



Physicochemical Standardization of *Kushta Abrak Safaid*: A Herbo-Mineral Unani Formulation

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ABSTRACT

Abrak (Mica) is a rock forming silicate of aluminium and is used in Unani system in the form of *kushta* (calcined product). After proper purification and incineration *abrak* becomes highly potent and is used in treatment of various diseases of respiratory system, stomach and intestine, tuberculosis, asthma, spermatorrhoea etc. *Hakim* describes *abrak* as antipyretic, general tonic, aphrodisiac, constipative and desiccant. Product standardization of a compound formulation is utmost necessary to check the purity and genuineness of a preparation. In this study the purification, preparation and standardization of *kushta abrak safaid* was performed. *Kushta* was evaluated on classical parameters like finger test, fineness test etc. as well as on modern parameters like bulk density, tapped density, hausner's ratio, carr's index, pH, loss of weight on drying, total ash, acid insoluble ash, water soluble ash, extractive value and loss of weight on ignition. The physicochemical parameters evaluated in this study might be considered as standard parameters of *kushta abrak safaid*.

Keywords: *Abrak*, Herbo-mineral, *Kushta*, Standardization, Unani.

INTRODUCTION

Kushta is derived from Persian word *kushtan* which means 'to kill'. *Kushta* or *bhasma* is the finest powder form of the medicinal preparations obtained by calcination of metal, minerals and animal drugs. It is easily absorbed in human body and is highly efficacious in action. [1] The rate of absorption of a drug depends on particle size. Smaller the particle size quicker and greater is the rate of absorption. [2] *Kushta* has the smallest particle size (in nano particle range) hence largest surface area as compared to any other solid dosage form of Unani system of medicine therefore this factor is responsible for rapid action of *kushta*. Subsequent action upon DNA/RNA molecule and protein is further hypothesized as possible mechanisms for rapid onset of therapeutic action of *kushtas*. [3]

Abrak is commonly known as mica. Its *Kushta* is considered to be very effective in treating various ailments like chronic fevers, bilious fever, spermatorrhoea, attenuated semen, phthisis and tuberculosis. It is known by different vernacular names like *alq* in Arabic, *sitarah zameen* in Persian,

abharaka, *abrak* or *bhodai* in Ayurveda. [4] Chemically *abrak* is Silicate of Alumina with Biotite Magnesia [5] and contains several elements such as Si, Fe, Al, Mg and K as main ingredient. [6] It is basically of four types; *Pinaka*, *dardura*, *naga* and *vajra*. The *pinaka* variety gets separated into smaller segments (lamellae) on subjecting to heat. The *naag* variety produces hissing sound like that of snake. The *dardura* one produces sound like frog (croaking) and the fragments bounce out from heating. The fourth one is ideal as it is immutable on subjecting to heat. [4, 7]

Mica if used in unpurified raw state results in reduction of life span and appetite and makes the body more prone to bacterial invasion. Hence before using *abrak* it is always subjected to purification. The idea of this is to get rid of the impurities and their deleterious effects. If this purification or '*tasfiya*' is not performed, its use is said to be injurious to the individual. [8] The physicians believed that there is no toxicity due to the unique and repeated purification processes employed during preparation. [9] Product standardization of a compound formulation is of paramount importance to ensure the genuineness of a preparation. So in this study *Kushta abrak safaid* was prepared by detoxifying *abrak* as per classical Unani literature. Its *kushta* was prepared in muffle furnace and was evaluated for various physicochemical parameters.

MATERIALS AND METHODS

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Abrak safaid (Mica) and *mooli* (*Raphanus sativus*) were purchased from the local market of Bangalore. *Gilo* (*Tinospora cardifolia*) was taken from the herbal garden of National Institute of Unani Medicine. *Shora qalmi* (*Potassium nitrate*) was purchased from chemical shop and was of AR grade.

Purification of Abrak (*Abrak mehloob* or *Abrak dhanab*)

The layers of raw *abrak* (Fig. 1) were first separated by pounding it in a mortar. The small pieces of *abrak* were then kept in a bag of thick cloth along with date seeds (*Phoenix dactylifera*) and tied (Fig. 2). The bag was then dipped in hot water and rubbed vigorously with both hands. Small particles of *abrak* were then squeezed out of the bag. The process of dipping the bag in hot water and rubbing was repeated till all the particles of *abrak* were squeezed out of the bag. The particles of *abrak* were allowed to settle down at the bottom of the vessels and the water was decanted. *Abrak* particles were removed and dried. These particles are *abrak mehloob* or *abrak dhanab* (Fig. 3).^[10-13]



