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Phytochemical analysis of *Acalypha indica* Linn, and *Lantana indica* Linn., A valuable medicinal plants

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Abstract
The present paper deals with phytochemical studies in *Acalypha indica* belongs to the family of Euphorbiaceae is a slender climbing shrub. *A. indica* are used as emetic, expectorant, laxative, diuretic and for the treatment of bronchitis, pneumonia, asthma and pulmonary tuberculosis and *Lantana indica* belongs to family *Verbenaceae*, is a shrub. It has been used as a sudorific, intestinal antiseptic, diaphoretic and in the treatment of tetanus, rheumatism and malaria in the Ayurvedic system of medicine. The plant extracts were subjected to phytochemical analysis for screening of medicinal constituents. Valuable data has been collected pertaining to the presence of various phytochemicals like Alkaloids, Flavonoids, Phenols, Steroids, Tannins, Terpenoids, Anthraquinones, Carbohydrates**,** Saponins and Cardiac Glycosides was carried out which has provided information regarding the medicinal potential of the plant.

Keywords: *Acalypha indica*, *Lantana indica*, phytochemical analysis, qualitative analysis

Introduction
Medicinal and aromatic plants have been intimately linked with human health and culture since time immemorial. Plants have been an important source of food, Fibre and medicine for thousand years and still continue to be so. Plant-derived medicines constitute a substantial component of present day human healthcare system in industrialized as well as developing countries. Plant medicines are products of plant secondary metabolism and are involved in various aspects of plant interaction with its immediate association. World health organization estimates that approximately eighty percent of the developing world`s population meets their primary health care needs through traditional medicine (Ivanova *et al*., 2005) [1].

Among ancient civilizations, India has been known to be rich repository of medicinal plants. The forest in India is the principal repository of large number of medicinal and aromatic plants, which are largely collected as raw materials for manufacture of drugs and perfumery products. About 8,000 herbal remedies have been codified in AYUSH systems in INDIA. Ayurveda, Unani, Siddha and Folk (tribal) medicines are the major systems of indigenous medicines. Among these systems, Ayurveda and Unani Medicine are most developed and widely practised in India.

Plants have been used for medicinal purposes long before prehistoric period. Ancient Unani manuscripts Egyptian papyrus and Chinese writings described the use of herbs. Evidence exist that Unani Hakims, Indian Vedas and European and Mediterranean cultures were using herbs for over 4000 years as medicine. Indigenous cultures such as Rome, Egypt, Iran, Africa and America used herbs in their healing rituals, while other developed traditional medical systems such as Unani, Ayurveda and Chinese Medicine in which herbal therapies were used systematically.

The term “medicinal plant” includes various types of plants used in herbalism ("herbology" or "herbal medicine"). It is the use of plants for medicinal purposes, and the study of such uses. The word “herb” has been derived from the Latin word, *“herba”* and an old French word *“herbe”*. Now a day, herb refers to any part of the plant like fruit, seed, stem, bark, flower, leaf, stigma or a root, as well as a non-woody plant. Earlier, the term “herb” was only applied to non-woody plants, including those that come from trees and shrubs. These medicinal plants are also used as food, flavonoid, medicine or perfume and also in certain spiritual activities.

Various medicinal properties have been attributed to natural herbs. Medicinal plants constitute the main source of new pharmaceuticals and healthcare products (Jeyachanran *et al*., 2007) [2]. The history of plants being used for medicinal purpose is probably as old as the history of mankind. The use of medicinal plants in industrialized societies has been traced to the extraction and development of several drugs from these plants as well as from traditionally used folk medicine (Mandal *et al*., 2007) [3]. Extraction and characterization of several active phytocompounds from these green plants have given birth to some high activity profile drugs (Misra. 2009) [4]. The use of traditional medicine is wide spread in India (Sreekumar *et al*., 2007) [5]. A growing body of evidence indicates that plant secondary metabolites play a critical role in human health and may be nutritionally important. Herbal medicine has become popular in the treatment of many diseases due to the belief that plant derived medicine is safe, easily available and have lesser side effects. Due to this, the market and public demand has been so great that many medicinal plants today face either extinction or loss of genetic diversity (Thomson. 1978) [6]. The use of medicinal plants as a source for relief from illness can be traced back over five millennia (Jaures *et al*., 2013; Yaakob *et al*., 2014) [7, 8]. However, a large number of useful medicinal plants have not been exploited.

