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STANDARDIZATION AND SOLVENT COMPARATIVE STUDY OF ABUTILON HIRTUM L.

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ABSTRACT

Background: Medicinal plants are gaining much interest became their use in ethno medicine treating common disease such as cold, fever& other claims. The study on medicinal plants started with extraction procedure that plays a clinical role to the extraction outcomes. *Abutilon hirtum L* (family: Malvaceae), known as Florida keys mallow plant is traditionally used as pain of kidney gravel, to treat diarrhoea, cough and toothache, to cure bladder inflammation, wounds and ulcers and as an antipyretic, demulcent, diuretic and mouth wash. **Aim and objective:** Solvents are important for extracting potential compounds from natural sources frequency of solvent used for extraction is potrayed and the results are discussed in the article. This research aim to describe and compare the best solvent used for extraction of *Abutilon hirtum L*, Standardize and evaluate of *Abutilon hirtum L*, for both quantitative and qualitatively on the basis of organoleptic characters, physical characters and phytochemical screening. **Method:** The *Abutilon hirtum L* extract was prepared by using maceration and followed by soxhlet extraction process. Different type of solvents (Ethanol, methanol, acetone, chloroform), were used for extraction. Identified which solvent is best for extraction of *Abutilon hirtum L* and organoleptical characters, physiochemical characters, phytochemical screening was done. **Conclusion:** At the end of this research we will find out the organoleptical properties, physiochemical properties, phytochemical constituents of

Abutilon hirtum L. This research may be helpful in isolation of specific phytoconstituents and its related medicinal activity studies.

KEYWORDS: *Abutilon hirtum L*, Maceration, Extraction, Solvents, Phytoconstituent.

1. INTRODUCTION

Pharmacognosy is the study of crude drugs obtained from plants, animals, and mineral kingdom and their constituents. Even though science of pharmacognosy is practised since a very early period, the term pharmacognosy was first used by C.A.SEYDLER, a German scientist in 1865 in his book analecta pharmacognostica. It is derived from two Latin words pharmacon, 'a drug' and 'gignosco', 'toacquire knowledge of', it means knowledge of science of drug. Diseases are born with man and drugs came into existence, since a very early time to remove the pain of diseases and a cure to them. Thus, the story and the history of the drugs are as old as the mankind. Natural drugs obtained from plants and animals are called drugs of biological origin and the active principles, because of which they have their therapeutic use, are produced in living cells are of plant or animal.[1]

Plant based drugs can be used directly i.e. they may be collected, dried & used as therapeutic agent (crude drug), or their constituents active principles are separated by various chemical processes, which are employed as medicine.[2]

India has an ancient heritage of traditional medicines. Materia Medica of India provides lot of information of the folkore practices and traditional aspects of therapeutically important natural products.[1]

In recent years there is an increasing awareness along the masses about the use of herbal drugs which are believed to be safe and does not produce any undesirable effect. The World Health Organization (W.H.O) estimated that 80% of population of developing countriesrelies. On traditional medicine mostly plant drug for their primary health care needs. Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties.[3] Plant produces these chemicals to protect itself but recent research demonstrates that many phytochemicals can protect humans against various diseases. The phytochemical analysis showed the presence of Alkaloids, Amino acids, Flavonoid, Glycosides, steroids and Saponins.

Figure 01: *Abutilon hirtum L* whole plant.

2. Literature review

2.1 Vernacular names of *abutilon hirtum L*[4]

- Common name: Hairy Indian marrow plant
- Hindi: Bankhaghi
- Malayalam: Kuruntotti
- Marathi: Bankhaghi
- Sanskrit; Atibula
- Kannada; Tutti
- Tamil: Vadattuti
- Telugu: Pala benda, Nela benda

2.2 Taxonomy[5,6,7]

Abutilon hirtum (Lam), sweet belongs to

- Kingdom - Plantae
- Division - Tracheophyta
- Class - Magnolipsida
- Order - Malveles
- Family - Malvaceae
- Subfamily - Malvoideae
- Genus - Abutilon Mill

2.3 Description[6]

Hairy Indian mallow is an perennial herb or undershrub, 0.5- 2 m tall. Flowers arise single in leaf axils, carried on 1.5- 3 cm long stalks which elongate up to 4 cm in fruit. Sepals are ovate, long pointed, velvety. Flowers are 3- 3.5 cm across, orange- yellow with a purple center.

