A comparative analytical study of Pravala bhasma and Pisti w.s.r. to Moola and Shakha

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Abstract

Of various gems, Pravala is widely used by the Ayurvedic physicians in their day to day practice of life. The use of Pravala for internal purposes and for preparing various formulations can be observed. Internally as medicine, it is administered in the form of Bhasma and Pisti for curing ailments such as Amlapitta, Netra Roga and Hridaya Roga etc. The drug is being manufactured by various industries and hence the product is widely available in the market. But pharmaceutically it greatly varies from industry to industry and physician to physician with respect to its quality. Moreover, in the market, it is available in two forms viz. Pravala shakha and Pravala moola. The former is costlier than the moola. Some of the clinicians claim that Pravala shakha is more efficacious as compared to Praval moola, for which there is no rationale explained in the classical texts. The quality and standard for this drug therefore, is a question in this scientific and advanced era. The parameters like organoleptic, physical, chemical, qualitative and quantitative etc. place key role, by which quality of any dosage form can be determined.

In the present study, the Pravala pisti is prepared by triturating with rose water whereas the Pravala bhasma is generally prepared by bhavna with ghritkumari and subjected to puta. Both moola and shakha bhasma and pisti are prepared by same methods and analysed on parameters like organoleptic, physical, chemical which include loss on drying, total ash, acid insoluble ash, water soluble extractive, alcohol soluble extractive, pH etc, qualitative and quantitative tests. The results show that there was no significant difference between moola and shakha. However, the percentage of calcium, phosphorous, iron and magnesium etc. elements are more in Praval moola.

Keywords Pravala, Pisti, Bhasma, Quality, Moola, Shakha

INTRODUCTION

The word Quality with reference to a dosage form is comprehensive and refers to characteristics like the potency, uniformity, purity, pharmacological action and stability etc. The quality of a dosage form should not only be tested at the end but must be ensured at the time of receipt of raw materials, through processing and after the preparation of the finished product. It is not only the moral duty of the pharmaceutical manufacturers to produce effective, safe and non-toxic dosage forms but it is their legal responsibility as well.

Pravala is being widely used by the Ayurvedic Drug Manufacturers to prepare Ayurvedic Medicines. It is administered in the form of Bhasma and pisti for curing various ailments such as Amlapitta, Netra Roga and Hridya Roga etc.

In the market, Pravala is available in two forms viz. Pravala shakha and Pravala moola. The Pravala shakha is costlier than the moola. Some of the clinicians claim that Pravala shakha is more efficacious as compared to Pravala moola, regarding this there is no rationale explained in the classical texts. Ayurvedic Drug Manufactures are also confused on the issue that which type of Pravala they should use.

The present paper deals with the comparative and analytical study of Praval bhasma and pisti w.s.r. to moola and shakha. A trial was made to establish the difference on the basis of their analysis in terms of organoleptic and physic-chemical parameters.

AIM AND RATIONALE

To ascertain the difference between Pravala moola and shakha by utilizing the suitable parameters. The following studies has been done carried out as there are no standard parameters available to standardize Praval moola bhasma and pisti and shakha bhasma and pisti.

MATERIALS AND METHODS

The preparations selected for the study i.e. Pravala moola bhasma, Pravala moola pisti, Pravala shakha bhasma, Pravala shakha pisti were prepared by using the authentic raw materials at Department of Rasa Shastra, National Institute of Ayurveda, Jaipur, Rajasthan

(A) Organoleptic Parameters:

The consistency, color, taste and odor of the samples were noted through the naked eye. These characters were useful for having primary idea about the quality of different formulations without using chemical tests.

(B) Physico-chemical Parametes:

The following parameters are required to develop standards for the reproducibility of Pravala bhasma and pisti, both from moola and shakha, of same quality thereby ensuring uniform therapeutic efficacy. The samples were analyzed for different chemical parameters at Drug Testing Laboratory, Jaipur.

1. Loss on drying[1]

For determination of loss on drying, 5 gm of the fine powder of samples was taken in a previously weighed petridish. It was then dried in an hot air oven at a temperature. of 105ºC for 5 hrs .The powder was then cooled in a dessicator for 5 min, taken out

and weighed. Drying and weighing was continued until a constant weight was obtained at one .From the weights noted, the loss on drying of the sample was calculated and expressed as percentage w/w.

2. Total ash[2]

For determination of total ash, 5 gm of accurately weighed sample was taken in a previously weighed and dried crucible. It was then subjected to incineration in muffle furnace at a temperature not exceeding 750º C until free from carbon. The crucible was taken out, allowed to cool and weighed immediately. The percentage of the total ash content in the sample was calculated and expressed as percentage w/w.

