

## QUALITATIVE PHYTOCHEMICAL ANALYSIS OF *ACALYPHA INDICA* L. MEDICINAL PLANTS OF FAMILY EUPHORBIACEAE

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### ABSTRACT

*A preliminary analysis was conducted on the aqueous extract of the leaves, stem, and root of Acalypha indica L. to determine its phytochemical composition. This plant is classified under the family Euphorbiaceae. This plant is well recognized in traditional medicine for its efficacy in treating a variety of diseases. The analysis was conducted using conventional methodologies. The medical importance of many phytochemical elements revealed in this plant confirms the long-standing practice of using medicinal plants as treatments for human ailments. The objective of this research was to identify the main phytoconstituents present in Acalypha indica L. medicinal plants and establish a correlation between their presence and the bioactivities shown by the plants. The plant was screened using conventional techniques, which revealed the presence of tannins, flavonoids, phenolics, saponins, steroids, cardiac glycosides, and alkaloids. The existence of these phytochemicals may be associated with the therapeutic capacity of certain plants. Additional research is required to assess the pharmacological capabilities of this plant, as well as to separate, analyse, and understand the chemical structures of the bioactive chemicals that are responsible for its activities and other therapeutic properties.*

**Keywords:** *Acalypha Indica*, Phytochemicals, Saponins, Tannins, Flavonoids, Steroids.

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### Introduction

Herbal remedies have long been used in ancient Indian practices like Ayurveda, Unani, and Siddha to treat and cure a wide range of illnesses and physiological problems. Phytochemicals derived from plants are significant in both traditional and modern medicine. Plant-based pharmaceuticals have played a significant role in the advancement of human healthcare for millennia. India and China often used plant-based medications (Duraipandian and Ignacimuthu, 2007). Plants synthesize a wide array of bioactive compounds, making them a valuable reservoir of various pharmaceuticals. Alkaloids, tannins, flavonoids, and phenolic chemicals are the most significant bioactive ingredients found in plants (Hill, 1952). These chemicals are often present in various plant components such as roots, leaves, shoots, and bark. A multitude of experts from various regions around the globe have extensively investigated the impact of plant extracts on microorganisms (Maheshwari, 1986; Rai, 1989; Negi, 1993). Plants synthesize a wide variety of bioactive compounds, making them the primary source of antimicrobial agents. According to Bibitha (2002), traditional health medicines are widely used by 80% of the global population. Over the last several years, many microorganisms have evolved resistance to different drugs, prompting the exploration of new sources of antibiotics.

*Acalypha indica* L., often referred to as "copperleaf", is a member of the Euphorbiaceae family. Traditionally, it has been used for treating throat infections, promoting wound healing, providing anti-venom effects, and alleviating migraine symptoms. Several clinical components, including kaempferol glycoside, mauritianin, clitorin, nicotiflorin, and biorodin, have been extracted from the flower and leaves of *A.indica* (Nahrstedt, 2006). The existence of these phytochemicals may be accountable for the extensive array of antibacterial properties. *A.grandis* leaves have been shown to exhibit many therapeutic

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qualities, including contraceptive action (Doughari, 2006). Therefore, research was conducted to qualitatively analyse the occurrence of distinct medicinally significant phytochemical elements in various kinds of extracts derived from the leaves of *A. indica*. The paper examines the medicinal importance of different phytochemicals in terms of their ability to manage and treat microbial infections.

**Table: 1 Description of *Acalypha indica* L.**

Binomial Name: - <i>Acalypha indica</i> L.
Local Name: - Muktajaschuri;
Family: - Euphorbiaceae;
Habit: - Small herb, rarely sub-shrub;
Habitat: - Waste, moist and shady places and river banks;
Flower colour: - Olive green;
Flowering season: - Dec-Apr;
Parts utilized: - Leaf, Stem, Flowers, Roots, and Seeds.



**Figure 1: *Acalypha indica* L.**

*Acalypha indica* L., a prevalent annual medicinal plant, mostly inhabits damp areas, often in residential backyards over the plains of India (Mondal et al., 2021). The nutritional content and phytochemicals found in *Acalypha indica* provide evidence for its traditional usage as an alternative remedy for the treatment of certain health issues (Nazril et al., 2016).

The herb has significant medical promise as an emetic, expectorant, laxative, and diuretic. It has use in the treatment of bronchitis, pneumonia, asthma, and pulmonary TB (Mohan, 2012). The foliage of this plant has laxative and anti-parasitic properties. Externally, in the treatment of scabies, they are ground with common salt, quicklime, or lime juice (Mohan, 2012). Lime juice and leaf paste have been recommended as a treatment for ringworm. It is advisable for children to refrain from consuming leaf juice (Mohan, 2012).

