



Research Article

PHYSICO-CHEMICAL STANDARDIZATION OF SAFOOF-E-TABKHEER: A POLYHERBAL UNANI FORMULATION WITH MODERN TOOLS

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ABSTRACT

In the current scenario of medicines, the herbal medicinal formulations are being used readily due to fewer side effects associated with them as compared to synthetic medicines. India is having a unique position in the world because of various standard systems of medicines like Ayurveda, Siddha, Yoga, Homeopathy, Naturopathy are being commonly practiced for the better health care of people. Unani herbal formulations have a very good therapeutic efficacy, but these medicines are widely criticized only due to lack of standardization and poor quality presentation. The aim of the present work is the Physico-chemical standardization of Safoof-e Tabkheer by examining it on various modern parameters. These characteristic features may be used as standards for setting up a monograph of the Safoof e Tabkheer. Safoof-e -Tabkheer (ST) is an important Unani pharmacopoeial formulation, which is used in the treatment of digestive disorders. Standardization of seeds of ST was carried out using organoleptic characterization and chemical characterization as moisture content & ash value to assess the quality and purity of formulation. The extract was extracted from ST by solvent extraction method using Soxhlet apparatus with suitable solvents as petroleum ether (60- 80°C), chloroform, ethyl acetate, and methanol. Results indicated the authenticity of the herbal formulation used in the study. The study was successful in establishing quality standards for the ST.

Keywords: Safoof-e-Tabkheer, Physic chemicals, Standardization, Extraction.

INTRODUCTION

The Unani system of medicine was first originated in Greece and the fundamentals of this system are based on the teachings of Hippocrates (460-277)BC. Who was both philosopher as well as a physician at that time¹. 65% of the Indian population is still using the herbal medicines in order to fulfill their primary health care needs according to the estimate of World health organisation². As therapeutic agents for Diabetes, Memory enhancers, Cough remedies, Arthritics and Liver Disease, the Herbal formulations achieved widespread acceptability³. Herbal drugs are consumed without any prescription as they are harmless but that is not always true sometimes, they are very hazardous, thus to assess the quality of herbal drugs standardization of herbal formulations is very essential based on the concentration of active principles⁴. For the production and manufacturing of Herbal formulations in order to establish its biological activity, its chemical view and quality assurance Standardization of Unani Formulations is most important⁵. According to Unani Pharmacy, the powdered drug is called as Safoof. Safoof is a type of medicinal preparation which is used internally as well as externally and contains plant, animal, and minerals as the main ingredients⁶. Standardization of herbal formulations ensures in each dose a specific amount of quantity, quality, the therapeutic effect of ingredients⁷. In To establish a consistent chemical, biological and quality assurance programme of herbal formulations standardization is most important for manufacturing as well as the production of herbal drugs⁸. Safoof-e-Tabkheer is an important Unani formulation which is mentioned in the

National Formulary of Unani Medicine⁹. All the plant drugs present in the formulation of Safoof-e-Tabkheer have different types of pharmacological activities such as *Foeniculum vulgare* is having Antibacterial activity, Antifungal activity, Antioxidant activity, Antithrombotic activity, Anti-inflammatory activity, Hepatoprotective activity¹⁰ and Antidiabetic activity¹¹, *Coriandrum sativum* is having Anti arthritic activity¹² and Chemopreventive effect¹³, *Amomum subulatum* is having Analgesic activity¹⁴ and immune-suppressive effect¹⁵, *Bambusa Bambos* is having Anti-inflammatory, Astringent, Laxative, Diuretic, Anti-obesity and abortifacient activity¹⁶. The Zof-e-Hazm and Nafkh-e-Shikam treatment of ST has been mentioned in the National Formulary of Unani Medicine but there is no data available on physicochemical standardization of Safoof-e-Tabkheer (ST). Therefore, in the present study, physicochemical standardization of a polyherbal Unani formulation Safoof-e-Tabkheer was carried out as per Unani/WHO guidelines.

MATERIALS AND METHODS

Procurement of Drug

The (ST) was procured from the Unani Dawakhana, University of Kashmir, Srinagar, J&k.

Ingredients of Formulation

The ingredients of (ST) as per the National Formulary of Unani Medicine (NFUM) are given in table [Table 1].

Table 1: Ingredients of Formulation Safoof-e-Tabkheer

Ingredients of Safoof e Tabkheer			
Ingredient	Botanical name	Family	Quantity
Badiyan	<i>Foeniculum vulgare</i>	Umbellifers	2.5g
KishneezKhushk	<i>Coriandrum sativum</i>	Umbellifers	2.5g
Dana Heel Khurd	<i>Amomum subulatum</i>	Zingiberaceae	2.5g
Tabkheer	<i>Bambusa bambas</i>	Poaceae	2.5g

STANDARDIZATION OF SAFOOF -E-TABKHEER

Organoleptic analysis

Organoleptic parameters which can be identified through the sensory organs such as appearance, taste, odor, texture, etc. are inclusive under organoleptic analysis¹⁷.