3. Acid insoluble ash[2]

The ash as obtained in ash value was transferred to a 100ml glass beaker, boiled with 25 ml 6N HCl for 5 minutes and filtered through a Gooch crucible fitted with ashless Whattman filter paper No. 41. The residue over filter paper was washed with hot water and distilled water, repeatedly and dried in an oven at 50ºC, cooled and weighed. Later, the residue along with the filter paper was shifted to pre-weighed crucible, kept in muffle furnace and heated up to 600ºC. After cooling, it was weighed and from the weight of the residue obtained, acid insoluble ash was calculated.

4. Water soluble Extractive[2]

Accurately weighed 5gm of sample was taken, with 100ml of chloroform water (95 ml water and 5ml chloroform) in a flask. The flask was fitted with cork, shaken continuously for 6 hours in the shaker machine and allowed to stand for eighteen hours, filtered rapidly taking precautions against loss of solvent. Twenty five ml of filtrate was evaporated to dryness in a tarred flat bottomed shallow dish, dried at 105º C to constant weight and weighed. Percentage of water soluble extractive was calculated with reference to the moisture -free drug.

5. Alcohol soluble Extractive[2]

Alcohol soluble extractive was determined in the same way as water soluble extractive using ethanol instead of chloroform water.

6. X- Ray Diffraction[3]

The test was carried out in IIT, Bombay (Deptt. Of Earth Sciences)

The resulting analysis is described graphically as a set of peaks with one percent intensity on the y-axis and goniometer angle on x- axis. The exact angle and the intensity of a set of peaks are unique to the crystal structure being examined.

7. Inductively Coupled Plasma (ICP)[4]

This test is also carried out in IIT, Bombay (Deptt. Of Earth Sciences)

Results of the Test are described in Table No. 4

8. Namburi Phased Spot Test (NPS Test)[5]

This test is carried out in Deptt. Of Rasashastra, NIA Jaipur.

Hundred gm of Haridra powder was mixed, with 300ml of absolute alcohol and was shaken in a shaker for 18 hrs and decanted. This is the alcoholic extract of Haridra. Sheets of Whatmann No.1 filter paper were then uniformly dipped in 50% Haridra color solution and dried. Pravala samples were taken into a semi micro test tube and were heated on a spirit lamp till the tip of the lower end of the test tube becomes red hot. After cooling, 0.5 ml of distilled water was added to these heated samples, shaked and allowed to settle. The samples became clear within 5 minutes. The impregnated papers were arranged on the glass sheet and 2-3 drops of solution of each sample on Haridra paper in the centre from a suitable height was dropped. Development of the spot of different colors and pattern at three different time intervals was carefully observed in a natural daylight.

Inference from the above test

 Observations in N.P.S.T. of various samples of Pravala tested on Haridra paper**.**

1st Phase:

A deep pink solid spot appears with immediate formation of more deep pink margin and wet periphery. By the end of 1st phase the central space became light pink.

2nd Phase:

By the end of 2nd phase the margin merges with the centre more.

3rd Phase:

By the beginning of 3rd phase the wet periphery fades away and after 24 hours 50% of the color fades away.

The bhasma which is exothermic and does not posses any other peculiar organoleptic properties but shows a characteristic formation of solid pink spot with wet periphery in N.P.S. test on haridra paper, fading away rapidly is inferred as pravala shakha bhasma. The bhasma is exothermic which adsorbs more solvent (distilled water) than pravala sakha bhasma with other characters being the same of pravala sakha bhasma on Haridra paper in NPS test is inferred as Pravala moola bhasma. No Relevant findings were found in both Moola and Sakha Pisti.

DISCUSSION

The rackets of spurious, misbranded and adulterated drugs are a big health hazard for the public and place an additional moral responsibility on genuine manufactures to effectively counter this nuisance. To rule out these drawbacks of a drug quality control is important. This can be achieved by doing analysis of samples.

Table No. 1 Organoleptic characters of raw Pravala moola & Pravala shakha

Parameters	Observations	
	Pravala Moola	Pravala Shakha
Color	Red	Light Red
Taste	Non specific	Non specific
Touch	Hard	Hard
Odor	Odorless	Odorless
Structure	Fossil , irregular, having many pores	Stick like, cylindrical , hard and dense

Under the present analytical study, the prepared samples were subjected to a variety of analytical methods to know the physical and chemical characteristics of samples. In the organoleptic characters, the parameters tested, show following results:

Table No.1 shows that both ashodhita and shodhita pravala moola and shakha exhibit similarity in color, touch, taste, odor etc. but structurally these seem to be different and easily identifiable. TableNo.2 shows that there were no significant difference found between the organoleptic characters of moola and shakha bhasma, and moola and shakha pisti. The corrosive nature of bhasma gradually decreases after subsequent putas. Varitaratva was not found in all the samples. This might be due to hygroscopic and adsorbent properties of pravala bhasma and pisti (calcium compounds). The organoleptic characters being subjective in nature cannot be evaluated numerically for reproducibility in the results until and unless subjected to sophisticated instruments. The results

obtained were constant persistently and yield the same characters in all the similar samples of bhasma and pisti.

