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PHYSICOCHEMICAL CHARACTERIZATION OF *KUSHTA KHARMOHRA* (*CYPREA MONETA* CALX): AN ADVANCE TOWARDS STANDARDIZATION

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ABSTRACT

Unani is a matchless system of medicine which uses drugs of animal and mineral origin in the form of *kushta* (very fine powder obtained through calcination). During calcination (*taklees*) raw drugs are made biocompatible through specific processes. *Kharmohra* (*Cyprea moneta* Linn) is one such drug which has been used in the form of *kushta* since antiquity. It has a wide range of therapeutic applications in diseases including asthma (*Zeeq-un-Nafas*), gout (*Niqras*) etc. Presently there is no scientific data available about standard *kushta kharmohra*. Therefore present study was aimed to prepare *kushta kharmohra* by subjecting it to *tasfiya* (purification) and *taklees*, and commence on physiochemical analysis of the prepared *kushta* with an eye toward the standardization of *kushta kharmohra*. To assure the quality of the prepared *kushta*, various classical tests like floating test, fineness test, and finger test were done. The results of the classical test showed that the quality of *kushta* prepared was good and in confirmation to the properties mentioned in classical text. Further modern quality control parameters like bulk density, tapped density, Hausner's ratio, Carr's compressibility index, pH, loss of weight on drying at 105^0C, total ash, acid insoluble

ash, water soluble ash, water insoluble ash, water soluble extractive value and loss of weight on ignition were also carried out. Results showed that the finished product has poor flow properties, minimum moisture content and negligible amount of extractive values. The result obtained might be specified as the quality control parameters of standard *kushta kharmohra.*

KEY WORDS: *Kushta, Kharmohra,* Unani medicine.

INTRODUCTION

Kharmohra is identified as the external shell of sea animal *Cyprea moneta* Linn [1]. It is known by various vernacular names like *Cowrie, Khar-mahara, Gosh Mahi, Varatika, Kadi, Marine shell, Porcelaneous Schalen, Kodi, Kaudi, Kauri, Kajak, Kaparda, Pingo* and *Gavalu* [1,2]. It is a small, convulate glossy shell of oval shape having varying size ranging from a tamarind seed to almond [3]. *Kharmohra* used as medicine should not weight less than 3.75 gm [4]. Three varieties of cowries are used as medicine. These are white, red and yellow. Ancient alchemist preferred *cowries* that are yellow in colour with circular lines on the dorsal side [3]. It is found on rocky ground particularly in and around coral reefs mainly in Indian and Pacific oceans [2]. Chemically, *kharmohra* is carbonate of Calcium [1]. In Unani system of medicine *kharmohra* is used internally in the form of *kushta* (Calx). *Kushta* are biological nanocrystals with size less than 100 nm in at least one dimension [5]. Due to very small particle size of *kushta*, it exerts its curative role more effectively after entering into the body [6]. *Kushta kharmohra* is used as medicine to cure various ailments of stomach, intestine, asthma (*Zeeq-un-Nafas*), cough (*Sual*), gout (*Niqras*), fever (*Humma*), renal stones (*Hasat-e Kuliya*), gonorrhea (*Sozak*), syphilis (*Aatishak*), leucorrhoea (*Sailan-ur Rehem*), dysentery (*Zaheer*) [7,8,9]. Though *Kushta kharmohra* is in use in Unani medicine since ancient time but there is no standard scientific data available about its quality control. Therefore, present study was conducted to standardize *Kushta kharmohra* on classical as well as modern parameters to establish the quality control parameters of *kushta kharmohra* which can be taken as standard for future references.

MATERIALS AND METHODS

Kharmohra, sirka and leemun were purchased from the local market in Bangalore.

Method of Detoxification

Kharmohra were dipped overnight in 500 ml *sirka* (Fig 1) and next day, boiled for 3 hrs (Fig 2). Afterwards they were washed with plain water (Fig 3) [10].

Fig 1. *Kharmohra* after overnight dipping in sirka

Fig 2. During 3 hr boiling

Fig 3. *Kharmohra musaffa*

Method of preparation of *Kushta Kharmohra:* *Kushta* was prepared as per *Kitab ul taklees* with a slight modification, that instead of using the cowdung cakes it was prepared in Muffle Furnace because of ease of preparation and better temperature control. 60 gm *kharmohra* was dipped in *aabe leemun* (Fig.5) and kept aside at room temperature for 3 days. After 3 days (Fig.6) *kharmohra* were kept in the crucible and closed with lid [7] and placed in Muffle Furnace. Heat pattern followed was according to Praveen *et al* [11]. In literature it is mentioned that for preparation of *kushta kharmohra* 5 kg of cow dung cakes are required. As the present *kushta* was prepared in MF, temperature pattern for 5 kg of cow dung cake was adopted from Praveen et al. The peak temperature maintained was 680°C for 70 ± 5 minutes, above 600°C temperature was maintained for 20 ± 5 minutes and above 500°C temperature was maintained for 25 ± 5 minutes (Fig. 4). After completion of heating (Fig.7) finished product i.e. *Kushta kharmohra* (Fig.8) was removed carefully and was preserved in an air tight bottle.