Petals are 1.5 cm long and 1 cm broad, hairless inside, hairy outside, broadly obovate. The column of stamen is 5-8 mm long, 1-1.3 cm long 1.5-2 cm across.

Stem, leaf-stalks and flowers –stalks are sticky velvety and hairy. Leaves are carried on 3-15 cm long stalks. Stipules are5-10 cm long, 1.5-2 mm broad, falcate, lanceolate, eventually reflexed.

Leaf blades are 4-18 cm long and broad, densely hairy on both sides, usually at base, coarsely toothed. Leaves are yellowish green to green. Hairy Indian mallow is widespread in India.[4]

Robust herbs 1 m tall. The stem viscid and with long simple hairs 2-5 mm long. Leaf blades mostly 5-7 cm long, subrotund, cordate, finely serrate, acuminate, softly tomentose beneath, more sparsely pubescent above; petioles equating to greatly exceeding the blades, stipules 7-9 mm long, lanceolate; recurved.

Flowers solitary in the leaf axils but the inflorescence becoming a terminal panicle, pedicels 2-3.5 cm long; calyx 12-27 mm long.

Half-divided, stellate- tomentulose; corella rotate, with a dark red centre, the petals 18-20 mm long, orange-yellow; stamina column 7 mm long, pubescent. The filament 4 mm long, the anthers yellow, styles 20-25.

Fruits 12-14 mm long, ca. 2cm in diameter, oblate, exceeding the calyx; mericarps 20-25, 3 seeded, apically obtuse to acute, stellate- hirsute, the hairs ca. 1mm long, seeds 2.4-2.8mm long, minutely scabridulous.

2.4 Ethanoclaim uses[8]

Abutilon hirtum L is used in traditional medicine as a demulcent, diuretic and to treat diarrhoea, bladder inflammation, wound and ulcers.

Extract of the leaves of *A. Hirtum L* show cytotoxic activities against human breast cancer cell.

Leaves are eaten by goats, camel and game animals reports that the vervet monkey (cercopithecus aethiops) feeds on the flowers of *A. Hirtum L*, which was one of five species accounting for 60% of their feeding time.

2.5 Phytochemical review[9]

The chloroform extract of leaves in *Abutilon hirtum L* contains phytochemicals like Diethyl phthalate, benzaldehyde 4- propyl, methoxyacetic acid 3- tridecyl ester, sulphurous acid dodecyl 2- propyl ester, sulphurous acid, butyl dodecyl ester,9- Hexadecenoic acid, Octane, 2,4,6- trimethyl, Heptadecane, 2,6-dimethyl, 2,5-Octadecadiynoic acid methyl ester, 1-Heptatriacotanol,8-Octadecenal, etc.

2.6 Pharmacology review

2.6.1 Anti-inflammatory activity[10]

The total ethanolic extract and different fraction of *Abutilon hirtum L* leaves were evaluated for their anti-inflammatory activity using the carrageenan –induced paw edema method.

2.6.2 Analgesic activity[11]

The total ethanolic extract and different fraction of *A.hirtum L* leaves shows the analgesic activity using hot plate method.

2.6.3 Antipyretic activity[12, 13]

The total ethanolic extract and different fraction of *Abutilon hirtum* shows the antipyretic activity using yeast-induced pyrexia method.

2.6.4 Anti-diabetic activity[14,15]

The anti-diabetic activity of the total ethanolic extract and different fraction of *Abutilon hirtum L* leaves was evaluated using streptozotocin –induced hyperglycemia method.

3. AIMS AND OBJECTIVE

3.1 Aim

The aim of the present research is to study the pharmacognostical, phytochemical evaluation of *Abutilon hirtum Linn*. (Malvaceae).