Proximate analysis

Proximate analysis was performed on Safoof-e -Tabkheer for the determination of various physic-chemical parameters like total ash, acid insoluble ash, water soluble ash, water-soluble matter, alcohol-soluble matter, loss on drying,¹⁸ extractive values (hot extraction)¹⁹, pH determination²⁰ and TLC. Qualitative phytochemical screening was carried out on the pet ether, chloroform, ethyl-acetate and methanolic extracts to determine the presence of various phytoconstituents.^{21,22,23}

Microscopic analysis

Microscopic analysis of Safoof-e-Tabkheer was studied according to the method mentioned in Trease and Evans Pharmacognosy.^{24,25}

Powder analysis

Particle size

Particle size for Safoof-e-Tabkheer powder was measured by a particle size analyzer (Litesizer 500). Approximately 1gm of powder in 5ml water was used for measurement and particle size was recorded.²⁶

Bulk Density and tapped density

About 50g of bulb powder was weighed and poured into a 100ml measuring cylinder and the volume noted. Then the cylinder was gently tapped and again the volume was noted. The initial volume gave the bulk density value and after tapping the volume reduced, it gives the value of tapped density.^{27,28}

$$\text{Bulk density } (\gamma_b) = (W_t/V_b)$$

where W_t is the mass of particles and V_b is the total volume of packing.

$$\text{Tapped density } (\gamma_{tab}) = (W_t/V_{tab})$$

where W_t is the mass of the powder taken and V_{tab} is the final volume after tapping.

Hausner ratio

Hausner ratio is related to interparticle friction and as such can be used to predict the powder flow properties.

$$\text{Hausner ratio} = \gamma_{tab}/\gamma_b$$

where γ_{tab} is the tapped density and γ_b is the bulk density. Values less than 1.25 show good flow and a value greater than 1.25 shows poor flow.

Carr's index

Carr's index is another indirect method of measuring the powder flow from bulk density.

$$\text{Carr's index } (\%) = (\gamma_{tab} - \gamma_b)/\gamma_{tab} \times 100$$

where γ_{tab} is the tapped density and γ_b is the bulk density.

The bulk density and tapped density were expressed in grams per milliliter (kg/m^3). The value below 25% indicates good flow characteristics and a value above 25% indicates poor flow characteristics²⁹.

Chromatographic Studies (thin layer chromatography)

TLC was carried out on TLC. Precoated aluminum plates, silica gel 60 F 254 (layer thickness 0.25 mm) was cut with ordinary household scissors. Plate markings were made with a soft pencil. for methanolic extract of ST. Glass capillaries were used to spot the sample for TLC applied sample volume 1-microliter by using capillary. In solvent system chloroform: methanol (8:2) used. After pre-saturation with mobile phase for 20 min for development were used. After the run plates are dried and sprayed freshly prepared ceric ammonium sulfate reagents was used to detect the bands on the TLC plates. The RF values of the spots were calculated by the following formula³⁰.

$$\text{R value} = \frac{\text{Distance traveled by the spot}}{\text{Distance traveled by the solvent}}$$

RESULT

Table 2: Organoleptic analysis

Appearance	Powder
Colour	Light brown
Taste	Slightly sweet
Order	pleasant
Texture/feel	Fine texture

Table 3: Physicochemical analysis and extractive values

Physico-chemical Parameters	Result
Total ash value (%w/w)	7.62±2.04
Acid-insoluble ash value (%w/w)	1.54±1.13
Water soluble ash value (%w/w)	3.21±0.54
Loss on drying (%w/w)	3.24±3.19
pH 1% solution	6.90
pH 10% solution	7.20
Extractive value	
Alcohol soluble matter	8.41±1.91
Water soluble matter	14.02±0.62
%Yield of various extracts (hot)	
Pet-ether	04.61±0.32
Chloroform	05.26±1.56
Ethyl-ether	14.56±1.32
Methanol	19.42±1.80

