Polygonal Activity of Acalypha Indica

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Abstract- *Medicinal plants have been used as remedies for many illnesses for a very long time all throughout the world. Acalypha Indica is a kind of plant with an inflorescence resembling catkins. It occurs throughout South Africa and tropical Africa, as well as in Yemen and Pakistan, India, and Sri Lanka. This plant is highly regarded in traditional Tamil Siddha medicine since it is recognized for its ability to revitalize the body. More than 3000 plants are formally recognized for their therapeutic use in India. Generally speaking, it is estimated that more than 6000 plants in India are utilised in conventional, human, peoples and natural medication. Acalypha indica extract was tested against various fungus and bacteria using different solvents like water, chloroform, ethanol, acetone, methanol and ethyl acetate.*

Keywords- Acaluypha indica, antibacterial actitivty, antifungal activity, zone of inhibitions, organisms strains.

I. INTRODUCTION

Acalypha indica is an weed plant which is commonly found in India, Africa, Pakistan,south east Asia, Yemen, Oceania, . In India, Sri Lanka, Western and conventional medicine both heavily rely on plant-based medicinal elements. The wide variety of bioactive chemicals that plants produce make them a great source of several types of medications. Extracts from the plant's leaves, roots, and stems are used medicinally to treat a wide range of conditions, including eye infections, respiratory issues, rheumatism, and skin issues, as well as to lower blood sugar levels. In order to extract the active ingredients from Acalypha indica, various extraction techniques like maceration, soxhlet apparatus extraction and fractional distillation. Generally soxhlet is highly preferred because of its accuracy, and efficacy, but phytochemical may degrade by thermal stress.

Herbal medicines are plays an important role to cure various diseases and physiological conditions in traditional methods such as Ayurveda, Siddha, and Unani . These methods are very convenient method to treat diseases depending upon the phytochemical content of the plant.

PLANT PROFILE

FIG 1 Acalypha indica
Scientific name: Acalypha indica (fig.1)

It is an small herb plant 30 to 120 cm in height with branched, deep-green, angular , hairy and deeply grooved stem ,2.5-6cm long, auxiliary inflorescence, 3 to8 cm long petioles, lite to dark green leaves, unisexual auxiliary spikes 3-7mm long flowers with capsule fruit.

TAXONOMY

Kingdom: Plantae
Unranked: Angiosperms
Unranked: Eudicots
Family: Euphorbiaceae
Genus: Acalypha
Species: Acalypha indica
Vernacular names
Sanskrit: Arittamanjarie
English: Indian acalypha
Telungu: kuppichettu; Harita-manjiri
Hindi : kupu; khokali
Tamil :kuppimeni

Vernacular names in other countries

Alcalifa :Brazil

Kuppimeni :India
Kupameniya :Srilanka

DISTRIBUTION:

Acalypha Indica is commonly grown in wet temperatures, and tropical areas along the equator cross-continental of Asia, Africa, Europe, and North America.

Indian people have documented the records of utilizing herbal medicines. In gulf countries, acalypha Indica is consumed as food.

ENTHOMEIDCAL PRACTICES

Some peoples in India consume plant leaves for their food since it is one of the parts of ayurvedic practices. In other countries the use of plant part treatment is very less. Acalypha Indica ethnomedical purposes can be divided into three parts: Root, stem, and leaves. In ethnomedical practices (64%) used their leaves, (24%) is used as a whole plant and roots(12%) .

Acalypha Indica is used to treat anthelmintic, anti-parasite, aphrodisiac, asthma, bronchitis, constipation, dermatology ailments, Diarrhea, Ear ache, Emetic, Epilepsy, Expectorant, Fever, Gum and teeth diseases, Headache, Hemorrhoids, Insect bites, laxative, Lower Blood sugar, Mouth ulcer, Pimples, Rheumatoid arthritis, Syphilic Ulcer and wound healing, While the single activity of the plant is less compared to combination effects.

