

PHYTOCHEMICAL SCREENING OF *ACALYPHA INDICA* L. LEAF EXTRACTS<sup>1</sup>R.Tamil Selvan, <sup>2</sup>A.K.Sultan Mohideen\*, <sup>3</sup>M.Asrar Sheriff and <sup>4</sup>N.Md.Azmathullah

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**ABSTRACT:** Medicinal plants have been used for centuries as remedies for human diseases because they contain components of therapeutic value. *Acalypha indica* L. belonging to the family Euphorbiaceae is a popular plant in traditional medicine used for treating various ailments. Phytochemical screening of the leaf extracts of *A.indica* was carried out following the standard procedures. Aqueous and ethanolic extracts of *A.indica* leaves indicated the occurrence of saponins, flavonoids, terpenoids and cardiac glycosides. The ethanolic extract of *A.indica* leaves also showed the presence of tannins and steroids. The medical significance of various phytochemical constituents identified in the leaf extracts of *A.indica* and their potential antimicrobial and therapeutic applications are discussed.

**Key words:** *Acalypha indica*, phytochemicals, saponins, tannins, phlobatannins, terpenoids, flavonoids, steroids.

## INTRODUCTION

Herbal medicines have been the basis of treatment and cure for various diseases and physiological conditions in traditional methods practiced in India such as Ayurveda, Unani and Siddha. Medicinal components from plants play an important role in conventional as well as western medicine. Plant derived drugs have been a part of the evolution of human healthcare for thousands of years. Plant based drugs were commonly used in India and China (Duraipandian and Ignacimuthu, 2007). Plants produce a diverse range of bioactive molecules, making them a rich source of different types of medicines. The most important of these bioactive constituents of plants are alkaloids, tannins, and flavonoids and phenolic compounds (Hill, 1952). These substances are usually found in several parts of plants like root, leaf, shoot and bark. The effects of plants extracts on microbes have been studied by a very large number of researchers in different parts of the world (Maheshwari, 1986; Rai, 1989; Negi, 1993). Plants produce a diverse range of bioactive molecules; require the most common source of antimicrobial agents. Their usage as traditional health remedies is the most popular for 80% of world population (Bibitha, 2002). In recent years, multiple drug resistance has developed in many microbes, which has resulted in search for new antibiotic sources.

*A. indica* L. commonly known as “Kuppai meni” in Tamil, belongs to the family Euphorbiaceae. It has been used traditionally for the treatment of throat infections, wound healing, anti-venom and migraine pain relief. There are various clinical constituents namely kaempferol glycoside, mauritianin, clitorin, nicotiflorin and biorodin that have been isolated from the flower and leaves of *A.indica* (Nahrstedt, 2006). The presence of these phytochemicals could be responsible for the wide range of antimicrobial activities. The leaves of *A.grandis* have also been reported to possess many medicinal properties including contraceptive activity (Doughari, 2006). Hence, a study was carried out to analyse qualitatively the presence of various medicinally important phytochemical constituents occurring in different types of extracts prepared from the leaves of *A. indica*. The medical significance of various phytochemicals for microbial control and therapeutics is discussed.

## MATERIALS AND METHODS

### Collection of plant materials

Plant materials were collected from The New college campus, Royapettah, Chennai (Plate-1A) and were identified and authenticated as *A.indica* at the Department of Plant biology and Plant biotechnology, The New College, Chennai. The freshly collected leaves of *A.indica* were shade dried at room temperature (32-37<sup>0</sup> C) for 5 days (Plate-1B). The dried leaves were ground into uniform powder using homogenizer (Plate-1C). The powdered air dried leaf material was extracted with distilled water and ethanol by cold percolation method (Dash et.al, 2005).



Plate-1: ACALYPHA INDICA

### Preparation of leaf extracts

**Aqueous extract:** 20gm of dried and powdered leaves of *A.indica*, were weighed and moistened with sufficient amount of water and made upto 200ml by addition of excessive distilled water. After 24 hours, the contents were boiled in a water bath and the filtrate was used to carry out qualitative phytochemical analysis. **Ethanolic extract:** 20gm of dried and powdered leaves of *A.indica* were weighed and moistened with sufficient amount of ethanol. After 72 hours, it was filtered and the powder was resuspended in ethanol and filtered again. The filtrate was evaporated in a boiling water bath and the evaporated dried extract of the leaves was used.