The plant *Acalypha indica* belongs to the family of Euphorbiaceae is a slender climbing shrub that grows to about 6 m high in marshy places (Venkataswamy *et al*., 2010) [9]. Mostly in the backyards of houses and waste places throughout the plains of India. Extracts of *A. indica*

are used as emetic, expectorant, laxative, diuretic and for the treatment of bronchitis, pneumonia, asthma and pulmonary tuberculosis. In homeopathy, the plant is used to treat severe cough associated with bleeding from lungs, haemoptysis and incipient phthisis (Singh *et al*., 1991) [10]. In the continuation of the strategy of new drug discovery, we studied the photochemical composition, antimicrobial and antioxidant activities of the *A. indica* methanol leaf extracts and its derivative fractions. The antimicrobial activities of medicinal plants can be attributed to the secondary metabolites such as alkaloids, flavonoids, tannins, terpenoids etc. that are present in the plant.

Lantana indica belongs to family *Verbenaceae*, is a shrub, native to India (Akhtar *et al*., 2006) [11]. It has been used as a sudorific, intestinal antiseptic, diaphoretic and in the treatment of tetanus, rheumatism and malaria in the Ayurvedic system of medicine (Verma *et al*., 1998) [12]. Essential oil obtained from the leaves of *L. indica* contains chemical compounds were trans-caryophyllene, α-selinene, globulol, trans-caryophyllene oxide, α-guaiene, valencene, humulene and β-eudesmene (Singh *et at*., 1990) [13]. *L indica* root contains, oleanolic acid, 3,24-dioxo-olean-12-en-28-oic acid, (+)-24-hydroxy-3-oxoolean-12-en-28-oic acid, 3-ketooleanolic acid, 3β,24-dihydroxyolean-12-en-28-oic acid (Bharathi *et al*., 2017) [14]. The present study deals with the phytochemical analysis of different plant parts of *Acalypha indica, Lantana indica* for the presence of Alkaloids, Flavonoids, Phenols, Steroids, Tannins, Terpenoids, Anthraquinones, Carbohydrates**,** Saponins and Cardiac Glycosides was carried out.

Materials and Methods

The use of plants for medicinal purpose is very old. The use of medicinal plants in the human kind has been traced to the extraction and development of several drugs from these plants as well as from traditionally used folk medicine. The secondary metabolites present in the plants play important role in human health and nutrition. The crude extracts of medicinal plants are more biologically active than isolated compounds due to their synergistic effects. In the present study, qualitative phytochemical analysis was carried out for the leafs extracts of *Acalypha indica* and *Lantana indica.*

Preparation of extracts

The leaf extracts of *Acalypha indica* and *Lantana indica* collected plant material was washed thoroughly in tap water, shade dried in open air separately (Fig:-1). Powder of the leaf is obtained by grinding them mechanically. About 100 gm of each dried powder of the plant were soaked separately in 100 ml of different solvents like methanol, ethanol, chloroform, pet ether and hot water in conical flasks and then subjected to agitation on a rotary magnetic shaker for about 72 hours. After three days the plant extracts were subjected to filtration, filtered with No 42 whatman filter paper separately (Fig:-2). Concentrated extracts was preserved in sterilized air tight labeled bottles and preserved in refrigerator at 4ºC until required for further use. The extract was filtered under reduced pressure using rotary flash evaporator and subjected for further preliminary phytochemical tests. Different tests conducted for the identification of phytochemicals is adopted by using the methods.