Fig. 1: Raw *Abrak*



Fig. 2: During *Dhanab*



Fig. 3: *Abrak* after *dhanab*

Method of preparation of *kushta abrak safaid*

The *kushta* was prepared as per *Kitab ul Taklees* but with a slight modification i.e. instead of using the cow dung cakes *kushta* was prepared in Muffle Furnace because of ease of preparation and better temperature control. 60 g *abrak mehloob* was triturated in 60 ml of *aab mooli* (Fig. 4), and then 120 ml decoction of *aab gilo* was added and triturated (Fig. 5) and dried. Later 60 g of *shora qalmi* (Potassium nitrate) was added to the mixture and left for drying in

sunlight for 1 day. The heating was done as given by Parmar *et al.*^[14] The peak temperature maintained was 1008°C at 35 ± 5 minutes, above 800°C temperature was maintained for 20 ± 5 minutes and above 600°C temperature was maintained for 40 ± 5 minutes. After removal from furnace (Fig. 6) it was dipped in 1litre water (Fig. 7) so as to remove the quantity of *shora qalmi*. Subsequently *kushta* was dried on electric heater (Fig. 8). After drying the finished product i.e. *kushta abrak safaid* (Fig. 9) was stored in an air tight bottle.



Fig. 4: *Abrak* triturated with *aab mooli*



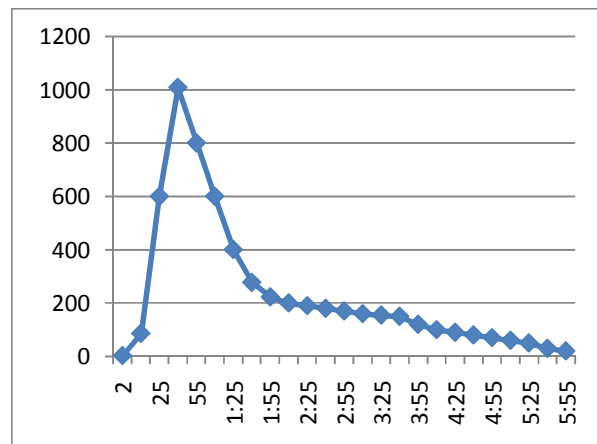
Fig. 5: *Abrak* triturated with *joshanda gilo*



Fig. 6: *Kushta* after taken out from furnace



Fig. 7: *Kushta* dipped in water

Fig. 8: *Kushta* being dried on heaterFig. 9: *Kushta Abrak Safaid*

Heat pattern followed during the preparation (X axis- Time in minutes, Y axis- Temperature in degree Celsius)

Physicochemical parameters

The prepared *kushta abrak safaid* was evaluated for organoleptic properties, preliminary tests, bulk density, tapped density, hausner's ratio, carr's compressibility index, pH, loss of weight on drying at 105°C, total ash, acid insoluble ash, water soluble ash, water insoluble ash, water soluble extractive value and loss of weight on ignition.

Bulk density and tapped density^[15-18]

10g of weighed *Kushta* was carefully added to the cylinder with the aid of a funnel. The initial volume was noted and the sample was then tapped until no further reduction in volume was observed. The bulk and tapped densities were calculated by the formula.

$$\text{Bulk Density} = \frac{\text{Mass}}{\text{Bulk Volume}}$$

$$\text{Tapped Density} = \frac{\text{Mass}}{\text{Tapped Volume}}$$

Hausner's ratio^[15-16, 19-20]

Hausner's ratio was calculated by following equation

$$\text{Hausner's ratio} = V_o/V_f$$

Where V_o = Unsettled apparent volume, V_f = final tapped volume.

Carr's index^[15, 17-19]

Carr's index was calculated by following equation

Carr's

index (%) =

$$\frac{[(\text{unsettled apparent volume} - \text{final tapped volume}) \times 100]}{\text{unsettled apparent volume}}$$

Loss of weight on drying at 105°C^[3, 15, 21-24]

200 mg of *kushta* was spread uniformly in petridish and was heated at 105°C then cooled in a desiccator and weighed. The process was repeated till two consecutive weights were constant. The percent loss in weight was calculated.

Determination of pH in 1% solution and 10% solution^[22, 24]

The pH value of 1% solution

An accurately weighed 1 g of *kushta* was dissolved in accurately measured 100 ml of distilled water and filtered with whatman's filter paper. pH was measured with digital pH meter.

The pH value of 10% solution

An accurately weighed 10 g of *kushta* was dissolved in accurately measured 100 ml of distilled water and filtered with whatman's filter paper. pH measured with a digital pH meter.

Total Ash^[23, 25-26]

2 gm of *kushta* was incinerated in a silica crucible at a temperature not exceeding 450°C. The crucible was then cooled and weighed and the percentage of total ash was calculated.