A leaf decoction is a treatment for earaches. Children are given dry leaf powder or a decoction with a little quantity of garlic to facilitate the expulsion of worms from their bodies (Mohan, 2012). This herb is used in homeopathy to treat severe coughs that are accompanied by pulmonary hemorrhage, hemoptysis, and early phthisis.

The plant contains kaempferol, a cyanogenetic glucoside, triacetoneamine, and acalyphine, an alkaloid. Additionally, Acalyphamide, other amides, 2-methyl anthraquinone, tri-O-methyl ellagic acid, sitosterol,  $\beta$ -sitosterol glucoside, stigmasterol, noctacosanol, quinine, tannin, resin, and essential oil are also found in the substance. The compound acalyphine, found in the plant *Acalypha indica*, is used for the treatment of inflamed gums (Bedon, 1982).

## Materials and Methods

Gathering Botanical Ingredients In the years 2022 and 2023, researchers in Jharkhand, India, gathered fresh plant samples from the dalma zone in East Singhbhum and the Saraikela-Kharsawan districts. The plant material was then ground into a coarse powder after being air dried.

### Phytochemical Testing

Our first step was to follow the steps outlined by Shanmugam et al. (2010) for the qualitative phytochemical screening.

- **Alkaloids Wagner's Test**

1 milliliter of diluted iodine solution (Wagner's reagent) is mixed with 1 milliliter of leaf extract. The development of reddish brown precipitates is a telltale sign of alkaloids.

- **Flavonoids Shinoda Test**

A little quantity of magnesium powder or filings and 8 to 10 drops of strong hydrochloric acid may be added to 1 milliliter of the extract. Allow to cool after simmering for 10–15 minutes. The presence of red coloring indicates the presence of flavonoids.

- **Steroids Libermann Burchard Test**

Pour 2 milliliters of concentrated H<sub>2</sub>SO<sub>4</sub> and 2 milliliters of acetic anhydride down the tube's sides into the extract. The development of a green hue is a telltale sign of the existence of steroids.

- **Glycosides Keller-Killani Test**

One drop of ferric chloride solution and one milliliter of strong sulphuric acid are added to five milliliters of glacial acetic acid with the extract. When cardiac glycosides are present, a brown ring will be seen at the interface.

- **Terpenoids Salkowski Test**

To 5 milliliters of extract, add 2 milliliters of chloroform and 3 milliliters of pure H<sub>2</sub>SO<sub>4</sub>. When terpenoids are present, a yellow ring will form at the junction of the two liquids; after two minutes, this ring will become reddish-brown.

- **Phenols Liebermann's Test**

Incorporate 1 milliliter of sodium nitrite, a small quantity of diluted sulfuric acid, and 2 milliliters of diluted sodium hydroxide into 1 milliliter of extract. Any hue that is rich in red, green, or blue is an indication of phenol's existence.

- **Tannins Modified Prussian Blue Test**

Combine 1 milliliter of the extract with 1 milliliter of potassium ferricyanide and 1 milliliter of iron chloride in 0.1 milliliters of hydrochloric acid. An apparent blue hue indicates the presence of tannins.

- **Saponis Forth Test**

After being heated in a water bath with 20 milliliters of distilled water, 2 grams of the powdered sample are filtered. A stable and durable foam is produced by vigorously shaking a mixture of 10 ml of filtrate and 5 ml of distilled water. The foaming is mixed with three drops of olive oil and shaken vigorously. You can see the emulsion being made, which will have a good effect.

## Result & Discussion

**Table 2: Preliminary Qualitative Phytochemical analysis of *Acalypha Indica L.* Medicinal Plant**

Phytochemicals Test	<i>Acalypha Indica L.</i>
<b>AL</b> (Alkaloids)	Presence(+)
<b>Fl</b> (Flavonoids)	Presence(+)
<b>St</b> (Steroids)	Absence(-)
<b>Gly</b> (Glycosides)	Presence(+)
<b>Ter</b> (Terpenoids)	Absence(-)
<b>Ph</b> (Phenols)	Presence(+)
<b>Tan</b> (Tannins)	Presence(+)
<b>Sap</b> (Saponins)	Presence(+)

The first qualitative phytochemical study of *Acalypha indica* L. indicates the presence of many bioactive components, such as alkaloids, flavonoids, glycosides, phenols, tannins, and saponins, but steroids and terpenoids are not present. The existence of these phytochemicals indicates that *Acalypha indica* L. likely has notable therapeutic characteristics, since these compounds are recognized for their involvement in diverse pharmacological activities such as antioxidant, anti-inflammatory, antibacterial, and cardioprotective actions. The lack of steroids and terpenoids suggests that the therapeutic activities of this plant are probably unrelated to these specific groups of chemicals. In conclusion, the existence of these many phytochemicals demonstrates the potential of *Acalypha indica* L. as a rich resource for creating natural medicinal substances.

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