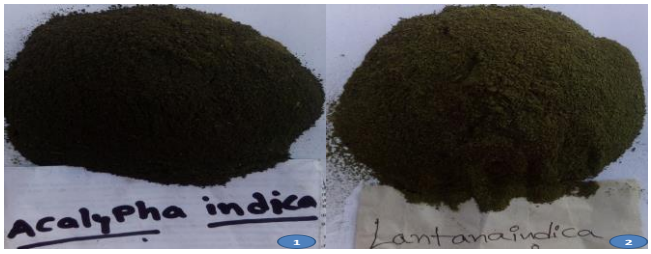

Fig 1: Dried leaf powred of 1. *Acalypha indica,* 2. *Lantana indica*

Fig 2: Dried leaf powder of 1. *Acalypha indica,* 2. *Lantana indica*

Qualitative phytochemical tests

Test for identification of Alkaloids: About 0.5 gm of extract was taken in a test tube and was diluted and homogenized with 10 ml distilled water, dissolved in 20 ml dilute Hcl solution and clarified by filtration. The filtrate was tested with Drangendroff's and Mayer's reagent. The treated solution was observed for precipitation of white or creamy colour.

Test for identification of Flavonoids: About 0.5 gm of extract was introduced into 10 ml of ethyl acetate in a test tube and heated in boiling water for 1 min. The mixture was then filtered. About 4 ml of the filtrate was shaken with 1 ml 1% aluminum chloride solution and incubated for 10 min. Formation of yellow colour in the presence of 1 ml dilute ammonia solution indicated the presence of flavonoids.

Test for identification of Phenols: About 0.5 gm of extract was taken in a test tube, mixed with 100ml distilled water and heated gently. To this, 2 ml of ferric chloride solution was added and observed for the formation of green or blue colour.

Test for identification of Saponins: About 0.5 gm of extract was taken in a test tube and 5 ml distilled water was added to it. The solution was shaken vigorously and observed for persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion.

Test for identification of Steroids: About 0.5 gm of extract was taken in a test tube and 2 ml of acetic anhydride was added to it and 2 ml of sulphuric acid was added by the sides of the test tube and observed for the colour change to violet or blue green.

Test for identification of Tannins: Five grams of the ground powder was extracted with 10 ml ammonical chloroform and 5 ml chloroform. The mixture was filtered and the filtrate was shaken with 10 drops of 0.5 M sulphuric acid. Creamish white precipitate was observed for the presence of tannins.

Test for identification of Terpenoids: 5 ml of the extract was mixed with 2 ml of chloroform and 2ml concentrated sulphuric acid to form a layer. A reddish brown coloration of the interface showed the presence of Terpenoids.

Test for identification of Cardiac glycosides: To 1ml of extract glacial acetic acid, few drops of ferric chloride and then finally concentrated sulphuric acid were added from the walls of the test tube. Appearance of the reddish brown at the junction of two layers and the bluish green colour in the upper layer indicates the presence of cardiac glycosides.

Test for identification of Anthraquinones: 5ml extract was boiled with 10ml of sulphuric acid and filtered while hot. The filtrate was shaken with 5ml of chloroform the chloroform layer was pipetted out into another test tube then 1ml of dilute ammonia is added. The resulting solution was observed for colour changes. The change in colour indicates the presence of anthraquinones.

Test for identification of carbohydrates: A few drops molischs solution was added to 2 mL of aqueous solution of the extract, there after a small volume of concentrated sulphuric acid was allowed to run down the side of the test tube to from a layer without shaking. The interface was observed for a purple colour as indicative of positive for carbohydrates.