Acid insoluble Ash^[23, 25-26]

The ash was boiled with 25ml of dilute hydrochloric acid for 5 minutes. The insoluble matter was collected on an ash less filter paper washed with hot water and ignited at a temperature not exceeding 450°C and weighed after cooling. The percentage of acid insoluble ash was calculated.

Water insoluble and Water soluble Ash^[23, 25-26]

The ash was boiled with 25 ml of distilled water for 5 minutes. The insoluble matter was collected on an ash less filter paper, washed with hot water and ignited. The weight of insoluble ash was subtracted from the weight of the total ash, giving the weight of the water soluble ash.

Determination of Extractive value^[26]

4.0 g of *kushta* was accurately weighed in a glass stoppered conical flask. 100 ml of water was added and weighed to obtain the total weight including the flask. It was shaken well and was allowed to stand for 1 hour. A reflux condenser was attached to the flask and boiled for 1 hour. 25 ml of the filtrate was transferred to a tared flat-bottomed dish and evaporated to dryness on water-bath then dried at 105°C for 6 hours. Then it was cooled in a desiccator for 30 minutes and weighed.

Determination of Loss on Ignition (LOI)^[27]

1.0 g *kushta* was taken in silica crucible and heated to constant weight at 950-1000° for an hour and then allowed to cool. Loss of weight on ignition was calculated by following equation.

$$\text{LOI \%} = \frac{[(W_3 - W_2) \times 100]}{W_2 - W_1}$$

Where W1 = weight of empty crucible, W2 = weight of crucible + sample, W3 = weight of crucible + sample after ignition

Table 1: Organoleptic Description of *Kushta Abrak Safaid*

Appearance	Lustrless
Colour	Yellowish white
Smell	Odourless
Taste	Tasteless

Table 2: Preliminary tests of *Kushta Abrak Safaid*

Preliminary tests	<i>Kushta Abrak Safaid</i>
Fineness test	Very fine
Loss of metallic luster	Yes
Wall stick test	Positive

Table 3: Physicochemical Tests of *Kushta Abrak Safaid*

S. No	Parameters	Mean $\pm$ SEM
1.	Bulk Density (gm/ml)	0.486 $\pm$ 0.00
2.	Tapped Density(gm/ml)	0.80 $\pm$ 0.01
3.	Hausner's Ratio (HR)	1.68 $\pm$ 0.01
4.	Carr's Index (%)	39.90 $\pm$ 0.02
5.	pH (1%)	9.91 $\pm$ 0.02
	pH (10%)	10.56 $\pm$ 0.02
6.	Loss on drying (%)	0.005 $\pm$ 0.00
7.	Loss on Ignition (%)	0.097 $\pm$ 0.00
8.	Total ash (%)	96.84 $\pm$ 0.03
	Acid insoluble ash (%)	86.38 $\pm$ 0.08
	Water insoluble ash (%)	87.63 $\pm$ 0.19
	Water soluble ash (%)	4.03 $\pm$ 0.02
9.	Extractive value (%)	4.83 $\pm$ 0.06

RESULTS AND DISCUSSION

The colour of *kushta abrak* was found to be Yellowish white. It was odorless, tasteless, smooth to touch and lustrless (Table 1). Floating test, fineness test and wall stick test were positive (Table 2). The mean value of bulk density and tapped density of *kushta abrak safaid* were 0.486 $\pm$ 0.006 gm/ml and 0.80 $\pm$ 0.01gm/ml respectively (Table 3) The mean value of Hausner's Ratio and Compressibility Index were 1.68 $\pm$ 0.01 and 39.90 $\pm$ 0.02% respectively (Table 3); pH in 1 % and 10 % solution 9.91 $\pm$ 0.02 and 10.56 $\pm$ 0.02 respectively (Table 3). The mean percentage of loss of weight on drying was 0.005 $\pm$ 0.00% (Table 3). The mean percentage value of the total ash, acid insoluble ash, water soluble ash and water insoluble ash were 96.84 $\pm$ 0.03%, 86.38 $\pm$ 0.08%, 4.03 $\pm$ 0.02% and 87.63 $\pm$ 0.19% respectively (Table 3). The mean percentage of the water soluble extractive value was 4.83 $\pm$ 0.06% (Table 3). The mean percentage of loss of weight on ignition was 0.097 $\pm$ 0.00 (Table 3). These findings would definitely help in providing assurance in use of *kushtas* for medication by ensuring batch to batch uniformity. The results obtained for the various physicochemical parameters of *kushta abrak safaid* may be taken as standard parameters for future reference.