Table 4: Qualitative analysis of the phytoconstituents

Chemical Constituent	Tests	Colour	Safoof-e-Tabkheer			
			Pet.Ether	Chloroform	Ethyl Ether	Methanol
Alkaloids	Dragendroff's test	Cream	--	++	++	++
	Hager's test	Reddish brown	--	--	++	++
	Wagner's	Reddish brown	--	--	++	++
Saponins	Foam test	White precipitate	--	--	++	++
Glycosides	Legal test	Reddish brown	--	++	++	++
Flavonoids	Alkaline reagent	Yellow	--	--	++	++
	Ammonia solution test	Yellow color	--	--	++	++
	Zinc test	Magenta	--	--	++	++
	Mg turning test	Reddish color	--	--	++	++
Steroids	Liebermann-Burchard test	Green/Red	++	++	++	++
Terpenoids	Salkowski test	Red/Yellow	++	++	++	++
Tannins	Chloroform	Green color	--	--	--	+
Phenols	Ferric chloride	Blue-black	--	--	++	++
Carbohydrates	Molisch test	Red precipitate	--	++	++	++
	Fehling's test	Brick red	--	--	++	++
	Iodine test	Black	--	--	++	++
Amino acids	Ninhydrin test	Violet color	--	--	--	--

++ (present), -- (absent)

POWDER MICROSCOPY OF SAFOOF-E-TABKHEER



Figure 1: Mesocarp in surface view



Figure 2: Epicarp in surface view



Figure 3: Group of fusiform sclerides



Figure 4: Thick walled endosperm

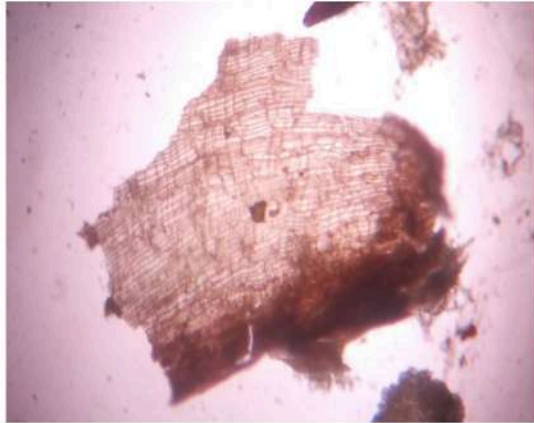


Figure 5: Endocarp in surface view



Figure 6: Multiseriate trichome fragment



Figure 7: Prismatic calcium oxalate crystal



Figure 8: Covering trichome



Figure 9: Fiber

Table 5: Powder analysis Safoof-E-Tabkheer powder

Parameters	Safoof-e -Tabkheer
Particle size	14.673 μm
Angle of repose	34.6
Bulk density	397.96kg/m ³
Tap density	476.2kg/m ³
Carr's ratio	17.06
Hausner's ratio	1.19
Flow behavior	Free flowing

Table 6: TLC of Safoof-e -Tabkheer

Extract	Solvent system	No. of spots	Rf value
Methanol	Chloroform:methanol (7:3)	5	0.26, 0.33, 0.45, 0.63, 0.72,

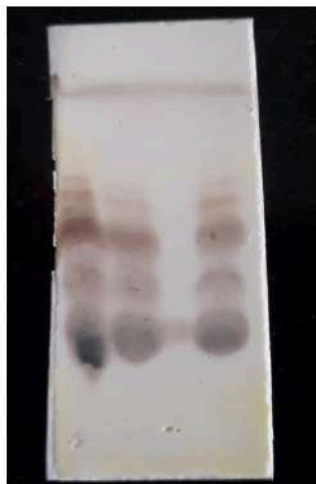


Figure10: TLC of methanolic extract of ST (chloroform : methanol)³¹

DISCUSSION

The total ash value is an indication of the total amount of inorganic material after complete ignition and the acid insoluble ash value is an indication of silicate impurities, which might have arisen due to improper washing of drug. The loss on drying value obtained is an indication of the amount of moisture content present in the drug. The extractive values names water soluble and alcohol soluble indicates the amount of active constituent in given drug material when extracted with a respective solvent, values obtained supports the fact that drug is unexhausted which is contrary to lower extractive value. The results of phytochemical tests indicate the presence of alkaloids, carbohydrates, glycosides, flavonoids, phenols, tannins, saponins, steroids and triterpenoids in the methanolic extract. TLC is one of the significant limit used for detecting the adulteration and for judging the quality of the drugs. From the powder study test, it is concluded that Safoof-e-Tabkheer has free-flowing behavior. From the all the above values, it can be concluded that the quality of Safoof-e-Tabkheer is fine.

CONCLUSION

As yet not any work is executed considering standardization of Safoof-e-Tabkheer. This study gave elaborated selective information about the refinement procedure and quality control parameters of Safoof-e -Tabkheer by examining it on various modern parameters. These characteristic features may be used as standards for setting up a monograph of the Safoof-e -Tabkheer.

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