Table No.3 shows that Loss on drying was slightly higher in moola than shakha sample, which is indicative of moisture contents.

Table No. 2 Organoleptic characters of Pravala moola and Shakha bhasma and Pishti samples

Parameters	Pravala Moola Bhasma	Pravala Shakha Bhasma	Pravala Moola Pisti	Pravala Shakha Pisti
Appearance	Fine powder	Fine powder	Fine powder	Fine powder
Color	White	White	White	White
Taste	Tasteless	Tasteless	Tasteless	Tasteless
Touch	Smooth	Smooth	Smooth	Smooth
Odour	Odorless	Odorless	Gulab odor	Gulab odor
Rekhapurnatva	Positive	Positive	Positive	Positive
Varitaratva	Negative	Negative	Negative	Negative

The pH showed alkalinity in all the samples. Higher pH was found in all the shakha samples as compared to moola samples. Both the moola and shakha bhasma had higher pH as compared to shodhita and raw material. This may be due to puta and addition of bhavana dravya in bhasma. In both the pistis, the pH remained alkaline but was less as compared to bhasma.

Table No. 3 Physico - chemical parameters of Ashodhita, Shodhita, Bhasma and Pisti samples of Pravala

S. No.	Sample	L.O.D.	AV	AIA	WSE	ASE	pH
1.	PM(R)	0.49	59.37	1.29	1.36	2.035	8.8
2.	PS(R)	0.47	57.68	0.57	1.58	1.641	9.1
3.	PM(S)	0.45	61.49	1.31	2.40	1.98	9.3
4.	PS(S)	0.39	58.44	0.71	1.92	1.15	9.4
5.	PM(B)	0.72	68.76	1.43	9.67	4.46	10.2
6.	PS(B)	0.82	64.35	1.28	6.16	4.74	10.6
7.	PM(P)	1.52	58.84	1.91	3.85	6.02	9.3
8.	PS(P)	1.14	56.66	1.83	4.42	8.20	9.7

L.O.D.- Loss on drying, AV – Ash value, AIA – Acid insoluble ash, WSE - Water soluble extractive, ASE – Alcohol soluble extractive.

The results are arranged in Table No. 3

In qualitative group analysis, all the samples confirmed presence of Calcium, carbonate, phosphate and magnesium. In Table No.4 I.C.P. imaging reveals that all the samples contain Ca, Mg and many other trace elements as P, Fe, Mn, Na, K, Si, S, Zn, Au, Ag, B, Ba, Bi, Cu, Cr, Ni, Sn, Sr and Al. It is seen that % of Ca was found higher in moola bhasma and moola pisti as compared to shakha bhasma and pisti. But the difference was not significant. Bhasma samples have more Ca content due to addition of herbal drugs. The other elements such as Mg, Fe, and Na etc. seem to be on higher side in moola as compared to shakha. The amount of silica is more in moola bhasma and pisti as compared to shakha bhasma and pisti due to presence of silica content in the moola.

Namburi phased spot is helpful in the deduction of continued chemical reaction that takes place gradually between two chemical substances on a static media. The test shows no major changes, the reason may be that it is a qualitative test and just indicates the presence of that substance.

Table No. 4 Percentage of minerals in I.C.P.

Element	Pravala Moola Bhasma	Pravala Shakha Bhasma	Pravala Moola Pisti	Pravala Shakha Pisti
Ca	51.97%	45.38%	44.60%	42.26%
Mg	3.77%	3.59%	3.39%	3.77%
Fe	679.1 mg/Kg	584.4mg/Kg	688.6 mg/Kg	330.3 mg/Kg
P	158.4 mg/Kg	154.8 mg/Kg	174.3 mg/Kg	93.9 mg/Kg
Si	2843.0 mg/Kg	1252.9 mg/Kg	1584.8 mg/Kg	901.3 mg/Kg
Na	3625.5 mg/Kg	3435.5mg/Kg	3516.7 mg/Kg	3572.3 mg/Kg
K	747.0 mg/Kg	555.4 mg/Kg	253.8 mg/Kg	259.6 mg/Kg
Mn	12.3 mg/Kg	29.3 mg/Kg	11.3 mg/Kg	21.6 mg/Kg

CONCLUSION

1. The above analytical study reveals that all the samples lie within the standard limits as mentioned in Pharmacoepial Standards for Ayurvedic formulations.

2. Insignificant difference was seen between Pravala moola and shakha samples.

3. The overall results inferred that both shakha and moola are having similar properties and hence, both can be used for medicinal purposes. As in the market, moola is cheaper than shakha and has higher % of Calcium, shakha can be replaced by moola. Moola is a cheap and better efficacy drug.

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