REFERENCES

1. Anonymous. National Formulary of Unani Medicine. Part 1st. CCRUM, New Delhi, 2006, pp. 66.
2. Gupta AK. Introduction to pharmaceuticals. Part 1, CBS publishers and distributors, New Delhi, 2009, pp. 87.
3. Rasheed A, Marri A, Naik MM. Standardization of Bhasma-importance and prospects. Journal of Pharmacy Research 2011; 4 (6):1931-1933.
4. Kabeeruddin HM. Kitab al Taklees. CCRUM, New Delhi, YNM, 41-43.
5. Anonymous. National Formulary of Unani Medicine. Part 6, CCRUM, New Delhi, 2011, pp. 153.
6. Rai P, Gupta VM, Pathak R, Gupt L, Kumar N, Singh S. Importance of media in the pharmaceutical processing's of metals and minerals-scanning electron microscopy study and energy

- dispersive X ray analysis of abharaka (biotite). Int Jour of Pharm and Pharmaceutical Sci. 2010; 2(4): 121-123.
7. Suresh P, Dhannapuneni VK. Rasendra Sara Sangrah of Sri Gopal Krishna Bhatt. Edn 1, Chaukhamba Sanskrit Pratishthan, New Delhi, 2007. pp. 48-55.
8. Chopra RN, Chopra IC, Handa KL, Kapur LD. Chopra's Indigenous Drugs of India. Academic Publisher, Calcutta, 1982. pp. 461-464.
9. Kamath SU, Pemiah B, Sekar RK, Krishnaswamy S, Sethuraman S, Krishnan UM. Mercury-based traditional herbo-metallic preparations: a toxicological perspective. Arch Toxicol. 2012; 86: 831-838.
10. Anonymous. The Unani Pharmacopoeia of India. Part-II, Vol. 1, CCRUM, New Delhi, 2007, pp. 270-271.
11. Anonymous. The Unani Pharmacopoeia of India. Part-I, Vol. 5, CCRUM, New Delhi, 2008, pp. 220.
12. Anonymous. The Unani Pharmacopoeia of India. Part-I, Vol. 4, CCRUM, New Delhi, 2007, pp. 214.
13. Anonymous. The Unani Pharmacopoeia of India. Part-I, Vol. 1, CCRUM, New Delhi, 2007, pp. 43-44.
14. Parmar DK, Patgiri BJ, Prajapati PK. Standardization of Gaja Puta and Ardha Gaja Puta in the preparation of Vanga Bhasma. An Int Quarterly Jour of Research in Ayurveda. 2010; 31(4): 511-516.
15. <http://www.who.int/medicines/publications/pharmacopoeia/Bulk-tapped-density>. Cited on 18/3/2013.
16. Kumar T, Chandrashekar KS, Tripathi DK, Nagori K, Pure S, Agrawal S, Ansari TJ. Standardization of "Gokshuradi Churna" An ayurvedic polyherbal formulation. Jour of Chemical and Pharmaceutical Research. 2011; 3(3):742-749.
17. Mehta KK, Patel HH, Patel ND, Vora CN, Patel NJ. Comparative evaluation of natural and synthetic super disintegrant for promoting nimesulide dissolution for fast dissolving technology. Int Jour of Pharmacy and Pharmaceutical Sci. 2010; 2(3): 102-108.
18. Dubey N, Dubey N, Mehta RS, Saluja AK, Jain DK. Quality Assessment of Kushta-e-Gaodanti: A Traditional Unani Medicine. Asian J. Research Chem. 2008; 1(1): 46-50.
19. Anonymous. The Japanese Pharmacopoeia. 15th Ed, Ministry of Health, Labour and Welfare, Japan, 2006, pp. 68, 1730.
20. Pandey MK, Singh GN, Sharma RK, Lata S. Standardization of Yakrit Plihanak Churna: An Ayurvedic polyherbal formulation. Ind Jour of Pharmaceutical Sci and Research 2012; 3(1): 171-176.
21. Mohopatra S, Jha CB. Physicochemical Characterization of Ayurvedic Bhasma (Swarna Makshika Bhasma): An Approach to Standardization. Int Jour of Ayurveda Research 2010; 1(2): 82-86.
22. Anonymous. Physicochemical Standards of Unani Formulations. Part 4, CCRUM, New Delhi, 2006: pp. 142-145.
23. Afaq SH, Tajuddin and Siddiqui MMH. Standardization of Herbal Drugs. A.M.U Press, Aligarh, 1994, pp. 33, 41.
24. Rajashekaran A, Murugesan A. Standardization of Saringa Bhasma. Ancient Science of Life. 2002; 11(3): 167-169.
25. Anonymous. British Pharmacopoeia. General Medical Council Pharmaceutical Press, London, 1968, pp. 1276-77, 1285-88.
26. Anonymous. Quality control methods for herbal materials. WHO Press, Geneva, 2011, pp. 29, 31.
27. Anonymous. The Ayurvedic Pharmacopoeia of India. Part 1, Vol 7, Dept of AYUSH Govt. of India, New Delhi, 2008, pp-73.