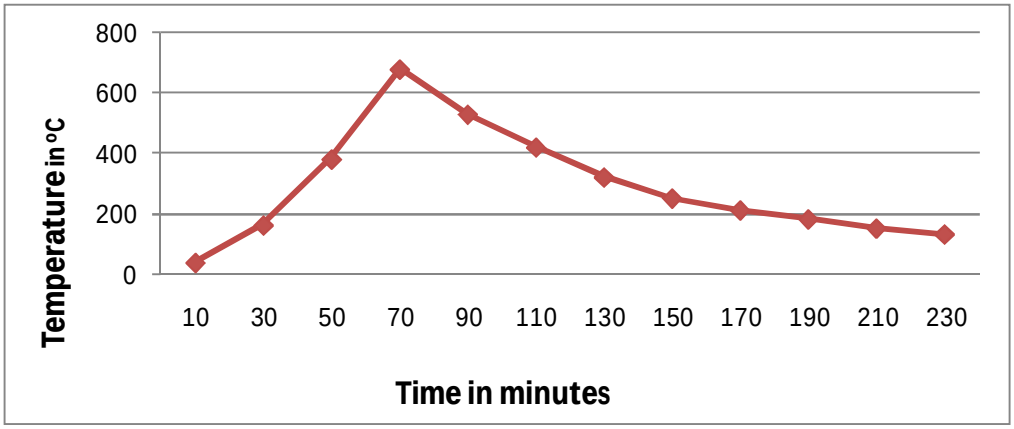

Fig. 4 Followed Heat Pattern

Fig.5. *Kharmohra* dipped in *arq lemun* for 3 days

Fig.6. *Kharmohra* dipped in *aabe lemun*

Fig.7.*Kushta* after removal from furnace

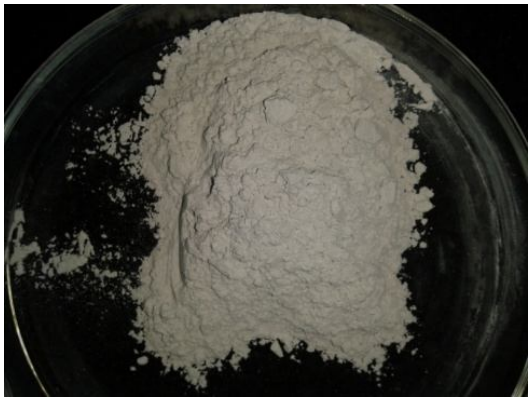

Fig.8. Final kushta

Physico-chemical parameters

The prepared *kushta kharmohra* was evaluated for classical parameters like Organoleptic properties, floating test, fineness test, wall stick test, finger test, as well as bulk density, tapped density, Hausner's ratio, Carr's compressibility index, pH, loss of weight on drying at 105^0C, 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

LBD (Loose Bulk Density) and TBD (Tapped Bulk Density) were ascertained by following method [12]. 2 g of *kushta kharmohra* was placed into a 10-ml measuring cylinder and the initial volume was noted. Then tapping was done. The tapping was continued until no further change in volume was observed. LBD and TBD was calculated by the following equation

LBD = Weight of the powder / volume of the packing. TBD = Weight of the powder / Tapping volume of the packing.

Hausner's ratio

Haussner's ratio was determined as the ratio between the tapped density to bulk density and was calculated by the following equation [13].

Hausner's ratio = Tapped density / Bulk Density

Carr's index

Carr's compressibility index was calculated by [14]

= (T.d – B.d)/T.d ×100 Where T.d=Tapped density, B.d- Bulk density

Loss of weight on drying at 105°C

200 mg of *kushta* was spread homogeneously in petridish and was heated at 105^{o}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 [15].

Determination of pH in 1% solution and 10% solution

The pH value of 1% solution

1 gm of *kushta* was dissolved in 100 ml of distilled water and filtered with whatman's filter paper and pH was measured with digital pH meter [16].

The pH value of 10% solution

10gm of *kushta* was dissolved in 100 ml of distilled water and filtered with whatman's filter paper and pH measured with a digital pH meter [16].

Determination of Total Ash

2 g *kushta kharmohra* was incinerated in silica dish at a temperature not exceeding 450^{0}c. The percentage of ash was calculated with reference to air dried drug [17].