PHYTOCHEMICAL STUDY

A Fresh plant of Acalypha Indica plant has a wide variety of nutrients like carbohydrates, proteins, vitamins, and lipids. This plant has high iron content followed by copper, zinc, and chromium which are used to treat patients for mineral deficiencies problems.

Table:1 PHYTO CHEMICAL CONTENT IN ACALYPHA INDICA LEAF FROM DIFFERENT PARTS (LEAF, ROOT, FLOWER)

Phyto chemical	Plant parts	References
Acalyphamide	Whole plant	Duke,2016
Acaindinin	Leaf	Ma et al.,1997
Acetonylgeraniin	Whole plant	Ma et al.,1997
Aurantiamide	Leaf	Raj etal.,2000
Caffeic acid	Whole plant	Muruganetal..,2015
Corilagin	Leaf	Ma et al.,1997
Cysteine	Whole plant	Hussain et al., 2013
Ferulic acid	Leaf	Murugan et al.,2015
Galic acid	Whole plant	Joy et al., 2010
Stigmasterol	Root	Raj et al., 2000
Resin	Leaf	Azmahani et al., 2002
Syringic acid	Root	Murugan et al., 2015
Tectoquinone	Whole plant	Duke., 2016
Triacetonamide	Leaf	Azmahani et al., 2002
3,3methylene bis(4-hydroxyl coumarin)	Root	Murugan et al., 2015

COLLECTION OF PLANT MATERIALS

1. The Acalypha Indica was collected and identified by institutes . this plant was washed with distilled water at two times to remove dust , soil and solid debris after that placed the plant into the oven a for overnight at 45ºc to dry then grind into powder from and stored in a well closed air tight container.
2. Acalypha indica was washed with pure waster and remove dirt and debris dry for 15 days at shed and grind it to fine powder and poured in well closed container.

EXTRACTION METHODS AND PROCEDURES:

Maceration technique:

Dry powder of Acalypha Indica powder was weigh and poured in the percolation tank and macerate for 3 days by using various solvents like, methanol, ethanol, acetone, chloroform etc.,

Soxhlet apparatus extraction techniques:

Weighed accurately of acalypha indica powder and poured into a muslin cloth and packed as a pouch and placed in a porous thimble and extract the plant by using different solvents depending upon the activity of the plant.

SCREENING

Detection of alkaloids

To small fraction of the various filtrates were separately stirred with a few ml and diluted with hydrochloric

acid and filtered it. The filtrate was examined using a number of alkaloid reagents, including Mayer's, Hager's, and Dragondroff's.

Test for Tannins

To the filtrate, add 2ml of gelatin solution formation of white precipitate .it indicates presence of tannins.

Test for flavonoids

Small portion of filtrates were dissolved in alcohol and treated with magnesium metal and then add concentrated hydrochloric acid. Formation of a Magenta colourwhich indicates the presence of flavonoids.

Test for saponins

A tiny amount of the filtrates was diluted with 20ml of distilled water and stirred for 15 minutes in a graduated cylinder. Formation of the foamy layer which indicates the presence of saponins.

Test for triterpenoids

To the filtrate one or two pieces of tin and three drops of thionyl chloride were added slowly, a violet or purple colour solution was formed this indicates the presence of triterpenoids.

Test for Anthroquinone

Take 2ml of the test solutionwith add magnesium and acetate solution. The result was observed it.

Test for catechol

Take 2ml of test solution of alcohol ass Erlich's reagent and add a few drops of concentrated hydrochloric acid and the result was observed it.

STUDY OF ANTIMICROBIAL ACTIVITY OF ACALYPHA INDICA

Preparation of plant extract

Acalypha indica leaves were washed and dried for 15 days at shed dry and made it into fine powder. The powder was subjected to solvent extraction by using the soxhlet apparatus. The powder sample was extracted 100g/200ml in Acetone, methanol, ethanol, chloroform, water, ethyl acetate, and hexane.

