PHYTOCHEMICAL ANALYSIS OF THE LEAVES OF *ABUTILON INDICUM*

R. Nithyatharani[1], U.S. Kavitha[2]
[1]Assistant Professor, [2]PG Student
Department of Microbiology, Cauvery College for Women, Trichy, India- 620 018

***Abstract*:** Plants have been used as medicines for thousands of years. One such medicinal plant is *Abutilon indicum.* It is erect, woody and shrubby plant found commonly in tropical regions. The whole plant is used to cure many diseases. The present study determines the qualitative and quantitative analysis of leaves of *Abutilon indicum* in different solvents like methanol, ethanol, chloroform, petroleum ether and aqueous. The qualitative analysis of the leaves showed the presence of alkaloids, steroids, terpenoids, flavanoids, saponins, phenols, tannins, aminoacids, carbohydrates and reducing sugar. The quantification of the compounds like alkaloids, flavanoids and phenols were estimated. The result confirms that the leaves of *Abutilon indicum* contains significant phytocomponents and are helpful to prepare natural drugs in scientific research.

Keywords: *Abutilon indicum*, Leaves, Medicinal plant, Phytochemical screening, Flavonoids

I. INTRODUCTION

Plant based medicines are used to cure many diseases since ancient times (Ankit saini, 2014). They have always been used as a rich source of biologically active drugs and have numerous traditional uses to serve mankind for many thousand years (Gupta, 2010). Traditional medicines derived from medicinal plants are used by about 60% of the world's population (Vaidya, 1997). One such traditionally used plant is *Abutilon indicum*.

Abutilon indicum belonging to Malvaceae family is a perennial erect shrub distributed throughout the tropical regions (Archna Sharma, 2013). It is commonly known as "Thuthi" in Tamil and "Country Mallow" in English (Saini, 2015). It is an herbaceous weed used as medicinal plant since ancient times. The whole plant and different parts of the plant are used to cure many human ailments. The leaves of this plant are used to cure ulcer, Inflammation, Rheumatism, Syphilis of penis, Piles and to relieve leg pains, Inflammation of bladder, Catarrhal bilious diarrhoea, Bronchitis, Gonorrhoea, Fevers (Saini, 2015). It is used as antidote for the treatment of snake bites (Gautam Girendra Kumar, 2011). The decoction of the leaves are used for toothache, tender gums (Prakshanth, 2006), bilious diarrhoea, and ear ache and also used as eye wash and mouth wash (Khadabadi, 2010).

This study aims to determine the phytocomponents of the leaves of *Abutilon indicum* in different solvents like methanol, ethanol, petroleum ether, chloroform and aqueous both qualitatively and quantitatively.

II. MATERIALS AND METHODS

2.1 Collection of plant sample

The fresh leaves were collected from Trichy district, Tamil Nadu, India.

2.2 Preparation of the extract

The leaves of *Abutilon indicum* were washed thoroughly in tap water to remove dust particles. The leaves were then dried in shade at room temperature and coarsely powdered by a mechanical grinder. The dried powdered sample was soaked in different solvents like methanol, ethanol, chloroform and petroleum ether for 3 to 5 days. Aqueous extract of the leaves were also prepared by soaking the dried powder in distilled water. After 5 days, the extracts were filtered using No.1 Whatman filter paper and stored in air tight container for further analysis.

2.3 Qualitative analysis of phytochemicals

Preliminary phytochemical screening was carried out (Harborne, 1980) and (Karthiswaran, 2010).

2.3.1 Test for alkaloids (Mayer's test)

To 1ml of extract, 1 ml of Mayer's reagent (Potassium iodide solution) was added. Formation of whitish yellow or cream coloured precipitate indicates the presence of alkaloids.

2.3.2 Test for steroids (Libermann Burchard test)

To 1ml of extract, 2ml of acetic anhydride and 2ml of concentrated sulphuric acid were added. Formation of violet to blue or green colour indicates the presence of steroids.

2.3.3 Test for terpenoids (Salkowski test)

To 1 ml of extract, 2ml of chloroform and few drops of sulphuric acid were added. Formation of reddish brown ring indicates the presence of terpenoids.

2.3.4 Test for flavanoids (Alkaline reagent test)

To 1 ml of extract, few drops of dilute ammonium solution and few drops of concentrated hydrochloric acid were added. A yellow colouration indicates the presence of flavanoids.