3.2 Objective

The present work has been planned to carry out the

Section-A

Pharmacognostical studies	Physio-chemical parameters
1.Authentification and collection of plant	1.Foreign matter
2.Macroscopy of the leaf and root	2.Loss on drying
3.Microscopy of leaf and root	3.Ash value a. Water soluble ash b. Acid insoluble ash
4. Behavioural characters with different reagent.	

Section-B

Phytochemical studies
1.Preparation extract ✓ **Ethanolic extract** ✓ **Methanolic extract** ✓ **Acetone extract** ✓ **Chloroform extract**
2.Quantitative analysis-preliminary phytochemical screening

4. MATERIALS AND METHODS

4.1.1 Plant Collection and Authentification

The leaves and root of *Abutilon hirtum* (Lam) sweet was collected from location Tirupur Tamilnadu situated in the southern region of India during the month of March 2022. It was Identified and Authenticated by Botanical survey of India (BSI) Coimbatore. The authentification number: BSI/SRC/5/23/2022/Tech/622.

All the chemicals used were analytical grade.

4.1.2 Preparation of powder

Leaf powder

The leaves were collected and shade dried. It was powdered in a mixer. The powder was sieved and kept in a well closed container in a dry place. (Sieve no: 60).

Root powder

The roots were collected and shade dried for 14 days. It was powdered in mixer. The powder was sieved and kept in a well closed container in a dry place (sieve no: 60).

4.1.3 Maceration technique[16,17]

This is an extraction procedure in which coarsely powdered drug material, either leaves or stem bark or root bark is placed inside a container; the menstrum is poured on the top until

completely covered the drug material. The container is then closed and kept for at least three days. The content is stirred periodically and if placed inside bottle it should be shaken time to time to ensure complete extraction. At the end of extraction, the micelle is separated from the marc by filtration or decantation. Subsequently the micelle is separated from the menstrum by evaporation in an oven or top of water bath. This method is convenient and very suitable for thermolabile plant material.

4.2 Section- A

4.2.1 Pharmacognostical studies

Morphological and micro morphological examination and characterization of medicinal plants have always been accorded due credentials in the pharmacognostical studies. Botanical identity of the plants is an essential prerequisite for undertaking the analysis of medicinal properties of any plant. A researcher may succeed in getting a new compound or may find many useful pharmacological active properties in the plant. If the botanical identity of the plant happens to be dubious or erratic, the entire work on the plant becomes invalid. Thus it is needless to stress the botanical identity of the crude drug is the threshold in the processes of pharmacological investigations.

4.2.2 Morphological studies of abutilon hirtum

The leaf and petiole were studied individually for its morphological characters by organoleptic test.

The root was studied individually for its morphological characters by organoleptic test.

4.2.3 Microscopical studies

1. Microscopy (Transverse section)

Leaf

Dorsoventral T.S through lamina shows single-layered upper and lower epidermis with thin cuticle, diacytic stomata on lower epidermis, glandular sessile trichomes and few covering trichomes, collenchymatous hypodermis, ground cortical parenchyma with prominent double-layered compact palisade and loosely arranged spongy mesophyll tissue zone with chlorophyll and oil globules; spiral xylem vessels associated with sclerenchymatous fibers present discontinuing the mesophyll tissue. Inmidrib, acrescent-shaped - collateral vascular zone consisting of xylem strands, phloem, and sclerenchymatous fibers, etc. embedded in ground tissue.

4.2.4 Behavioural characters of abutilon hirtum (Leaf-crude powder)

Powder when treated with Acetone showed in greyish colour, powder when treated with Iodine solution no colour change, powder when treated with Ammonia showed in creamy white colour, powder when treated with Ethanol showed in creamy white colour, powder when treated with Ferric chloride showed in pale grey, powder when treated with Acetic acid showed in Bluish tinge, powder when treated with Chloroform showed in white colour, powder when treated with Distilled water showed in white colour.

4.2.5 Physio-chemical parameters[3]

The powder was subjected to physiochemical parameters such as foreign organic matter, loss on drying, ash values. The procedure was adapted as per WHO guidelines 1996, 1998, 2001 and James 1995.