MATERIALS REQUIRED FOR ANTI-MICROBIAL ACTIVITY

- Plant extract
- Petri plates
- Agar media
- Cotton plug
- Cotton
- Scale
- Tissue paper
- Rubber bands
- Conical flask
- flame
- Paraffin marker
- Microbial culture
- Gel puncher
- Inoculation loops
- Micro pipettes
- Micro Tips
- Gel Puncher
- incubator
- laminar flow hoods
- Dionised water
- weigh balance
- autoclave
- Biological incubator
- T bend road

BACTERIAL STRAINS

The Dr. MGRMedical University Chennai, Tamil Nadu, Department of Microbiology provided the test organisms. This study looks at Gram-positive (Staphylococcus aureus, Staphylococcus epidermidis, Bacillus cereus, Streptococcus faecalis) and Gram-negative (Klebsiella pneumoniae, Escherichia coli, Proteus vulgaris, Pseudomonas aeruginosa) microorganisms.To maintain the stock culture as needed, the organisms were sub cultured on Mueller Hinton Agar medium slant, incubated at 37°C for 48 hours, and then kept 4 ºc at in the refrigerator.

ANTI-BACTERIAL ASSAY

DISC DIFFUTION METHOD

The antibacterial activity was tested by the disc-diffusion method. Petri dish plates were prepared with 20 ml of sterile Muller Hinton Agar. The test culture was swabbed by using a L-bent rod on the top of the solidified media and allowed to dry for 10 min. Three Concentrations of plant

extract were used in the studies (10mg,25mg and 50mg per disc). The loaded discs were positioned on the medium's surface and kept at room temperature for 30mins to allow compound diffusion. The appropriate solvent was used to prepare the negative control. At 37°C, streptomycin (10 mg/disc) and ampicillina standard drug were employed for 24 hours. The procedure was repeated by three times, and the zone of inhibition was measured in diameter.

FUNGAL STRAINS

The tested organisms which are supplied by the Department of Microbiology in SRM COLLEGE four organisms in fungi like Candida Albicans, Aspergillus niger, Candida tropicalis, Candida Kefr, auricularia species were subjected in this study. The organisms are transferred intoSabourd's Dextrose agar plates and sub cultured in Sabourd's Dextrose Broth slant and incubate at 40ºc, stock culture to be stored at 2-8ºc until as per need.

ANTI-FUNGAL ASSAY

DISK DIFFUSION METHOD

The fungus activity was tested by the Disk diffusion method. Petri dishes were prepared with 20 ml of sterile Sabourd's Dextrose Agar. The test culture was swabbed by using sterlized L- bent rod on the top of the solidified media and allows to dry for 10 mins. The three concentrations of plant extract were used in the studies (1.25mg/ml,2.5mg/ml,5mg/ml). The loaded discs were positioned on the medium surface and kept at -room temperature for 30 mins to allow compound diffusion. The appropriate solvent was used to prepare negative control at 35ºc ketaconazole is diluted with dimethyl sulfoxide and was impregnated onto sterile bank disc with a concentration of (10µg/ml). The zone of inhibition was measured in the diameter.

II. RESULTS AND DISCUSSION

Table 2 PHYTO CHEMICAL SCREENING

phytochemicals	Methanolic extract	Ethanolic extract	Acetone extract	Chloroform extract	Ethylacetate extract	Water extract
Alkaloids	++	++	+	-	++	+
Saponins	+	++	-	+	++	+
Flavonoids	++	++	+	+	+	+
Tannins	+	+	+	-	-	-
Anthroquines	+	+	-	-	++	-
Catachols	-	-	-	++	+	+
Triterpenoids	+	++	+	+	-	-

