Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Der Pharmacia Lettre, 2010, 2(5): 308-315
(http://scholarsresearchlibrary.com/archive.html)

ISSN 0975-5071
USA CODEN: DPLEB4

Preliminary Phytochemical and Pharmacognostic Profile of *Abutilon indicum* Linn. root

Surendra Kr Sharma[1*], Naveen Goyal[2]

[1] *Department of Pharmaceutical Sciences, Guru Jambheshwar University of Science and Technology, Hisar, India*
[2] *Department of Pharmaceutical Sciences, Rajendra Institute of Technology and Sciences, Sirsa, India*

ABSTRACT

Abutilon indicum Linn. (Malvaceae) commonly called Country Mallow is abundantly found as weed in sub-Himalayan tract and in hotter parts of India. The present study attempts to summarize the pharmacognostical profile of root of Abutilon indicum Linn. The study comprises of preliminary phytochemical screening, morphology, histology, powder analysis, ash values, extractive values and loss on drying.

Key-words: *Abutilon indicum* Linn., Country Mallow, Kangi, Malvaceae, Pharmacognostic

---

INTRODUCTION

An estimated 70% of population around the world use traditional medicines derived from plant species for their treatment and cure. In order to formalize the position of these medicines within the present health care system, a necessary first step is the establishment of standards of quality, safety and efficacy. Keeping this objective in mind, the authors are involved in establishment of pharmacognostical standards of Indian traditional drugs from past few years [1].

Abutilon indicum Linn. *var*. Sweet (Malvaceae) commonly called "Country Mallow" is a perennial plant up to 3m in height. It is abundantly found as weed in sub-Himalayan tract, hotter parts of India, adjoining countries, Malaya, Philippine Islands and China. The plant is used in traditional medicine in India, Pakistan, China and Philippine for treatment of several diseases like bronchitis, body ache, toothache, jaundice, diabetes, fever, piles, leprosy, ulcers, cystitis, gonorrhea and diarrhea [2-6]. *Abutilon indicum* Linn. is reported to have hepatoprotective [7],

hypoglycemic [8], antimicrobial [9], male contraceptive [10] and antidiarrhoeal [11] activities. A large number of phytoconstituents have been isolated from different parts of *Abutilon indicum* Linn. *viz*. carbohydrates, essential oil, flavonoids, sesquiterpenes, fatty acids, amino acids and sterols [12-14].

MATERIALS AND METHODS

The roots of *Abutilon indicum* Linn. were collected from Chaudhary Charan Singh Haryana Agriculture University Campus, Hisar, Haryana in May, 2004 and identified by Raw Materials, Herbarium and Museum division of NISCAIR, New Delhi [Ref. no. NISCAIR/RHM/F-3/2005/consult/536/11]. A voucher specimen has been retained in the Department of Pharmaceutical Sciences, GJUS&T, Hisar for further reference.

Preliminary phytochemical screening

Preliminary phytochemical screening was carried out by usual chemical tests for determination of various phytoconstituents in the plant drug [15].

Morphology and Histology of Root

Morphology of plant was studied by naked eye and with the help of simple microscope. Transversal sections of fresh root of *Abutilon indicum* Linn. were cut with the help of microtome. The section was treated with phloroglucinol and hydrochloric acid for staining the lignified tissues and then examined under the compound microscope [16, 17].

Powder Analysis

The shade dried root was powdered with grinder and sieved through 40 mesh sieve for powder analysis. The powder was then treated with different chemical reagents and its behavior was studied under day light, long UV and short UV [18].

Ash Values

Total ash value, acid insoluble ash value, water soluble ash and sulphated ash values were determined using usual procedures [19].

Extractive values

The extractive values were determined using different solvents *viz.* petroleum ether, chloroform, benzene, ethanol, water [19].

Loss on drying

The loss on drying was determined by usual procedures [20].

Paper Partition Chromatography of Carbohydrates and Amino acids:

The aqueous extract of root was subjected to paper chromatographic studies by descending technique to detect the presence of various carbohydrates and amino acids in the extract using solvent systems a mixture of *n*-butanol : glacial acetic acid : water (4: 1: 5, –top layer) and n-butanol: glacial acetic acid: water (4:1:1) respectively [21].

RESULTS AND DISCSSIONS

The qualitative test of preliminary phytochemical screening is summarized below:

Table 1: Presence or Absence of various constituents in root of *Abutilon indicum* Linn

Sr. No.	Constituents	Root Extract
1.	Alkaloids	
	• Mayer's reagent	–
	• Dragendroff's reagent	–
	• Wagner's reagent	–
	• Hager's reagent	–
2.	Carbohydrates	
	• Molish test	+
	• Fehlings test	+
3.	Glycosides	
	• Keller Killani test	+
	• Sodium Nitroprusside test	+
	• Borntrager test	+
4.	Phenolic compounds & Tannins	
	• Ferric chloride test	+
	• Lead acetate test	+
	• Gelatin test	+
5.	Flavonoids	
	• Ammonia test	+
	• Shinoda/Pew test	+
6.	Proteins and Free Amino Acids	
	• Millions test	+
	• Xantho protein test	+
	• Biuret test	+
	• Ninhydrin test	+
7.	Sterols	
	• Liebermann – Burchard test	+
	• Salkowski reaction	+
	• Hesse's reaction	+
	• Hersch's sohn's reaction	+
8.	Acidic Compounds & Free Acids	+
9.	Resins	+
10.	Saponins	+

+ Present, – Absent

Macroscopic Characters

The root is true, 0.8-1.6 cm in diameter, cylindrical with smooth surface, yellowish brown in colour, strong fragrance and characteristic taste. Fracture is fibrous in nature. Numerous root hairs are present.