Determination of Acid-Insoluble Ash

To the crucible containing total ash 25 ml of dilute Hcl was added. The insoluble matter was collected on Whatman ashless filter paper and washed with hot water until the filtrate is neutral. The filter paper containing the insoluble matter was transferred to the original crucible, dried on a hot-plate and ignited to constant weight. The residue was allowed to cool in a suitable desiccator for 30 minutes and weighed without delay. The content of acid-insoluble ash was calculated with reference to the air-dried drug [18].

Determination of Water Soluble Ash

The ash was boiled for 5 minutes with 25 ml of water and insoluble matter was collected in a crucible or on an ashless filter paper and wash with hot water, and ignited for 15 minutes at a temperature not exceeding 450^0c. The weight of the insoluble matter was subtracted from the weight of the ash; the difference in weight represents the water-soluble ash [18].

Determination of Extractive value

4.0g of *kushta* was accurately weighed and put in a conical flask. 100 ml of water was added and weighed to obtain the total weight including the flask. It was shaked 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 petridish 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 [19].

Determination of Loss on Ignition (LOI) [20]

1.0 g *kushta* was taken in silica crucible and heated to constant weight at $950\text{-}1000^0$ for an hour and then allowed to cool. Loss of weight on ignition was calculated by following equation.

$$\text{LOI \%} = \frac{[(W3-W2)\times 100]}{W2-W1}$$

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

RESULTS AND DISCUSSION

The colour of *kushta kharmohra* was yellowish white. It was odorless, tasteless, lusterless smooth to touch, and very fine (Table 2). Floating test, fineness test, wall stick test and finger tests were positive (Table 3). The mean value of bulk density and tapped density of *kushta kharmohra* were 0.91±0.003 gm/ml and 0.65±0.005 gm/ml respectively. The mean value of Hausner's Ratio and Compressibility Index were 1.41±0.00 and 30.42±0.02% respectively (Table 4). Hausner's ratio and compressibility index of *kushta kharmohra* were greater than 1.2 and 23 indicating poor flow properties [22]. pH in 1% and 10% solution were 10.47±0.00 and 11.17± 0.02 respectively (Table 4). It is mentioned that most of the *kushtajat* are alkaline. It also indicated that the finished product was content of metallic oxides (calcium oxide) as the fact that pH value of water solutions of metal oxides is basic. The mean percentage of loss of weight on drying and loss of weight on ignition was 0.003±0.00% and

0.026± 0.00. (Table 4) Loss of weight on drying is a method to measure the loss in mass of the sample. This is done to determine the amount of water, all or a part of the water of crystallization or volatile matter in the sample, which is removed during drying [23]. Loss of weight on ignition is a method to measure the loss in mass of the sample. This is used to determine the amount of water and organic matter which is removed during ignition. As the prepared *kushta* showed very less weight loss on drying, it could be assumed that the finished product was devoid of water and organic matters. The mean percentage value of the total ash, acid insoluble ash, water soluble ash and water insoluble ash were 94.74±0.06%, 86.38±0.13%, 5.50±0.02% and 89.50±0.08% respectively. (Table 4) High ash value shows the presence of very high inorganic content. Lower value of the acid insoluble ash suggests the greater physiological availability of the drug. The mean percentage of the water soluble extractive value was 0.73± 0.03%. (Table 4) Extractive values help in the determination of the adulteration and is an index of the purity of the drug. In case of *kushta* extractive value is performed to extract out organic matter if present. Less extractive values again confirm that *kushta* was prepared properly and finished product was free from organic material.

Table 1: Physical properties of raw *Kharmohra*

Properties	**Raw *Kharmohra***
Nature	Hard
Colour	Whitish yellow
Cleavage	Absent
Fracture:	Conchoidal
Luster	Pearly
Streak	White
Transparency	Translucent

Table 2: Organoleptic properties of raw *kharmohra* and *Kushta kharmohra*

Properties	**Raw *Kharmohra***	***Kushta Kharmohra***
Colour	Grayish yellow	Yellowish white
Odour	Odourless	Odourless
Taste	Tasteless	Tasteless
Touch	Smooth	Smooth
Appearance	Pearly	Lusterless

Table 3: Preliminary tests of *Kushta kharmohra*

Floating test	Positive
Fineness test	Very fine
Wall stick test	Positive
Finger test	Positive

