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RESEARCH ARTICLE

The Physico-Chemical studies of Khar-e-Khasak (*Tribulus terrestris* Linn.)

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Abstract

Khar-e-Khasak (Tribulus terrestris Linn) commonly known as Gokhru is an important drug of Unani Medicine. It has been described as diuretic, carminative, antiseptic and widely used by Unani Physicians in various gastrointestinal ailments. In this paper studies carried out to determine the ash values, extractive values, fluorescence analysis and thin layer chromatographic parameters are reported which were performed to standardize the fruit of the plant for its purity.

Keywords: Khar-e- Khasak; Unani; Standardization; Tribulus terrestris

Introduction

Khar-e-Khasak (Tribulus terrestris Linn) is widely used in Unani system of medicine for various bodily disorders. It is an annual or perennial plant growing throughout India and other warm countries such as Ceylon and all warm regions of both hemispheres [1, 2]. In India, two types of Gokhru are found, the small one is known as "Gokhru Khurd' (Tribulus terrestris Linn) and bigger one is known as "Gokhru Kalan" (Pedalium murex) [3–10]. It is reported to be useful in the treatment of renal calculi, inflammation, weakness, infection [6]. In addition, ethnobotinical reports suggest the use as appetizer, antidote, analgesic, blood purifier [11, 12]. Although the fair amount of work has been reported on the plant, but no attempt has been made the drug to standardize the drug for its purity. Therefore the present investigations were carried out to standardize the drug for the purpose of identification and quality control.

Materials and Methods

The Fruits of Tribulus terrestris (Khar khasak) were procured from Khari Bawli, Delhi-110006. The identification of fruits of Tribulus terrestris was established by Department of Botany, faculty of Science, Hamdard University.

The crushed fruits of T. terrestris were subjected to various chemical tests like total ash acid insoluble ash, water insoluble ash, sulphated ash, water soluble ash, extractive values. The behavior of the powdered fruit with different chemical reagents and fluorescence analysis were observed under UV (255 and 366 nm). Thin layer chromatographic studies were also carried out with precoated Almunium plates, Silica Gel for the methanol and petroleum ether extracts obtained after using various mobile phases and spray/treatments.

Results

The values of total ash, acid insoluble ash, water soluble ash, water insoluble ash, sulphated ash as well as extractive values in petroleum ether, chloroform, alcohol, and water were determined. The results are presented in Tables 1, 2, 3 and 4.

Fluorescence analysis and powdered drug reaction with different reagents were observed and noted in Table 5 and 6. Thin layer chromatography behavior of methanolic extract, petroleum

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Table 1 Ash Values

S. No.	Ash	Wt. ofCrucible (gm)	Wt. of drug (gm)	Wt. of crucible + Wt. of crude drug (gm)	Wt. of crucible+ Wt of crude drug after ignition (gm)	Wt. of ash (gm)	Ash value (%)
1.	Total Ash	42.26	5	47.26	42.76	0.50	10
2.	Acid insoluble Ash	42.26	5	47.26	42.31	00.05	1
3.	Water Soluble Ash	42.25	5	47.25	42.36	0.11	2.2
4.	Water insoluble Ash	42.25	5	47.25	42.59	0.34	6.8
5.	Sulphated Ash	42.09	5	47.09	42.84	0.75	15

Table 2 Extractive Values: Cold Extraction

S. No.	Extract	Wt. of drug (gm)	Wt. ofempty petridish (gm)	Wt. of emptyPetridish (gm) +Wt. of extractive Matter (gm)	Wt. ofextractive matter (gm)	Extrac-tivematter (%)
1.	Petroleum ether extract	5	39.11	39.39	0.28	5.6
2.	Chloroform Extract	5	39.11	39.33	0.22	4.4
3.	Alcoholic Extract	5	42.49	42.73	0.24	4.8
4.	Water Extract	5	39.10	39.55	0.45	9

Table 3 Hot Extraction

S. No.	Extract	Wt. of drug (gm)	Wt. ofempty petridish (gm)	Wt. of empty petridish (gm)+Wt. of extractive matter (gm)	Wt. ofextractivematter (gm)	Extrac-tivematter (%)
1.	Petroleum Ether extract	100	41.55	46.16	4.61	4.61
2.	Chloroform Extract	100	41.54	46.84	5.30	5.30
3.	Alcoholic Extract	100	41.53	47.38	5.84	5.84
4.	Water Extract	100	41.54	51.96	10.4	10.42

