Standardization and Quality Control Methods of Unani Single Drug 'Tudri Surkh' (*Cheiranthus cheiri* Linn.)

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Abstract

Tudri Surkh botanically equated to seeds of *Cheiranthus cheiri* Linn. belongs to Cruciferae (Brassicaceae) family. In Unani System of Medicine Tudri Surkh is used as stomachic, diuretic, expectorant, demulcent, emmenagogue and also in the ailments of asthma, cough and fever. Seed oil is applied locally for bruises, nervous and rheumatic pains. It is one of the ingredients in the Unani formulations namely Majoon-e-Alkula, Majoon-e-Regmahi, Khamira Gaozaban Ambari, Khamira Gaozaban Ambari Jadwar Ood Saleeb Wala, Khamira Gaozaban Ambari Jawaharwala, Khamira Gaozaban Sada. In view of its medicinal importance, the present study was conducted to standardize the drug using pharmacognostic method, physico-chemical parameters, TLC studies and WHO methods. Physico-chemical data observed were moisture content (9.56%), total ash (6.60%), acid in-soluble ash (1.25%) and solubility in alcohol (13.69 %) and water (20.01%). TLC studies of chloroform and alcohol extracts showed various spots at 254nm, 366nm and in visible light. The Quality control parameters such as microbial content (TBC, TFC, *Enterobacteriaceae*, *Salmonellae* Spp. and *Staphylococcus aureus*) and the heavy metals (Pb, Cd, As and Hg) were found within the permissible limits. Aflatoxins (B_1, B_2, G_1 and G_2) and pesticide residues were not detected in the drug Tudri Surkh.

Keywords: Tudri Surkh, Pharmacognostic, Physico-chemical, TLC, Quality control parameters

Introduction

Plants plays a vital role in maintaining human health and improving the quality of human life from thousands of years and serves to human the valuable components of medicines, seasonings, beverages, cosmetics and dyes. Herbal medicine contains natural substances that can promote health and reduce illness. Nowadays researchers are focusing on plant research and it has increased all over the world. Enormous evidence has been collected to show immense potential of medicinal plants used in various traditional systems (Pratap *et al.*, 2013).

The seed of *Cheiranthus cheiri* Linn. is known as Tudri Surkh in Unani System of Medicine. In Unani medicine the seeds are used as stomachic, diuretic, expectorant, demulcent, emmenagogue and also used in the ailments of asthma, cough and fever. Seed oil is applied locally for bruises, nervous and rheumatic pains besides a tonic to improve the male reproductive system. Flowers are

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used in paralysis and impotence (Khare, 2007; Kritikar and Basu, 1998; Chopra *et al*., 2006). *Cheiranthus cheiri* is a shrub like herb, indigenous in the North Temperate zone, Central and Northern Europe; it is cultivated in Indian gardens as an ornamental plant (wall flower).

Materials and Methods

Collection of drug

Seeds were collected from raw drug dealers, Chennai and identified by the botanist and compared with the herbarium specimen of RRIUM, Chennai (Specimen No. 00165).

Pharmacognostical studies

Botanical identification of the fruit was carried out using available literature (Kritikar and Basu, 1998; Khare, 2007; Hooker, 1999). The pharmacognostical studies such as macroscopical, microscopical and powder microscopy were carried out using standard method (Johansen, 1940). Free hand sections of the fruit were taken, microscopical drawings made using Camera Lucida and observations recorded.

Physico-chemical parameters

Physico-chemical parameters like foreign matter, total ash, acid in-soluble ash, loss on drying at 105°C, solubility in alcohol and water were carried out as per standard method (Anonymous, 1998).

TLC analysis

Preparation of extract

The powder of the drug (2g) was extracted using 30ml of chloroform and alcohol extracts were concentrated upto 10ml in a standard flask. These extracts were used for the TLC studies.