2.3.5 Test for saponins (Froth test)

To 1 ml of extract, 5 ml of distilled water was added and shaked vigorously. Formation of froth indicates the presence of saponins.

2.3.6 Test for phenols (Lead Acetate test)

To 1ml of extract, 1 ml of lead acetate solution was added. Formation of precipitate indicates the presence of phenols.

2.3.7 Test for tannins (Lead acetate test)

To 1ml of extract, 1ml of lead acetate was added. A formation of white precipitate indicates the presence of tannins.

2.3.8 Test for tannins (Ferric chloride test)

To 1ml of extract, 1ml of ferric chloride solution was added. Formation of blue, black or brownish green colour indicates the presence of tannins.

2.3.9 Test for cardiac glycosides (Keller killiani test)

To 1ml of extrct, 5ml of distilled water was added and evaporated to dryness. Then to the Sample 2ml of glacial acetic acid containing trace amount of ferric chloride solution was added. Then 1ml of concentrated sulphuric acid was added along the sides of the tube. Formation of brown ring underlayed with blue colour indicates presence of cardiac glycosides.

2.3.10 Test for aminoacids (Ninhydrin test)

To the 1ml of sample, 3 to 4 drops of Ninhydrin solution was added and boiled in water bath for 10 minutes. Formation of purple or blue colour indicates the presence of amino acids.

2.3.11 Test for proteins (Biuret test)

To the 1ml of extract, 1ml of 40% sodium hydroxide solution and 2 drops of 1% copper sulphate solution were added. Formation of violet colour indicates the presence of proteins.

2.3.12 Test for carbohydrates (Barfoed test)

To the 2ml of extract, 1ml of Barfoed's reagent was added and boiled in water bath for few minutes. Formation of reddish brown precipitate indicates the presence of carbohydrates.

2.3.13 Test for reducing sugars (Fehling's test)

To the 1ml of extract, equal quantities of Fehling solution A and B were added and heated. Formation of brick red precipitate indicates the presence of reducing sugars.

2.4 Quantitative estimation of phytochemicals

2.4.1 Alkaloid determination

5 gm of sample was added to 200 ml of 10% acetic acid in ethanol in a beaker. The beaker was tightly covered and allowed to stand for 4 hours. This was filtered and the extract was concentrated on a water bath to one quater of the original volume. The entire solution was precipitated by the drop wise addition of concentrated ammonium hydroxide solution. The precipitate was collected and washed with dilute ammonium hydroxide and filtered. The residue is alkaloid, which was dried and weighed (Harborne, 1980).

2.4.2 Flavanoid determination

10 gm of sample was added to 100 ml of 80% aqueous methanol in a beaker. The whole solution was filtered through Whatman filter paper No.42 (125mm). The filtrate was then evaporated to dryness and weighed (Harborne, 1980).

2.4.3 Determination of total phenols

Few grams of sample were boiled with 50 ml of ether for 15 minutes for the extraction of phenols. To the 5ml of extract, 10 ml of distilled water, 2ml of ammonium hydroxide solution and 5ml of concentrated amyl alcohol were added. The samples were left for 30 minutes. This was measured at 505 nm (Harborne, 1980).

III. RESULTS AND DISCUSSION

The qualitative phytochemical analysis of the leaves of *Abutilon indicum* is summarized in the Table 1. The quantification of important phytocompounds of the leaves is summarized in Table 2. The methanolic extract of leaves showed the presence of high number of phytocomponents when compared with ethanol, petroleum ether, and chloroform and aqueous. The methanolic extracts revealed the presence of alkaloids, steroids, flavanoids, phenols, tannins, terpenoids, aminoacids and carbohydrates. Phytochemicals such as flavanoids and alkaloids have hypoglycemic activities (Karthiswaran, 2010). The leaves show the presence of high amount of tannins and they play a major role in the treatment of intestinal disorders like diarrhoea and dysentery (Cherian, 1995). The leaves also have flavanoids which can act as antioxidants (Akinpelu, 2006). These extracts are further undertaken for isolation and identification of specific phytocomponents for pharmacological studies.

