrak before and after Shodhan in Godugd

Parameters	Before Shodhan	After Shodhan
pH	7.9	8.2
Loss of drying	0.30 %	0.28%

Physio-chemical characters of Godugd before and after Shodhan

Parameter	Before Shodhan	After Shodhan
pH	6.6	6.8
Solid content	13.52	18.57

Abhrak Shodhan in Gomutra

No. of Nirvap	Temp. At Red Hot stage	Total time taken to reach red hot stage	Weight before Nirvap (gm)	Weight after Nirvap (gm)	Weight Loss (gm)
1	780	6 min 12 sec	50	49.80	0.20
2	772	6 min 40 sec	49.80	49.20	0.60
3	766	5 min 10 sec	49.20	48.72	0.48
4	770	5 min 50 sec	48.72	48.36	0.36
5	756	5 min 10 sec	48.36	47.90	0.46
6	690	5 min 02 sec	47.90	47.50	0.40
7	710	5 min 15 sec	47.50	46.80	0.70
Average	749.14	-	-	-	Total-3.2 gm

Organoleptic Examination of Abhrak before and after Shodhan in Gomutra

Parameters	Before Shodhan	After Shodhan
Colour	Shiny Greyish Black	Shiny Silver
Odour	Odourless	Gomutra odour
Taste	Hard crystalline smooth	Shiny brittle
Texture	Sour	Sour

Physio-chemical examination of Abhrak before and after Shodhan in Gomutra

Parameters	Before Shodhan	After Shodhan
pH	7.9	8.5
Loss of drying	0.30 %	0.27 %

Physio-chemical characters of Gomutra before and after Shodhan

Parameter	Before Shodhan	After Shodhan
pH	9.2	9.5
Solid content	10.20 %	13.42 %

Instrumental Comparative Analysis of Abhrak Samples after Shodhan**EDS (X-ray Dispersive Spectroscopy)**

No.	Element	Sample I (Godugd Shodhit Abhrak)	Sample II (Gomutra Shodhit Abhrak)
1	Oxygen	38.35	45.43
2	Calcium	31.79	3.50
3	Silica	8.73	16.31
4	Magnesium	6.35	12.65
5	Iron	5.59	6.69
6	Potassium	4.04	7.29
7	Aluminium	3.47	6.63
8	Arsenic	0.84	1.11
9	Sodium	0.16	0.30

It was found that there was marginally more reduction in the percentage weight of Oxygen, Silica, Iron, Potassium and Aluminium in Godugd Shodhit Abhrak as compared to Gomutra Shodhit abhrak. After considering the results of Organoleptic, physico-chemical and instrumental tests, we can consider that Godugd and Gomutra are both effective media for shodhan of Abhrak. However more elemental changes were found in Godugd shodhit abhrak which showed decrease in level of Arsenic and other contents of the mica, hence we can consider Godugd to be marginally better medium for shodhan.

CONCLUSION

There was a significant statistical difference in each parameter of every sample. Agnipariksha of Abhrak was useful for assessment. It was useful, feasible, inexpensive and conclusive. Out of this, Sample I showed maximum characteristics of Grahyatva and less properties of Agrahyatva, chemically showed more amounts of Fe and Mg, and showed excellent vanhisahatva or no change in special heat test. Hence, Sample I was termed as grahya sample. The EDS technique was used to determine the elemental composition. Sample-G showed high percentage of Aluminium, whereas Sample-I showed high percentage of magnesium. Sample-I also showed traces of Arsenic, whereas no heavy metal traces were found in Sample- G. Percentages of Fe, Mg, K in sample I were higher than sample G while percentage of Aluminium was higher in sample G than Sample I. Godugd may serve as more efficient media for shodhana of Abhrak as compared to Gomutra. Thus, it can be concluded that the subjective parameters described in ancient text are valid, only the critical analysis of norms described for every rasadravya is required. The outcome of the study will lead to use of standard Abhrak in Pharmaceutical production of Ayurvedic drugs.

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