1. Determination of foreign organic matter

An accurately weighed 100 g of air dried coarse drug and spread out in a thin layer. The sample drug was inspected with the unaided eye or with the use of 6x lens and the foreign organic matter was separated manually as completely as possible and weighed. The percentage of foreign organic matter was calculated with reference to the weight of the drug taken.

Foreign matter = Initial weight – Final Weight / Initial weight × 100

2. Determination of moisture content (Loss on drying)

An accurately weighed 10 g of coarsely powdered drug was placed in a tarred evaporating dish. Then the dish was dried at 105°C for 5 h and weighed. The drying and weighing was continued at one hour intervals until the difference between the two successive weighing is not more than 0.25 %. The loss on drying was calculated with reference to the amount of powder taken.

% loss on drying = weight of water in the sample / weight of the wet sample x100

3. Determination of ash values ash content

The residue remaining after incineration is the ash content of crude drug, which simply represents inorganic salts naturally occurring in the drug or adhering to it or deliberately added to it as a form of adulteration.

Determination of total ash

An accurately weighed 3 g of air dried coarsely powdered drug was taken in a tarred silica crucible and incinerated at a temperature not exceeding 450° C, until free from carbon then allowed to cool and weighed. The percentage of ash was calculated with reference to the air dried drug.

% Total ash = weight of ash / weight of sample x 100

Determination of acid insoluble ash

The total ash obtained from the previous procedure was mixed with 25 ml of 2 M hydrochloric acid and boiled for 5 min in a water bath, and then the insoluble matter was collected in an ash less filter paper and washed with hot water, dried and ignited for 15 min at a temperature not exceeding 450°C cooled in desiccators and weighed. The percentage of acid insoluble ash was calculated with reference to the air dried drug.

% acid insoluble ash = weight of acid insoluble ash / weight of sample x 100

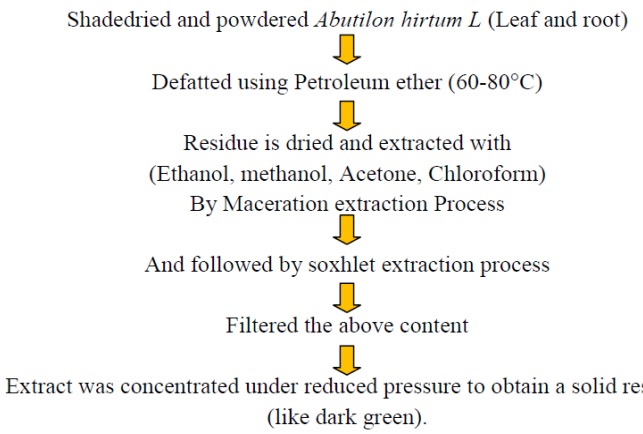
Determination of water soluble ash

The total ash obtained from the previous procedure was mixed with 25 ml of water and boiled for 5 min in a water bath, and then the insoluble matter was collected in an ash less filter paper and washed with hot water, dried and ignited for 15 min at a temperature not exceeding 450°C, cooled in desiccators and weighed. The insoluble matter was subtracted from the weight of the total ash; the difference in weight represents the water soluble ash. The percentage of water soluble ash was calculated with reference to the air dried drug.

% of water soluble ash = weight of water soluble ash / weight of sample x100

4.3 Section- B

4.3.1 **Extraction procedure of *abutilon hirtum L.***



4.3.2 Leaf

Ethanolic extract

The shade dried and coarsely powdered leaf of *Abutilon hirtum L* (Leaf) was defatted with petroleum ether (60-80°c). The residue was dried and extracted with Ethanol (70%) by Maceration followed by soxlet extraction until the complete extract of the material and filtered. The extract was concentrated under reduced pressure to obtain a solid residue (dark green). The ratio is 1:5.

Methanolic extract

The shade dried and coarsely powdered leaf of *Abutilon hirtum L* (Leaf) was defatted with petroleum ether (60-80°c). The residue was dried and extracted with Methanol by Maceration followed by soxlet extraction until the complete extract of the material and filtered. The extract was concentrated under reduced pressure to obtain a solid residue (dark green).The ratio is 1:5.