The TLC profile of chloroform and ethanol extracts were performed using pre-coated silica gel 60 F_{254} TLC plate (E. Merck) as adsorbent. TLC studies of both extracts were carried out using solvent systems like toluene: ethyl acetate: Acetic acid (8: 2: 0.2) and toluene: ethyl acetate (1: 1) respectively. After drying, the plates were examined under UV – 254nm and 366nm and observed the spots. Further the plates were dipped in vanillin-sulphuric acid reagent followed by heating at 105ºC till appeared the bright spots appeared (Wagner *et al.*, 1984; Sethi, 1996).

Quality control parameters

The WHO parameters like microbial load, heavy metals, aflatoxin and pesticide residues were carried out using standard methods of WHO & AOAC guidelines (Anonymous, 1997, 1998, 2000).

Results and Discussion

Pharmacognostic studies

Macroscopic: Seeds are reddish brown, bright, 2.5 to 3.5mm long, 1.5 to 2 mm wide, mucilaginous with warty surface; cotyledons incumbent, non-endospermic with large embryo, musky odour and mucilaginous taste (Fig. 1 & 2).

Microscopic: T.S. of seed shows, epidermis consisting of single layer of rectangular, flattened, thin walled cells containing colourless concentrically striated mucilage; sclerenchyma cells palisade like consisting of single layer of non-lignified cells with their radial and inner tangential walls thickened looks like beaker shaped cells; pigmented cells consisting of single layer of elongated parenchyma cells filled with yellowish brown contents; single layer of thick walled cells followed by a layer of crushed parenchyma cells; cotyledons and embryo consisting of oval to polygonal, thin-walled, parenchyma cells containing aleurone grains and oil (Fig. 3,4 & 5).

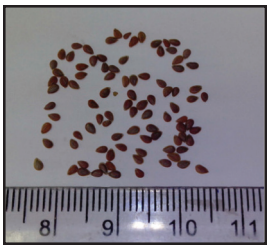

Fig. 1: Seeds

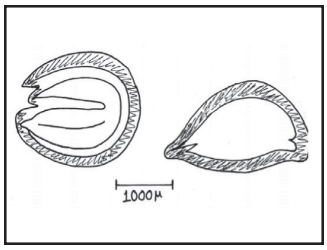

Fig. 2: Seed - surface view

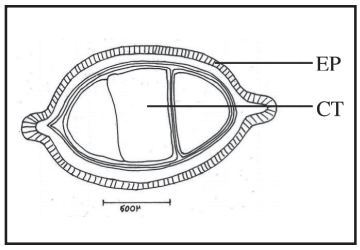

Fig. 3: T S of Seed
A diagrammatic sketch

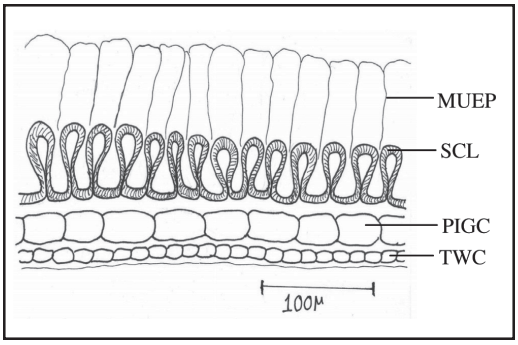

Fig. 4: T. S. of seed

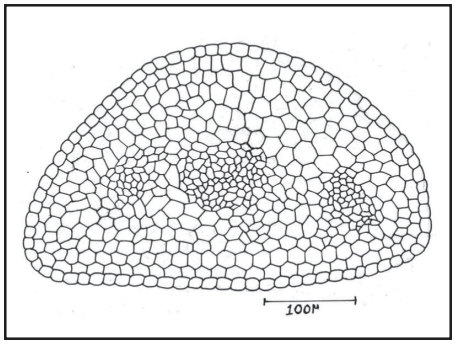

Fig. 5: T S of cotyledons

Abbreviation: EP - Epidermis; SCL - Sclerenchyma; CT - Cotyledons;
MUEP - Mucilaginous epidermis; PIGC - Pigmented cells; TWC - Thick walled cells

Powder Microscopy: Reddish brown, sclerenchyma cells in surface view, epidermal cell is surface view with mucilage, thick walled cells in surface view; elongated pigmented cells in surface view, cotyledonary parenchyma cells in surface view (Fig. 6).