Results and Discussion

In the present study, qualitative phytochemical analysis was carried out for the leafs extracts of *Acalypha indica* and *Lantana indica.*

Phytochemicals of *Acalypha indica* leaf extracts

Phytochemical screening of medicinal plants is very important in identifying new sources of therapeutical and industrial importance (Nadia *et al*., 2016) [15]. The present study contributes valuable information of bioactive compounds in *Acalypha indica leaf* extracts. Qualitative analysis of plant extract was carried out for Alkaloids, Flavonoids, Phenols, Steroids, Tannins, Terpenoids, Anthraquinones, Carbohydrates**,** Saponins and Cardiac Glycosides. All of the phytochemicals like Tannins, Phenols, Saponins, Alkaloids, Anthraquinones, Terpenoids, Steroids were presents and absent in flavonoids, Carbohydrates, Cardiac glycosides in leaf extract of methanol. Ethanol extracts of leaf *A. indica* present Tannins, Phenols, Saponins, Alkaloids, Anthraquinones, Cardiac glycosides, Terpenoids, Steroids were presents and absents in Flavonoids and Carbohydrates. Chloroform extracts of leaf *A. indica* present Tannins, Phenols, Saponins, Alkaloids, Anthraquinones, Flavonoids, Carbohydrates were presents and absents in Cardiac glycosides, Terpenoids, Steroids. Leaf extracts of Pet Ether *A. indica* present Tannins, Phenols, Saponins, Alkaloids, Flavonoids, Cardiac glycosides, Terpenoids, Steroids were presents and absents in Anthraquinones, Carbohydrates. Leaf extracts of Water *A. indica* present Tannins, Phenols, Alkaloids were presents and absents in Saponins, Flavonoids, Anthraquinones, Cardiac glycosides, Carbohydrates, Terpenoids, Steroids (Fig:-1; Table:-1). In the present study, alkaloids, Flavonoids, Steroids, Carbohydrates and Saponins are present in leaf extracts, which agrees with (Sudhakar *et al*., 2016; Prem kumar *et al*., 2016) [16, 17], which is similar to the reports of different medicinal plants (Mohan *et al*., 2014) [18].

Table 1: Phytochemicals of *Acalypha indica leaf* extracts

S. NO	Phytochemicals	Methanol	Ethanol	Chloroform	Pet Ether	Water
1	Tannins	+ *ve*	+ *ve*	- *ve*	+ *ve*	+ *ve*
2	Phenols	+ *ve*	+ *ve*	- *ve*	+ *ve*	+ *ve*
3	Saponins	+ *ve*	+ *ve*	+ *ve*	+ *ve*	- *ve*
4	Alkaloids	+ *ve*	+ *ve*	+ *ve*	+ *ve*	+ *ve*
5	Flavonoids	- *ve*	- *ve*	+ *ve*	+ *ve*	- *ve*
6	Anthraquinones	+ *ve*	+ *ve*	+ *ve*	- *ve*	- *ve*
7	Cardiac glycosides	- *ve*	+ *ve*	- *ve*	+ *ve*	- *ve*
8	Carbohydrates	- *ve*	- *ve*	+ *ve*	- *ve*	- *ve*
9	Terpenoids	+ *ve*	+ *ve*	- *ve*	+ *ve*	- *ve*
10	Steroids	+ *ve*	+ *ve*	- *ve*	+ *ve*	- *ve*

+ *ve* Present of the phytochemicals.
- *ve* Absent of the phytochemicals.