Table 4: Physicochemical Tests of *Kushta kharmohra*

Parameters	Experiment 1	Experiment 2	Experiment 3	Mean ±SEM
Bulk density (gm/ml)	0.92	0.91	0.92	0.91± 0.003
Tapped Density (gm/ml)	0.64	0.66	0.65	0.65±0.005
Hausner's ratio (HR)	1.43	1.42	1.40	1.41±0.00
Compressibility index (%)	30.43	30.46	30.39	30.42±0.02
pH (1%)	10.49	10.46	10.48	10.47±0.00
pH (10%)	11.12	11.19	11.20	11.17± 0.02
Loss of weight on drying (%)	0.003	0.004	.003	0.003±0.00
Loss of weight on ignition (%)	0.027	0.024	0.029	0.026± 0.00
Total ash (%)	94.85	94.63	94.74	94.74± 0.06
Acid insoluble ash (%)	86.47	86.56	86.13	86.38± 0.13
Water insoluble ash (%)	89.34	89.52	89.65	89.50± 0.08
Water soluble ash (%)	5.51	5.47	5.54	5.50± 0.02
Water soluble extractive value (%)	0.7	0.7	0.8	0.73± 0.03

CONCLUSION

Unani system of medicine has its own scientific principles behind the preparation of each formulation. But the lack of standardization is the main factor due which regardless of its prosperous traditional legacy of drugs and pharmacy procedures, it has a miserable sharing in global market. The current study is to lay a path that further studies can be progressed on *kushta kharmohra* like XRD, particle size analysis, AFM, TEM etc to bridge between traditional and conventional medicine and to encourage the facts written in the classical literature.

REFERENCES

1. Devanathan R , Rajalakshmi P, Brindha P. Chemical standardization studies on varatika bhasma. Int J Curr Pharm Res, 2 (4); 2010: 12-16.
2. Mubarak H, Masilamani G. Siddha Marine Drug Palagrai (Cyprarea Moneta Linn)- A Review. Ind Jour Of Geo-Marine Sci, 2012; 41(2): 121-3.
3. Nadkarni KM, Nadkarni AK. *Indian Materia Medica*. Bombay; Popular Prakashan Pvt. Ltd: 1976, pp.158-9.
4. Thottam PJ. Modernizing Ayurveda. Chennai; Sura Books Pvt Lmtd: 2005, pp. 38.
5. Rasheed A, Marri A, Naik M.M. Standardization of Bhasma -importance and prospects. Jour of Pharmacy Res, 2011; 4(6): 1931-3.
6. Said HM. Hamdard pharmacopoeia of eastern medicine. New Delhi; Sri Sat Guru publication: 1997, pp. 222-223.
7. Kabeeruddin HM. Kitabul Taklees. New Delhi; Central Council of Research in Unani Medicine: YNM, pp. 187.
8. Kareem BH, Ferozuddin CH. Miftahul Khazain. New Delhi; Idara Kitabus shifa: YNM, pp. 372.
9. Rehman QA. Israr Seena ba Seena. New Delhi; Idara Kitabus Shifa: 2003, pp. 94-5.
10. Hafeez A. Sanatal Takless. New Delhi; Central Council of Research in Unani Medicine: YNM, pp. 87.
11. Tate PM, Patgiri BJ, Prajapati PK. Pharmaceutical standardization of Naag bhasma. Ayujour, 2009; 30(3): 300-9.
12. Farzana A, Halder S, Shuma M L, Rouf AS. In Vitro Release Kinetics Study of Indomethacin 12Hr Matrix Tablet From Methocel K4M CR and Methocel K15M CR. Jour of Biomed and Pharmaceutical Res, 2012; 1 (3): 60-5.

13. Nuka R, Potu AR, Nandan R. Formulation Development and In-Vitro Evaluation of Ramipril Micropellets. World jour. of pharmaceutical res, 2012; 2(1): 76-87.
14. Ramanjaneyulu M, Kumar MS, Bairam R, Babu PM. Formulation and Evaluation of Oral Disintegrating Release Dosage Form Containing Meclizine Hcl. Int. jour. of pharmacy, 2012; 2(4): 717-726.
15. Anonymous. Physicochemical Standards of Unani Formulations. New Delhi; CCRUM: 2006.
16. Anonymous. The Ayurvedic Pharmacopoeia of India. Vol. 2, New Delhi; GOI. Dept. of AYUSH: 2008.
17. Anonymous. The Unani Pharmacopoeia of India. Vol. 2, New Delhi; GOI. Dept. of AYUSH: 2007.
18. Anonymous. The Unani Pharmacopoeia of India. Vol. 3, New Delhi; GOI. Dept. of AYUSH: 2007.
19. Anonymous. Quality Control Methods for Herbal Materials. Geneva, Switzerland; WHO : 2011.
20. Anonymous. The Ayurvedic Pharmacopoeia of India. Vol. 7, New Delhi. GOI. Dept. of AYUSH: 2008.
21. Aulton EM. Aultons Pharmaceutics. London; Churchill Livingstone, Elsevier: 2009, 176-8.
22. Anonymous. The Japanese Pharmacopoeia. 15th ed, Japan; Ministry of Health, Labour and Welfare: 2006, pp 44, 68.