Acetone extract

The shade dried and coarsely powdered leaf of *Abutilon hirtum L* (Leaf) was defatted with petroleum ether (60-80°c). The residue was dried and extracted with Acetone by Maceration followed by soxlet extraction until the complete extract of the material and filtered. The extract was concentrated under reduced pressure to obtain a solid residue (dark green).The ratio is 1:5.

Chloroform extract

The shade dried and coarsely powdered leaf of *Abutilon hirtum L* (Leaf) was defatted with petroleum ether (60-80°c). The residue was dried and extracted with Chloroform by Maceration followed by soxlet extraction until the complete extract of the material and filtered. The extract was concentrated under reduced pressure to obtain a solid residue (dark green). The ratio is 1:5.

4.3.3 Root

Ethanolic extract

The shade dried and coarsely powdered Root of *Abutilon hirtum L* (root) was defatted with petroleum ether (60-80°c). The residue was dried for 2 weeks and extracted with Ethanolby Maceration followed by soxlet extraction until the complete extract of the material and

filtered. The extract was concentrated under reduced pressure to obtain a solid residue (dark green). The ratio is 1:5

Methanolic extract

The shade dried and coarsely powdered Root of *Abutilon hirtum L* (root) was defatted with petroleum ether (60-80°c). The residue was dried for 2 weeks and extracted with Methanol by Maceration followed by soxlet extraction until the complete extract of the material and filtered. The extract was concentrated under reduced pressure to obtain a solid residue (dark green). The ratio is 1:5

Acetone extract

The shade dried and coarsely powdered Root of *Abutilon hirtum L* (root) was defatted with petroleum ether (60-80°c). The residue was dried for 2 weeks and extracted with Acetone by Maceration followed by soxlet extraction until the complete extract of the material and filtered. The extract was concentrated under reduced pressure to obtain a solid residue (dark green).The ratio is 1:5

Chloroform extract

The shade dried and coarsely powdered Root of *Abutilon hirtum L* (root) was defatted with petroleum ether (60-80°c). The residue was dried for 2 weeks and extracted with Chloroform by Maceration followed by soxlet extraction until the complete extract of the material and filtered. The extract was concentrated under reduced pressure to obtain a solid residue (dark green). The ratio is 1:5.

4.4 Phytochemical studies

The plant extract was subjected to qualitative analysis. Qualitative analysis includes phytochemical screening of secondary metabolites such as Alkaloids, Aminoacids, Flavonoids, steroids, Glycosides, Saponins are determined.

4.4.1 Qualitative analysis

4.4.2 Preliminary phytochemical screening[3]

The plant extract was subjected to qualitative tests adopting standard procedures for the identification of the phyto-constituents present in it by Harborne (1998) and kokate et al.,(2003).

1. Test for alkaloids[3]

2 gm of the powdered material

↓

Mixed with 1gm of calcium hydroxide and 5 ml of water into a smooth paste

↓

It was then evaporated to dryness in a porcelain dish on a water bath

↓

To this 200 ml of chloroform was added, mixed well and refluxed for half an hour on a water bath

↓

Then it was filtered and the chloroform was evaporated

↓

To this 5 ml of diluted HCl was added followed by 2 ml of each of the following reagents.

1.1. Mayer's test

a small quantity of the extract

↓

Treated with Mayer's reagent.

↓

Cream colour precipitate indicates the presence of alkaloids.

1.2. Dragendorff's test

A small quantity of the extract

↓

Treated with Dragendorff ’s reagent

↓

Orange brown precipitate indicates the presence of alkaloids.

1.3. Wagner's test

A small quantity of extract

↓

Treated with Wagner's reagent

↓

Reddish brown precipitate indicates the presence of alkaloids.

1.4. Hager's test

A small quantity of extract

↓

Treated with Hager's reagent

↓

Yellow precipitate indicates the presence of alkaloids.

2. Test for carbohydrates[3]

2.1 Molisch's test

The extract of the powdered drug

↓

2-3 drops of 1% alcoholic anaphthol + 2ml of concentrated H_2SO_4

↓

Added along the sides of the test tube

↓

A purple colour indicating the presence of carbohydrates.

