

# PHYTOCHEMICAL ANALYSIS OF A. INDICUM AND C. DACTYLON - A COMPARATIVE STUDY

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**Abstract:** Medicinal plants are the greatest gift to human beings. Infantile diarrhoea is one of the most common diseases among children. Medicinal plants are used from ancient times to cure infantile diarrhoea. In this regard, *Abutilon indicum* and *Cyanodon dactylon* are among them. The aim of the present study to determine the preliminary phytochemical screening of both the leaves of *Abutilon indicum* and *Cyanodon dactylon* in different solvents like methanol, ethanol, chloroform, petroleum ether and aqueous by both qualitative and quantitative analysis. Phytoconstituents such as alkaloids, terpenoids, flavonoids, saponins, carbohydrates, and proteins were identified from both samples. The quantification of flavonoids, alkaloids and phenols were done. The results suggested that *Abutilon indicum* possess more phytoconstituents compared with *Cyanodon dactylon*.

**Key words:** *Abutilon indicum*, *Cyanodon dactylon*, medicinal plant, leaves, phytochemical screening

## I. INTRODUCTION

Plant based medicines are used to cure many diseases since ancient times. 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. Traditional medicines derived from medicinal plants are used by about 60% of the world's population.

The plant *Abutilon indicum* (Linn.) is belonging to Malvaceae family; Also known as Mallow in english, *Abutilon indicum* is used as a medicinal plant. It has been reported that *Abutilon indicum* has Anti-inflammatory and Anti-proliferative activity (Kaladhar, et. al., 2014), Anti-Arthritic activity (Nitin Bhajipale, 2012), Analgesic and Sedative property (Deepraj pal, et. al., 2013), Antioxidant and Antimicrobial activity (Dhirender Kaushik, et. al., 2010), Hepatoprotective activity (Rohit Gupta, et. al., 2015), Anti diarrhoeal, Anti-convulsant, Larvicidal, Wound healing, and Anti-estrogenic activity. It is proved that this plant contains carbohydrates, proteins and amino acids, saponins, flavanoids, glycosides, phytosterols and phenolic compounds

*Cynodon dactylon* (L) is belonging to family-poaceae, is a perennial herb found in various regions of India. It has different names in different Indian languages such as *Durva* (Marathi), *Durba* (Bengali), *Dhro* (Gujarati), *Garichgaddi* (Telugu), *Arukampillu* (Tamil), *Shataparva* (Sanskrit) etc. *Cynodon dactylon* occupies a key position in ethno medicinal practices and traditional systems of medicine. It has vast medicinal value (Animesh, et. al., 2012) and it is used in the treatment of various diseases such as astringent, sweet, cooling, haemostatic, depurative, vulnerary, constipating, diuretic and tonic and is useful in impaired conditions of *pitta* and *kapha*, hyperdipsia, burning sensation, haemoptysis, haematuria, haemorrhages, wounds, leprosy, diarrhoea, dysentery, conjunctivitis, vomiting (Auddy, et. al., 2003). *Cynodon dactylon* contains many metabolites notably proteins, carbohydrates, minerals, flavonoids, carotenoids, alkaloids, and glycosides (Vijayalakshmi, et. al., 2011).

The objective of the present study is to determine the preliminary phytochemical screening of both the leaves of *Abutilon indicum* and *Cyanodon dactylon* in different solvents like methanol, ethanol, chloroform, petroleum ether and aqueous by both qualitative and quantitative analysis.

## II. MATERIALS AND METHODS

### 2.1 Collection of plant sample

The leaves of *Abutilon indicum* and *Cyanodon dactylon* were collected from Tiruchipalli, Tamil nadu, India.

## 2.2 Preparation of the extract

The collected leaves 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 methanol for 3 to 5 days. After 5 days, the extract was 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 by the method described by (Kokate, *et. al.*, 1986 and Harbourne, *et. al.*, 1980).

### 2.3.1 Test for alkaloids (Mayer's test)

To the 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 the 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 the 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 flavonoids (Alkaline reagent test)

To the 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 flavonoids.

### 2.3.5 Test for saponins (Froth test)

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

### 2.3.6 Test for phenols (Lead Acetate test)

To the 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 the 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 the 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 the 1ml of extract, add 5ml of distilled water and evaporate it to dryness. Then to the Sample add 2ml of glacial acetic acid containing trace amount of ferric chloride solution. Then add 1ml of concentrated sulphuric acid to 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, add 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 quarter 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 (Harbourne, *et. al.*, 1980).

### 2.4.2 Flavonoid 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 (Harbourne, *et. al.*, 1980).

### 2.4.3 Determination of total phenols

Few grams of sample were boiled with 50 ml of ether for the extraction of phenols for 15 minutes. 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 (Harbourne, *et. al.*, 1980).