Phytochemicals of *Lantana indica leaf* extracts

Qualitative analysis of *Lantana indica* leaf extract was carried out for Alkaloids, Flavonoids, Phenols, Steroids, Tannins, Terpenoids, Anthraquinones, Carbohydrates**,** Saponins and Cardiac Glycosides. All of the phytochemicals like Tannins, Phenols, Terpenoids, Steroids flavonoids, and Cardiac glycosides were presents in leaf extract of methanol and absent in Saponins, Alkaloids, Anthraquinones, Carbohydrates. Ethanol extracts of leaf *L. indica A. indica* Tannins, Saponins, Alkaloids, Anthraquinones, Terpenoids, Steroids, Flavonoids, Carbohydrates were presents and absents in Phenols, Cardiac glycosides. Chloroform extracts of leaf *L. indica* Saponins, Alkaloids, Anthraquinones, Flavonoids, Carbohydrates were presents and absents in Tannins, Phenols, Cardiac glycosides, Terpenoids, Steroids. Leaf extracts of Pet Ether *L. indica* Tannins, Phenols, Saponins, Alkaloids, Cardiac glycosides, Terpenoids, Anthraquinones, Steroids were presents and absents in Flavonoids, Carbohydrates. Leaf extracts of Water *A. indica* present, Cardiac glycosides, Terpenoids, Steroids, Alkaloids were presents and absents in Tannins, Phenols, Saponins, Flavonoids, Anthraquinones, Carbohydrates (Fig:-2; Table:-2). The methanol, ethanol and aqueous leaf extracts of *Lantana indica* contains flavonoidal glycosides, carbohydrates, proteins, triterpenoids and tannins showed the antimicrobial activities, however reported in the present study which agrees with the findings of difference medicinal plants (Venkataswamy *et al*., 2010; Mohan *et al*., 2017; Shubha Gupta *et al*., 2016) [9, 20, 21].

Table 2: Phytochemicals of *Lantana indica leaf* extracts

S. NO	Phytochemicals	Methanol	Ethanol	Chloroform	Pet Ether	Water
1	Tannins	+ *ve*	+ *ve*	- *ve*	+ *ve*	- *ve*
2	Phenols	+ *ve*	-*ve*	- *ve*	+ *ve*	- *ve*
3	Saponins	- *ve*	+ *ve*	+ *ve*	+ *ve*	- *ve*
4	Alkaloids	- *ve*	+ *ve*	+ *ve*	+ *ve*	+ *ve*
5	Flavonoids	+ *ve*	+ *ve*	+ *ve*	- *ve*	- *ve*
6	Anthraquinones	- *ve*	+ *ve*	+ *ve*	+ *ve*	- *ve*
7	Cardiac glycosides	+ *ve*	- *ve*	- *ve*	+ *ve*	+ *ve*
8	Carbohydrates	- *ve*	+ *ve*	+ *ve*	- *ve*	- *ve*
9	Terpenoids	+ *ve*	+ *ve*	- *ve*	+ *ve*	+ *ve*
10	Steroids	+ *ve*	+ *ve*	- *ve*	+ *ve*	+ *ve*

+ *ve* Present of the phytochemicals.
- *ve* Absent of the phytochemicals.

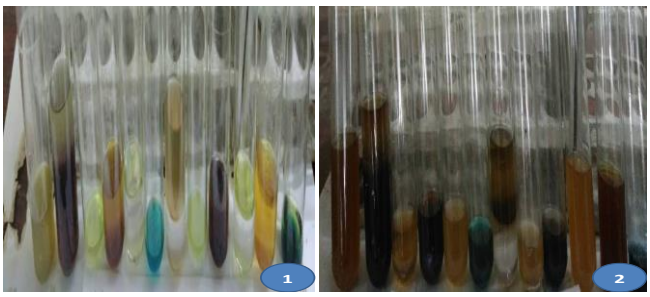

Fig 3: Phytochemical analysis tests of leaf extracts of 1. *Acalypha indica*, 2. *Lantana indica.*

Conclusion

It is concluded that *Acalypha indica* and *Lantana indica* is a plants with a variety of methanolic and ethnic medicinal uses. The qualitative analysis of *A. indica* and *L. indica* shows the presence of bioactive compounds such as Alkaloids, Flavonoids, Phenols, Steroids, Tannins, Terpenoids, Anthraquinones, Carbohydrates**,** Saponins and Cardiac Glycosides leaf extracts is also reported which is very important for the pharmaceutical industry. This is valuable information for preparation of drugs in pharmaceutical industry and stress the need for more intensive research in this medicinal plant since the compounds play a great role in healthcare.

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