2.2. Fehling's test

The extract of the powdered leaf + Fehling's solution I and II

↓

Heated on a boiling water bath for half an hour

↓

Red precipitate was obtained indicating the presence of free reducing sugars.

2.3. Benedict'stest

The extract of the powdered leaf + Benedict's reagent

↓

A red precipitate was formed indicating the presence of reducing sugar.

3. Test for anthraquinone glycosides[3]

3.1. Borntrager's test

The powdered drug

↓

Boiled with dilute sulphuric acid

↓

Filtered and to the filtrate benzene was added and shaken well.

↓

The organic layer was separated to which ammonia solution was added slowly.

↓

No pink colour was observed in ammoniacal layer showing the presence of anthraquinone glycosides.

3.2. Modified borntrager's test

0.1 g of the powdered drug

↓

Boiled for 2 minutes with dil.HCl

↓

Few drops of FeCl3 solution filtered while hot and cooled

↓

The filtrate was then extracted with benzene and the benzene layer was separated

↓

Equal volume of dil.NH3 solution was added to the benzene extract

↓

No pink colour was observed in ammoniacal layer showing the presence of glycosides.

4. Test for cardiac glycosides (For deoxysugar)[3]

4.1. Keller kiliani test

1 g of the powdered leaf

↓

Boiled with 10 ml of 70 % alcohol for 2 minutes, cooled and filtered

↓

To the filtrate 10 ml of water + 5 drops of solution of lead sub acetate were added and filtered, evaporated to dryness

↓

The residue was dissolved in 3 ml of glacial acetic acid

↓

To these 2 drops of ferric chloride solution was added

↓

Then 3 ml of Concentrated H_2SO_4 was added to the sides of the test tube carefully and observed

↓

No reddish brown layer was observed indicating the absence of deoxysugars.

5. Test for sterols

The powdered drug was first extracted with petroleum ether

↓

Evaporated to a residue

↓

Then the residue was dissolved in chloroform and tested for sterols.

5.1. Salkowski's test

A few drops of concentrated H_2SO_4 was added to the above solution

↓

Shaken well and set aside

↓

The lower chloroform layer of the solution turned red in colour indicating the presence of sterols.

5.2. Test for libbermann - Burchard's[3]

To the chloroform solution

↓

Few drops of acetic anhydride + 1 ml of Concentrated H_2SO_4 were added

↓

At the junction of two layers a brown ring was formed

↓

The upper layer turned green indicating the presence of sterols.

6. Test for saponins [3]

6.1. Froth test

0.1g of powder was vigorously shaken with 5ml of distilled water for 30 seconds

↓

Undisturbed for 20 min

↓

Persistent froth indicated presence of Saponins.

7. Test for tannins ferric chloride[3]

Small quantity of the powdered drug was extracted with water

↓

To the aqueous extract few drops of ferric chloride solution was added

↓

Bluish black colour was produced indicating the presence of tannins.

8. Test for phenolic compounds[3]

8.1. Ferric chloride

A small quantity of the powdered drug was extracted with water

↓

To the alcoholic extract few drops of ferric chloride solution was added

↓

Bluish black colour was produced indicating the presence of tannins.

9. Test for flavonoid[3]

9.1. Shinoda's test

Little of the powdered drug was heated with alcohol and filtered

↓

To the test solution magnesium turnings and few drops of concentrated HCl were added

↓

Boiled for five minutes

↓

Red colour was obtained indicating the presence of Flavonoid.

9.2 Alkali test

To the small quantity of test solution

↓

10% aqueous sodium hydroxide solution was added

↓

Yellow orange colour was produced indicating the presence of Flavonoid.

10. Test for acid [3]

To the small quantity of test solution

↓

Few drops of concentrated H_2SO_4were added

↓

Yellow orange colour was obtained indicates the presence of Flavonoid.

11. Test for fixed oil[3]

A small amount of the powder was pressed in between in the filter paper

↓

The paper was heated in an oven at 105°C for 10 minutes

↓

A translucent greasy spot appeared indicating the papers.

12. Test for quinines[3]

To 1 ml of plant extract

↓

1 ml of conc. H_2SO_4 was added

↓

Formation of red colour indicated the presence of Quinones.