Chemical analysis

Analytical data shows 9.56 % of moisture content. Ash content of the drug was 6.59 % and 1.25 % of acid in-soluble ash shows the siliceous matter in the plant. Alcohol soluble extractives represent the extraction of polar constituents like phenols, tannins, glycosides, alkaloids and flavonoids. The water soluble extractive denotes the presence of inorganic contents. The results of physico-chemical parameters are shown in Table (1).

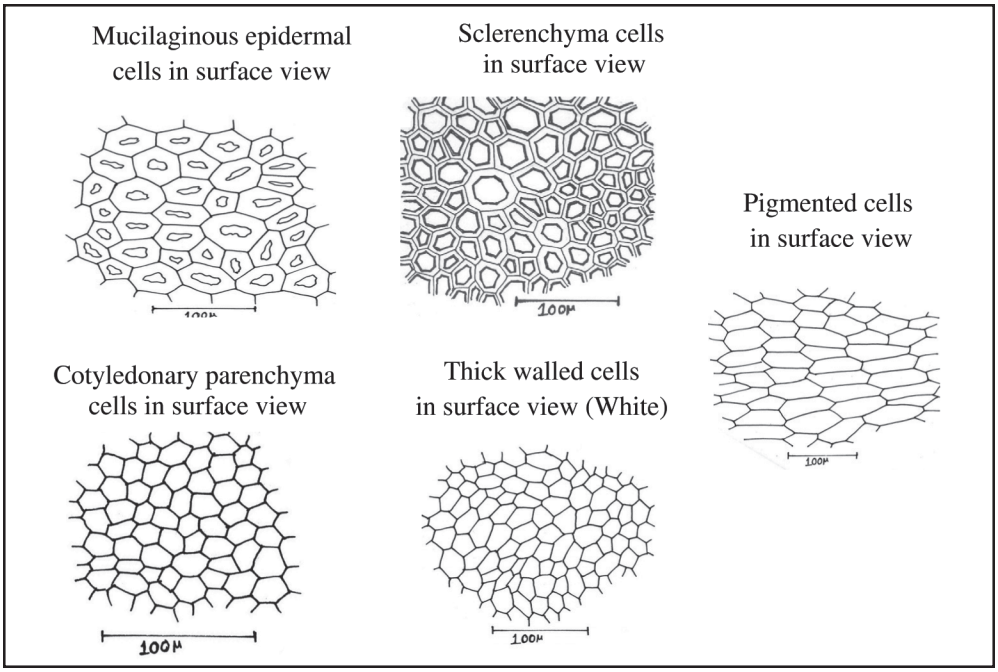

Fig. 6: Powder microscopy

Table 1: Physico-chemical parameters of *Tudri Surkh*

S.No.	Parameters	Results (n=3)±S.D.
1.	Foreign matter (%)	Nil
2.	Loss on drying at 105ºC (%)	9.56
3.	Ash (%)	6.59
4.	Acid insoluble ash (%)	1.25
5.	Alcohol soluble extractives (%	13.69
6.	Water soluble extractives (%)	15.81

Thin Layer Chromatography

The R_f values of the TLC analysis of chloroform and alcohol extracts are shown in Table - II and III. The plates were visualized using vannilin-sulphuric acid reagent and heated at 105º till appear the colored spots. The TLC of the chloroform extract at UV- 254 nm showed 5 spots, UV-366 nm showed 3 spots and 5 spots showed after derivatization with vanillin - sulphuric acid (Fig. 7). Alcohol extract showed at UV-254 nm 4 spots, UV-366 nm showed 3 spots and after derivatization with vanillin – sulphuric acid showed 6 spots (Fig. 8).