Table 1. Qualitative results of the leaves of the *Abutilon indicum*

Tests	Methanol	Ethanol	Petroleum ether	Chloroform	Aqueous
Alkaloid	+	-	-	-	-
Steroids	+	+	+	+	+
Flavanoids	+	+	-	-	+
Terpenoids	+	-	-	-	-
Saponins	+	+	+	+	+
Phenols	+	+	+	+	+
Tannins	+	-	+	-	+
Cardiac glycosides	-	+	-	-	-
Aminoacids	+	-	-	-	-
Proteins	-	-	-	-	-
Carbohydrates	+	-	-	+	-
Reducing sugars	-	+	-	-	+

Table 2. Quantitative results of the leaves of the *Abutilon indicum*

Tests	Methanol	Ethanol	Petroleum ether	Chloroform	Aqueous
Alkaloid	13.56 ± 4.08	12.31 ± 0.12	10.65 ± 1.97	9.32 ± 1.0	12.95 ± 2.23
Flavanoid	9.13 ± 0.02	6.09 ± 0.02	5.05 ± 0.04	3.04± 0.01	8.12 ± 0.07
Phenols	14.53 ± 1.35	10.25 ± 1.3	2.09 ± 0.09	1.89 ± 1.02	2.12 ± 0.32

IV. CONCLUSION

The qualitative and quantitative analysis shows that the leaves of the *Abutilon indicum* contains significant phytoconstituents such as alkaloids, steroids, flavanoids, terpenoids, phenols, tannins, carbohydrates, and aminoacids. The methanolic extracts are rich in phytoconstituents when compared with other extracts. Thus, the study reveals that the plant can act as a source of many bioactive compounds acting against some human diseases. The work is in progress to ascertain its biological activity and brighten the pharmacological profile of it in the arena of medicine.

REFERENCES

[1] Akinpelu, A. D. Onakoya, ZTM. 2006. Antimicrobial activities of medicinal plants used in folkore remedies in South Western. African journal of biotechnology, 5: 1078-1081.

[2] Ankit saini, D. P. Singh, Girendra Kumar Gautam, Mohammed Ashfaq, Brajesh Dwivedi. 2014. Evaluation of Root and Leaf Extract of *Abutilon indicum* for Antifungal Activity. International Journal of Chemistry and Pharmaceutical Sciences, 2: 717-721.

[3] Archna Sharma, R. A. Sharma and Hemlata Singh. 2013. Phytochemical and Pharmacological Profile of *Abutilon indicum* L. Sweet: A Review, International Journal of Pharmaceutical sciences Review and Researc, 20: 120-127.

[4] Cherian, S. Augusti, K. T. 1995. Insulin sparing action of leucopelargonidin derivative isolated from Ficus bengalesis linn. Indian journal of experimental biology, 33: 608-611.

[5] Gautam Girendra Kumar and Vidhyasagar Gali. 2011. Phytochemical screening of *Abutilon muticum* (del. ex dc.) And celosia argentea linn. International Journal of Pharmacology and Biological Sciences, 2: 463-467.
[6] Gupta, R. K. 2010. Medicinal & Aromatic plants, CBS publishers & distributors, 1st edition: 116-117.
[7] Harborne, J. B. 1980. Phytochemical methods, Chapman and Hall limited, London: 49 – 189.
[8] Karthiswaran, K. Mirunalini, S. Dhamodharan, G. Krishnaveni, M. Arulmozhi, V. 2010. Journal of biological sciences, 10: 242-246.
[9] Khadabadi, S. S. Bhajipale, N. S. 2010. A Review on Some Important Medicinal Plants of *Abutilon* spp, Research Journal of Pharmaceutical, Biological and Chemical Sciences, 1: 718-730.
[10] Prakshanth, V. Neelam, S. Padh, H. Rajani. M. 2006. Search for antibacterial and antifungal agents from selected Indian medicinal plants, Journal of Ethnopharmacology, 107: 182-188.
[11] Saini, A. Gahlawat, D. K. Chauhan, C. Gulia, S. K. Ganie, Archita, S. A. and Yadav, S. S. 2015. Ethnomedicinal uses and phytochemistry of *Abutilon indicum* (Linn.) Sweet: an overview", Journal of Pharmacognosy and Phytochemistry, 3: 66-72.
[12] Vaidya, A. B. 1997. "The Status and Scope of Indian Medicinal Plants acting on Central Nervous System", Indian Journal of Pharmacology, 29: 340-343.