13. Test for resins[3]

The extracts were treated with acetone

↓

Small amount of water was then added and shaken

↓

Appearance of turbidity indicates the presence of resins.

5. RESULT AND DISCUSSION

5.1 Macroscopical studies

The leaves and root of *Abutilon hirtum L* was subjected to macroscopical studies and the results are presented in table 01 and 02.

Table 01: Macroscopical studies of *Abutilon hirtum L* (leaf).

S. NO	Parameters	Observation
1.	Colour	Green
2.	Surface	Hairy surface
3.	Texture	Coriaceous
4.	Odour	Faint
5.	Taste	Mucilaginous
6.	Apex	Cordate with acuminate
7.	Base	Symmetric
8.	Arrangement	Alternate
9.	Margin	Fine separate
10.	Length	11- 13 cm
11.	Width	8- 10 cm
12.	Petiole-length	1.5- 22 cm

Table 02: Macrocscopical studies of *Abutilon hirtum L* (root).

S. No	Parameters	Observation
1.	Colour	Yellowish brown
2.	Shape	Cylindrical
3.	Odour	Odourless
4.	Taste	Mucilaginous
5.	Surface	Wrinkled
6.	Fracture	Fibrous
7.	Length	6-11 cm
8.	Width	0.5-1 cm

Figure 02: Whole plant of *abutilon hirtum L* Figure 03: Leaf of *Abutilon hirtum L.*

Figure 04: Root of *abutilon hirtum L.*

Figure 05: Leaf powder of *abutilon hirtum L.*

Figure 06: Transverse section of *Abutilon hirtum L* (Leaf).

5.2 Description of plant parts

5.2.1 Leaf

The leaves are simple, petiolate, alternate, cordate with acuminate apex, fine serrate margin and symmetric base, a green in colour with the upper surface is darker than lower the one, having a hairy surface, a coriaceous texture, a faint of odour and a mucilaginous taste and showing palmately res reticulate venation. The midrib is more prominent on the lower surface. The leaves measure 11-13 cm in length and 8-10 cm in width.

5.2.2 Root

The root is a tap root carrying several lateral rootlets, yellowish brown in colour, cylindrical in shape, odourless with mucilaginous taste. It measures 6-11 cm in length and 1.5-1 cm in diameter. It is thick, woody with a longitudinally wrinkled surface and a fibrous fracture.

5.3 Determination of Physio - Chemical properties Of *Abutilon hirtum* (Leaf)

Table 03: Physio - Chemical properties of *Abutilon hirtum* (Leaf).

S. No	Physio chemical constant	Reports (%)
1.	Foreign matter	0.5%
2.	Loss on drying	14.6%
3.	Total ash	9.67%
4.	Water soluble ash	6.12%
5.	Acid in soluble ash	1.27%

5.4. Determination of behavioural characteristics of *Abutilon hirtum* (Leaf)

The crude powder of *Abutilon hirtum L* was treated with various chemicals & reagents, and its behavioural characters were observed. Its results are present in the table 04.

Table 04: Behavioural characters of *abutilon hirtum L* (Leaf).

S. No	Reagent Used	Visible/Day Light	Short Uv(254 Nm)	Long Uv (366nm)
1	Acetone	Greyish	Light bluish grey	Greyish
2	Iodine solution	Yellow	No colour	No colour
3	Ammonia	No colour	Bluish grey	Creamy white
4	Ethanol	No colour	White	Creamy white
5	Ferric chloride	Rust brown	Brownish	Pale grey
6	Acetic acid	Blue	Pinkish tinge	Bluish tinge
7	Chloroform	No colour	Light yellow	White
8	Distilled water	No colour	White	White

5.5. Preliminary phytochemical analysis of extracts of *Abutilon hirtum* (Leaf, Root)

The phytochemical screening of the extracts (70%) of *Abutilon hirtum L* (Leaf) powder revealed the presence of indole alkaloids, carbohydrates, sterol, tannins and phenolic compounds, flavanoids, protein and amino acids.

Table 05: Preliminary phytochemical analysis of different extracts of *Abutilon hirtum L* (Leaf, Root).