Table 4 Successive Extraction

S. No.	Extract	Wt. of drug (gm)	Wt. ofempty petridish (gm)	Wt. of empty petridish (gm) + Wt of extractive matter (gm)	Wt. ofextractivematter (gm)	Extrac-tivematter (%)
1.	Petroleum ether extract	100	40.03	44.94	4.91	4.91
2.	Chloroform Extract	100	43.34	44.34	1.00	1.00
3.	Alcoholic Extract	100	43.72	48.27	5.55	5.55
4.	Water Extract	100	54.06	56.52	2.49	2.49

Table 5 Florescence Analysis

S. No.	Solvent used	Ordinary Light	U V Light (254 nm)	U V Light (366 nm)
1.	Petroleum ether	Transparent	White	Very light Pink
2.	Acetone	Greenish yellow	White	Pink
3.	Ethyl Acetate	Transparent	White	Pink
4.	Chloroform	Light brown	Dirty white	White turbid
5.	Methanol	Dull yellow	Bluish white	White
6.	Alcohol	Light yellow	Bluish white	White
7.	Water	Light yellow	White	Blue
8.	Dil. HCL	Light yellow	Black	Black
9.	Dil. HNO_3	Bright yellow	Grey	Black
10.	Dil. H_2So_4	Brown	Black	Black
11.	Conc. HCL	Brownish yellow	Dark brown	Dark brown
12.	Conc. HNO_3	Orange	Green	Light brown
13.	Conc. H_2So_4	Black	Black	Black
14.	Iodine solution	Maroon	Dark blue	Light sky blue
15.	Glacial acetic acid	Muddy	Black	White

Table 6 Powdered Drug Reaction with Different Reagents

TREATMENT	OBSERVATION
Conc. HCL	Brownish yellow
Conc. HNO_3	Orange
Conc. H_2SO_4	Black
Iodine solution	No change
Glacial acetic acid	No change
Powder as such	Very Light yellow/ white
Ferric chloride (5%)	No change
Sodium hydroxide (5%)	No change
Pressed with filter papers	No oily stain appears
Shaked with water	Little froth appears

Table 7 TLC data of *Tribulus terrestris*

S. No.	Extract	Mobile Phase	Rf value in Iodine chamber	No. of Spots	Rf value in50% H_2SO_4 spraying reagent	No. of Spots
1.	Petroleum ether	Petroleum ether: ethyl acetate (8:2)	0.8029, 0.9343, 0.97	3	0.8029, 0.9343, 0.97	3
2.	Chloroform	chloroform:formic acid: methanol (9:0.5:0.5)	0.35, 0.53, 0.575, 0.96	4	0.35, 0.53, 0.575, 0.96	4
3.	Methanol	Chloroform:ethyl acetate (9:1)	0.644, 0.766,0.920	3	0.644, 0.766,0.920	3

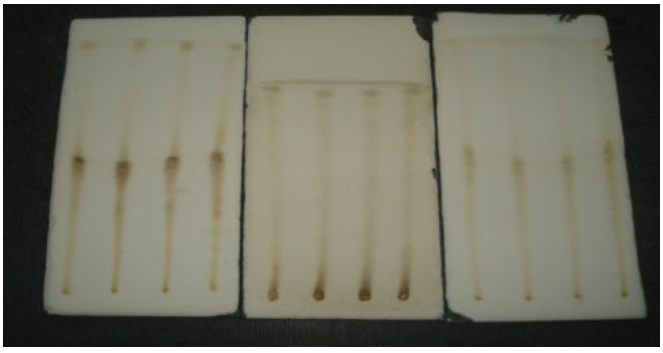

Figure 1 TLC plates of chloroform, methanolic and petroleum extract of Tribulus terrestris respectively

ether, chloroform extracts of fruit in different mobile phases and Spray/ treatment were observed and Rf values were noted in Table 7 and Figure 1.

Discussion

The total percentage of ash value, acid insoluble ash, water-soluble ash, sulphated ashes, percentage of water and alcohol soluble contents, percentage yield of extractives in different solvents are constant feature of a particular part of plant which may constitute individual drug. These reports would be of much significance in determining the genuineness of the drug sample.

Furthermore, the observation made after treatment of the powdered drug with different chemical reagents, fluorescence analysis and Rf values of the extracts in different solvents and

spray/ treatments would be helpful in identification and quality control of the drug.

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