## III. RESULTS AND DISCUSSION

The qualitative phytochemical analysis of the leaves of *Abutilon indicum* and *Cyanodon dactylon* are summarized in the Table 1 and Table 2 respectively. The quantification of important phytochemicals of the leaves of *Abutilon indicum* and *Cyanodon dactylon* are summarized in Table 3 and Table 4. The methanolic extract of leaves shows the presence of high number of phytochemicals when compared with other solvents like ethanol, petroleum ether, chloroform and aqueous in both samples. Phytochemicals such as saponins, terpenoids, and alkaloids have hypoglycemic activities (Cherian and Augusti, 1995). The leaves show the presence of terpenoids and they play a major role in the treatment of intestinal disorders like diarrhoea and dysentery (Akinpelu and Onakoya, 2006). The leaves show positive result for phenols which can be act as antioxidants (Rumaisa, *et. al.*, 2013). The leaves also have flavanoids which can act as antioxidants. Phytochemicals have highest therapeutic efficiency in pharmaceutical field (Thilagavathi, *et. al.*, 2015). Earlier studies suggested that *Abutilon indicum* (Chandrasekaran, *et. al.*, 2004) and *Cyanodon dactylon* (Babu, *et. al.*, 2009) possess anti diarrhoeal activity. This study suggests that *Abutilon indicum* possess more phytochemicals compared with *Cyanodon dactylon*. It helps to undertake further studies on isolation and identification of specific phytochemicals for pharmacological studies.

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

TESTS	METHANOL	ETHANOL	PETROLEUM ETHER	CHLOROFORM	AQUEOUS
ALKALOID	+	-	-	-	-
STERIODS	+	+	+	+	+
FLAVANOIDS	+	+	-	-	+

TERPENOIDS	+	-	-	-	-
SAPONINS	+	+	+	+	+
PHENOLS	+	+	+	+	+
TANNINS	+	-	+	-	+
CARDIAC GLYCOSIDES	-	+	-	-	-
AMINOACIDS	+	-	-	-	-
PROTEINS	-	-	-	-	-
CARBOHYDRATES	+	-	-	+	-
REDUCING SUGARS	-	+	-	-	+

Table 2. Qualitative results of the leaves of the *Cyanodon dactylon*

TESTS	METHANOL	ETHANOL	PETROLEUM ETHER	CHLOROFORM	AQUEOUS
ALKALOID	-	-	-	-	-
STEROIDS	+	+	+	+	+
FLAVANOIDS	+	+	-	-	+
TERPENOIDS	+	+	-	+	+
SAPONINS	+	+	+	+	+
PHENOLS	+	-	-	-	+
TANNINS	+	-	-	-	+
CARDIAC GLYCOSIDES	+	+	-	-	+
AMINOACIDS	+	+	-	-	+
PROTEINS	+	+	+	+	+
CARBOHYDRATES	+	+	+	+	-
REDUCING SUGARS	-	-	-	-	-

Table 3. 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



<b>Flavanoid</b>	9.13 ± 0.02	6.09 ± 0.02	5.05 ± 0.04	3.04 ± 0.01	8.12 ± 0.07
<b>Phenols</b>	14.53 ± 1.35	10.25 ± 1.3	2.09 ± 0.09	1.89 ± 1.02	2.12 ± 0.32

**Table 4. Quantitative results of the leaves of the *Cyanodon dactylon***

<b>Tests</b>	<b>Methanol</b>	<b>Ethanol</b>	<b>Petroleum ether</b>	<b>Chloroform</b>	<b>Aqueous</b>
<b>Alkaloid</b>	1.56 ± 4.08	1.31 ± 0.12	0.65 ± 1.97	0.32 ± 1.0	0.95 ± 2.23
<b>Flavanoid</b>	8.13 ± 0.02	7.90 ± 0.02	2.15 ± 0.04	1.04 ± 0.01	8.02 ± 0.07
<b>Phenols</b>	13.23 ± 1.35	1.25 ± 1.3	0.09 ± 0.09	0.89 ± 1.02	7.12 ± 0.32

#### IV. CONCLUSION

The qualitative and quantitative analysis shows that the leaves of *Abutilon indicum* and *Cyanodon dactylon* contain active phytochemicals such as alkaloids, steroids, terpenoids, phenols, tannins, proteins, flavonoids and saponins. The methanolic extracts are rich in bioactive substances when compared with other extracts. Thus, the studies reveal the presence of various phytoconstituents of the leaves of *Abutilon indicum* is far higher than the phytoconstituents of the leaves of *Cyanodon dactylon*. Further studies are being undertaken to isolate its phytoconstituents and to identify its medicinal properties in the field of medicine.

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