### Phytochemical screening

The freshly prepared extracts (Aqueous and Ethanolic) were subjected to phytochemical screening to test for the presence of the phytoconstituents such as tannins, phlobotannins, saponins, flavonoids, terpenoids, cardiac glycosides and steroids following standard methods described by Harborne (1973) and Sofowara (1993).

## RESULTS AND DISCUSSION

Phytochemical screening of the aqueous and ethanolic extracts of *A.indica* leaves showed the presence of various medically active constituents (Table-1). The phytochemical constituents commonly present in both the leaf extracts include saponins, flavonoids, terpenoids and cardiac glycosides. The ethanolic extract of *A.indica* in addition, showed the occurrence of the phytochemicals such as tannins and steroids.

**Table 1: Qualitative phytochemical constituents in *Acalypha indica* leaf extracts**

S.No.	Phytochemical Constituents	Aqueous extract	Ethanolic extract
1	Tannins	-	+
2	Phlobatannins	-	-
3	Saponins	+	+
4	Flavonoids	+	+
5	Terpenoids	+	+
6	Cardiac glycosides	+	+
7	Steroids	-	+

(+) Present ; (-) Absent

Plants have since ancient times provided mankind with various medicinal agents and natural products serving as source of many drugs (Balandrin et al., 1993). Contrary to synthetic drugs, antimicrobials of plant origin are not associated with many side effects and have an enormous therapeutic potential to heal many infectious diseases. According to the World Health Organisation, medicinal plants would be the best source to obtain a variety of drugs. Though there is large body of information to support the wide ranging applications of *A.indica* in folk and indigenous medicine for the treatment of eye infection, wounds, joint pain, arthritis and many other diseases (Doughari, 2006) the occurrence of phytochemicals and their medicinal role has not been adequately studied. The results of the phytochemical screening of *A.indica* leaves show that they are very rich in tannins, saponins, terpenoids, alkaloids and phlobatanins which are best known for their antimicrobial and antiviral properties (Taylor et.al., 1996; Oudhia, 2003). Britto et.al., (2011) have also identified & reported the presence of alkaloids, tannins, saponins, steroids, flavonoids, terpenoids and cardiac glycosides in ten medicinal plants belonging to different families.

Flavonoids are present in all vascular plants and have been reported to exert multiple biological effects including anti-inflammatory, antiulcerogenic, antiallergic, antiviral and cancer activities (Harborne, 1973). Medicinally, tannins are used in antidiarrhoeal, haemostatic and antihæmorrhoidal preparations. Tannins have been reported in the leaves of pomegranate, Tambolan, guava and Euphorbia which is in accordance with the present work (Nascimento et.al., 2000; Edeoga, 2005). Saponins are glycosides of steroids, steroid alkaloids found in plants, especially in the plant skins where they form a waxy protective coating. They are useful in lowering cholesterol, as antioxidants and anti-inflammatory agents. Terpenoids are large and diverse class of naturally occurring organic chemicals found in all classes of living organisms. The presence of terpenoids in the leaf extract of *A.indica* as indicated in this study is in agreement with the wide distribution and antibacterial properties of this compound reported by Nostro et.al. (2000) and Edeoga et.al., (2005) in other plants. Cardiac glycosides are drugs used in the treatment of congestive heart failure and cardiac arrhythmia and are found as secondary metabolites in several plants like *Digitalis sp.*, *Convallaris*, *Euphorbia sp.*, [Edeoga et.al., 2005].

In this study, *A. indica* was chosen because it is widely distributed in many parts of Chennai, easily adapted to local environmental conditions and has high medicinal value. This study revealed that the extracts of *A. indica* contained many important phytochemical constituents with various medicinal properties. However, taking into consideration, safety aspects, toxicity and isolation of active compounds and phytochemicals, further studies need to be carried out to unravel the search for bioactivity.

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