S. No	Phytoconstituents	Test name	Parts	C_2H_5OH	CH_3OH	$CHCl_3$	C_3H_6O
1	Saponins	-	Leaf	+	+	+	-
			Root	+	+	-	+
2	Alkaloids	Mayer's test	Leaf	+	+	+	+
			Root	+	-	-	+
		Dragendorff's test	Leaf	+	+	-	-
			Root	-	+	+	+
3	Sterols	Salkowski's test	Leaf	+	+	-	+
			Root	+	-	+	-
4	Tannins	Ferric chloride	Leaf	+	+	+	+
			Root	+	+	+	+
5	Phenolic groups	-	Leaf	+	-	-	+
			Root	-	+	-	+
6	Flavonoids	Shinoda's test	Leaf	+	+	+	-
			Root	+	-	+	+
		Alkali test	Leaf	+	-	-	-
			Root	-	+	-	+
		Acid test	Leaf	+	-	+	-
			Root	-	-	-	-
7	Carbohydrate	Benedict's test	Leaf	+	+	-	-
			Root	+	-	-	+
		Fehling's test	Leaf	+	+	-	-
			Root	-	-	-	-
8	Anthra quinone glycoside	Borntrager's test	Leaf	+	+	+	+
			Root	+	+	-	+
		Modified borntrager's test	Leaf	+	+	+	+
			Root	+	-	+	-
9	Cardiac Glycoside	Keller killiani test	Leaf	-	+	-	-
			Root	-	-	-	-

*** Note:**

+ Phytoconstituent is present.

- Phytoconstituent is absent.

6. SUMMARY

The process of standardisation can be achieved by stepwise pharmacognostic studies. The organoleptic assessment provides the simplest and quickest means to establish the identity

and thereby ensure the quality of a particular sample and these features are useful in judging the material totally powder form.

The organoleptic character of the shows greenish colour, slightly bitter taste and characteristic odour. Physico-chemical constants like ash value, water soluble alcoholic extracts, loss on drying determined by were per method described in Indian Pharmacopoeia.

Ash value depends upon the inorganic substances present in the particular formulation. This may be useful in standardising the drugs. The ash value of formulation is 9.67%. The acid insoluble ash value of the drug denotes the amount of siliceous matter in the plants. The quality of the drug is better if the insoluble acid value is low. It is 1.27%. Loss on drying indicates the total volatile content and moisture content of the formulation. High moisture content may affect the quality of drug and the less value of moisture content could prevent bacterial, fungal or yeast growth. This formulation shows a loss on drying at 105◦ C of 14.6%. These values correlate with the metabolic reaction of the drug and helps in evaluating crude drugs.

The fluorescent characteristic of powdered drug plays a vital role in the determination of quality and purity of the drug material. Some constituents show fluorescence in the visible range in daylight. The ultraviolet light produces fluorescence in many natural products which do not visibly fluorescence in daylight. If substance themselves are not fluorescent, they may often be converted into fluorescent derivatives or decomposition products by applying different reagents.

Medicinal plant extracts are reported to have health beneficial properties that are due to secondary metabolites such as phenolics, flavonoid, glycosides, alkaloids, tannins, saponins, anthraquinones, etc., present in them. These bio-components are known for their versatile biological effects and are implicated in the treatment of a variety of diseases. The screening of phytochemicals in *Abutilon hirtum L* was clearly validated in this study. Ethanolic extract of formulation shows the adequate presence of phyto-constituents than the methanol and acetone, chloroform extracts.

7. CONCLUSION

The current study has demonstrated that different solvent extracts of Abutilon roots and leaf contained alkaloids, carbohydrates, Flavonoide, glycosides, Phenol Saporins, steroids, sterols.

The present studies shows that the organoleptic characters, physiochemical and physical properties of *Abutilon hirtum L* leaves and roots.

We compared the different solvent extracts of leaf and root of *Abutilon hirtum L*, the ethanolic extract is better, because more amount of phytoconstituents are identified in this extract.

Further studies are to be carried out isolation of specific phyto constituents and identifying their therapeutic activity (Invitro or invivo methods).

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