Histology

Anatomical investigations of root of *Abutilon indicum* Linn. showed the presence of Cork : about 6 layers, radially arranged, thin walled, polygonal, tabular cells; Cortex : Parenchymatous; Medullary rays: 2-3 layered, Parenchymatous radially elongated cells; Phloem: Consisting of fibres, slightly lignified alternating with sieve tissue; Xylem: Present as protoxylem and metaxylem and Consist of Xylem fibres, lignified vessels, little xylem parenchyma; Xylem vessels are lignified.

Fig. 1: Root of *Abutilon indicum*

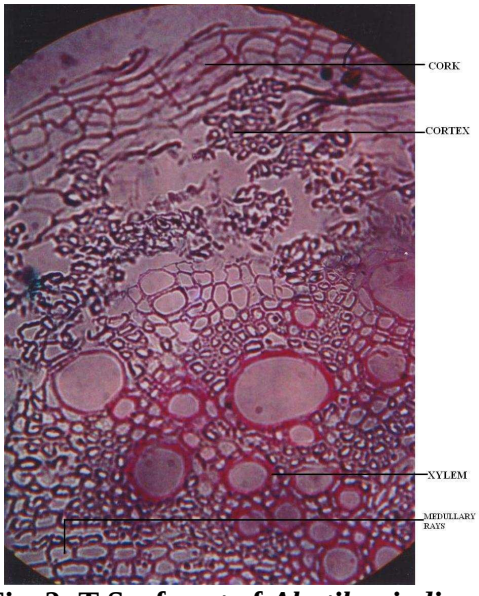

Fig. 2: T.S. of root of *Abutilon indicum*

Powder Analysis

Powder analysis consists of its behavior with different chemical reagents under day light, long UV and short UV range.

Table 2: Powder behavior with different chemical reagents

Treatment	Day Light	Long UV (365 nm)	Short UV (254 nm)
Powder as such	Light yellow	Light yellow	Cream
Powder + 1 N NaOH	Dark yellow	Light green	Greenish yellow
Powder + 1 N HCl	Creamish yellow	Cream	Yellow
Powder + 1 N NaOH in Methanol	Dark yellow	Yellow	Greenish yellow
Powder + Picric acid	Dark yellow	Black	Yellow
Powder + 1 N HNO_3	Reddish brown	Brown	Brown
Powder + Acetic acid	Light yellow	Cream	Yellow
Powder + Acetone	Light brown	Cream	Yellow
Powder + 50% H_2SO_4	Light yellow	Black	Dark yellow
Powder + HNO_3 + NH_3 solution	Brown	Light green	Dark yellow
Powder + Methanol	Brownish yellow	White	Light yellow
Powder + Nitro cellulose in amyl acetate	Light yellow	White	Dark yellow
Powder + 1 N NaOH in Methanol + Nitrocellulose in amyl acetate	Light yellow	Whitish cream	Dark greenish yellow
Powder + 1 N HCl + Nitrocellulose in amyl acetate	Yellow	Greenish yellow	Light yellow

Ash Values

(a) Total Ash Value

Total ash percentage = 13.26%

(b) Acid Insoluble Ash

Insoluble ash percentage = 01.56%

(c) Water Insoluble Ash Value

Water Insoluble ash percentage = 08.26%

(d) Sulphated Ash Value

Sulphated ash percentage = 07.26%

Table 3: Extractive values of root of *Abutilon indicum* Linn. in different solvents

Sr. No.	Extractive Value	Range (%)	Mean (%)	Standard Deviation
1.	Petroleum Ether	2.91 – 3.22	3.04	0.16
2.	Benzene	0.31 – 0.38	0.35	0.04
3.	Chloroform	0.22 – 0.28	0.24	0.03
4.	Ethanol	5.92 – 6.82	6.45	0.47
5.	Water	3.71 – 4.17	3.89	0.24

n = 3

Paper Partition Chromatography of Carbohydrates and Amino acids:

Table 4. Amino acids analysed by paper chromatography

Sr. No.	Amino Acid	R_f Value	Amino acid detected
1.	Alanine	0.42	–
2.	2-Aminobutyric acid	0.52	–
3.	Arginine	0.18	–
4.	Aspartic acid	0.27	+
5.	Cysteine	0.08	–
6.	DOPA	0.28	–
7.	Glutamic Acid	0.32	+
8.	Glycine	0.27	–
9.	Histidine	0.14	–
10.	Hydroxyproline	0.30	–
11.	Isoleucine	0.75	–
12.	Leucine	0.50	+
13.	Lysine	0.18	+
14.	Methionine	0.63	–
15.	Norleucine	0.78	–
16.	Ornithine	0.12	–
17.	Phenylalanine	0.68	+
18.	Proline	0.12	+
19.	Serine	0.21	–
20.	Threonine	0.34	+
21.	Tryptophan	0.30	–
22.	Tyrosine	0.18	–

+ : Detected; – : Not Detected

Table 5. Carbohydrates analysed by paper chromatography

Sr. No.	Carbohydrates	R_f Value	Carbohydrate Detected
1.	D-Mannose	0.39	–
2.	Maltose	0.27	–
3.	Lactose	0.13	–
4.	D-Ribose	0.44	–
5.	D-Glucose	0.20	+
6.	D-Mannitol	0.19	–
7.	Ribulose	0.57	–
8.	Fructose	0.18	+
9.	D-Glucosamine	0.31	–
10.	D-Xylose	0.47	–
11.	L-Sorbose	0.25	–
12.	D-Galactose	0.38	–
13.	L-Arabinose	0.40	–

+ : Detected; – : Not Detected

Loss on drying
Loss on drying was found to be 3.80 ± 0.43%.

Extractive Values
The extractive values determination showed the maximum yield with ethanol followed by water, Petroleum ether, Benzene and Chloroform.

CONCLUSIONS

The present study attempts to summarize the pharmacognostical profile of root of *Abutilon indicum* Linn. And it also comprises of Preliminary phytochemical screening, morphology, histology, powder analysis, ash values, extractive values, loss on drying and paper partition chromatography of carbohydrates and amino acids. It is an attempt to establish the various pharmacognostical standards of root of *Abutilon indicum* Linn. **This is the first such report on the plant *Abutilon indicum***.

REFERENCES

[1] P Gupta; N Vasudeva; Sharma S.K. Pharmacognostical Study and Preliminary Phytochemical Screening of the Roots of *Tagetes erecta* Linn. Roots. *Hamdard Medicus*, **2009**, *52*(1).
[2] KR Kirtikar; BD Basu, B.D. Indian Medicinal Plants, Second ed., International Book Distributor, Dehradun, 1987; pp. 314-317.
[3] Anonymus. Wealth of India, Vol. 1, CSIR, New Delhi, 1985; p.20.
[4] VV Sivarajan; I Balachandran. Ayurvedic drugs and their plant sources, Oxford and IBH Publishing Co., New Delhi, 1994; p. 570.
[5] Bakshi, DN Guha; P Sensarma; DC Pal. A Lexicon of medicinal plants in India, Vol. 1, Naya Prakash, Culcutta, 1999; p.9.
[6] G Nicholson. Encyclopedia of Plants, Vol. 1, Anmol Publication, New Delhi, 1991; p. 3.
[7] E Porchezhian; SH Ansari. *Phytomedicine*, **2005**, *12*, 62-64.
[8] Lakshmayya; NR Nelluri; P Kumar; NK Aggarwal; TS Gouda; SR Setty. *Indian Journal of Traditional Knowledge*, **2003**, *2*, 79-83.
[9] BK Mehta; R Neogi; S Kotra; OP Mali. *Fitoterapia*, **1997**, *68*, 273-274.
[10] MJ Shah; F Subhan; F Tahir; W Alam. *Hamdard Medicus*, **1997**, *40*, 34-36.
[11] VM Chandrashekhar; AN Nagappa; TS Channesh; PV Habber; KP Rao. *Journal of Natural Remedies*, **2004**, *4 (1)*, 12-16.
[12] Z Ahmed; SNH Kazmi, W Ahmed; A Malik. *Hamdard Medicus*, **1993**, *36*, 28.
[13] KN Gaind, KS Chopra. *Planta Medica*, **1976**, *30***,**174.
[14] I Matlawska; M Sikorsba. *Acta Pol Pharm*, **2002**, *59***,** 227.
[15] CK Kokate. Practical Pharmacognosy, Vallabh Prakashan, New Delhi, 1994; p. 107.
[16] TE Wallis. Textbook of Pharmacognosy, CBS publishers and Distributors, Delhi, 1985; pp. 104 – 105.
[17] KR Khandelwal; CK Kokate; AP Pawar; SR Gokhale. Practical Pharmacognosy Techniques and Experiments, Nirali Prakashan Publishers, 1996; p. 19.
[18] CJ Kokoshi; RJ Kokoshi; FJ Sharma. *Journal of American Pharm. Association*, **1958**, *47*, 75-77.

[19] Anonymus. Indian Pharmacopoeia, Indian Pharmacopoeia commission, Govt. of India, New Delhi, 1996; p.53-54.
[20] Anonymus. Indian Pharmacopoeia, Indian Pharmacopoeia commission, Govt. of India, New Delhi, 1996; p.89.
[21] SK Sharma; M Ali. *Journal of the Indian Chemical Society*, **1992**, *69*, 891-92.