Quality control parameters

The microbial load and heavy metals were found within the permissible limit (Table – 4 and 5).

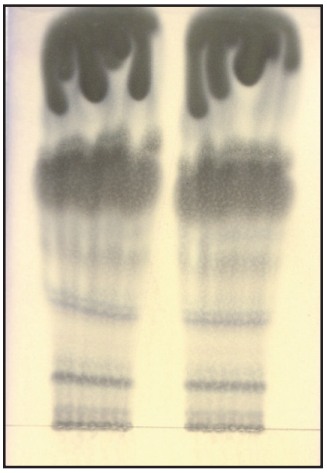

Fig. 7: Chloroform extract
Solvent system: Toluene : Ethyl acetate : Acetic acid (8 : 2 : 0.2)
Detector: V. S. Reagent

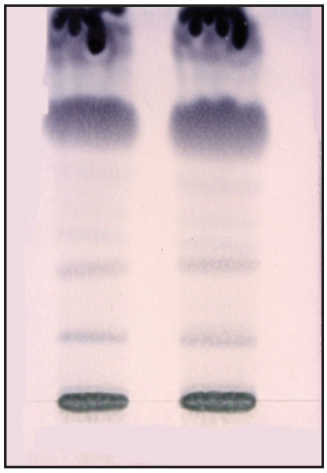

Fig. 8: Alcohol extract
Solvent system: Toluene : Ethyl acetate (1 : 1)
Detector: V. S. Reagent

Table 2: TLC data of the chloroform extract of *Tudri Surkh*

Solvent system	Rf Values		
	UV 254 nm	UV 366 nm	V. S. Reagent
Toluene : Ethyl acetate : Acetic acid (8 : 2 : 0.2)	0.78 Pink	0.63 Blue	0.56 Dark grey
	0.63 Light pink	0.26 Pale blue	0.45 Violet
	0.49 Light pink	0.16 Blue	0.39 Grey
	0.23 Pink		0.26 Violet
	0.16 Pink		0.12 Grey

Table 3: TLC data of the alcohol extract of *Tudri Surkh*

Solvent system	Rf Values		
Toluene: Ethyl acetate (1 : 1)	UV 254nm	UV 366nm	V. S. Reagent
	0.91 Light pink	0.72 Blue	0.91 Grey
	0.72 Pink	0.39 Pale blue	0.72 Violet
	0.39 Pink	0.14 Blue	0.56 Light grey
	0.14 Pink		0.39 Light grey
			0.34 Violet
			0.14 Violet

Table 4: Microbial load

S.No.	Parameter Analyzed	Results	WHO Limits
1	Total Bacterial Count	2×10^{2} CFU / gm	10^{5} CFU / gm
2	Total Fungal Count	Ansent	10^{3} CFU / gm
3	Enterobacteriaceae	Absent	10^{3} CFU / gm
4	*Salmonella* Spp.	Absent	Nil
5	*Staphylococcus aureus*	Absent	Nil

Table 5: Heavy metals

S.No.	Parameter Analyzed	Results	WHO & FDA Limits
1	Arsenic	Nil	10 ppm
2	Cadmium	Nil	0.3 ppm
3	Lead	0.0031	10 ppm
4	Mercury	Nil	1.0 ppm

The aflatoxin such as B_1, B_2, G1 & G_2 and analysed pesticide residues such as organo chlorine group, organo phosphorus group, acephate, chlordane, dimethoate, endosulphan, ethion, endosufon sulphate, fenthion, lindane, methoxychlor, phorate sulfoxide and phorate sulfone were not detected from the drug.

Conclusion

The evaluated standards such as macroscopic, microscopic, physico-chemical, TLC analysis and quality control parameters were derived and described are

of diagnostic impor-tance in authentication and quality control of the seeds of *Cheiranthus cheiri*.

Acknowledgement

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