+ presence ++ most present - Absence

In the phytpochemical screening the plants has flavcnoids and alkaloids are more active in the anti-microbial activity the ethanolic and methanolic extracts give the large amount of products when compare with water and chloroform extract, ethyl acetate and acetone has median amount of product, overall alkaloids, saponins, flavanoids, tannins, antrhroqunonies, catachols and triterpenoids are present in the plants of acalypha indica the screening tests. The reports are shown in table-2

Table 3 ZONE OF INHIBITION WAS TESTED IN VARIOUS EXTRACT BY DISK DIFFUSION METHOD

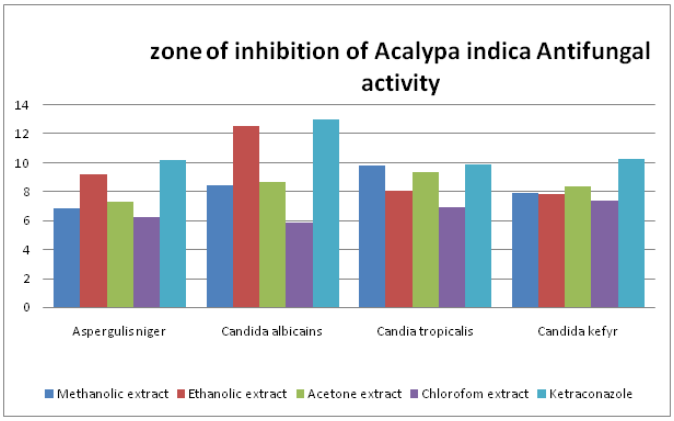
Extracts	Concentration (mg/disk)	Disk diffusion method (inhibition zone mm)a							
		S.a	S.e	B.c	S.f	K.p	E.c	P.v	P.a
Hexane	1.25	9.5	8.4	10.6	9.6	-	-	-	-
	2.5	10.7	10.0	11.0	10.5	-	-	-	-
	5	12.8	11.0	13.8	12.0	-	-	-	9.7
Chloroform	1.25	9.6	10.6	8.5	11.5	-	-	-	-
	2.5	11.5	12.5	10.0	12.6	-	-	-	-
	5	12.3	14.8	12.4	14.8	-	-	-	11.5
Acetone	1.25	11.8	9.0	11.6	10.7	-	-	-	-
	2.5	12.8	11.5	13.5	12.8	-	-	-	-
	5	14.6	13.8	15.0	15.0	-	-	-	10.0
Methanol	1.25	12.5	11.7	9.7	13.8	-	-	-	-
	2.5	13.6	12.5	11.8	15.4	-	-	-	-
	5	15.8	14.0	14.0	16.5	-	-	-	12.7
Ethanol	1.5	12.8	11.9	9.9	13.9	-	-	-	-
	2.5	13.9	12.8	11.9	15.5	-	-	-	-
	5	16.0	14.2	14.3	16.7	-	-	-	12.8
Streptomycin	10µg	14	-	12	13	-	12	-	11
Ampicillin	10µg	18	-	-	-	-	25	-	-

-, No activity; S.a, Staphyloccocus aureus; S.e, Staphylococcus epidermidis; B.c, Bacillus cereus; S.f Streptococcus faecalis; K.p, Klebsiella pneumonia; E.c, Escherichia coli; P.v Proteus Vulgaris; P.a Pseudomonas aeruginosa; streptomycin, control antibiotic a, Zones are the mean diameter of three replicates

The acalypha indica extract was tested against both gram positive and gram negative bacteria with different concentration by disk diffusion. The zone was formed within 18 to 24 hours the zone was formed the zone was compared with standard antibiotics streptomycin and ampicillin and documented. The report was shown in table-3.

Table 4 ZONE OF INHIBITION OF ANTIFUNGAL ACTIVITY OF ACALYPHA INDICA

Fungal culture	Methanol extract	Ethanol extract	Acetone extract	Chloroform extract	water	Ketaconazole
AspergillumNiger	6.88	9.21	7.33	6.23	-	10.23
Candida albicains	8.44	12.53	8.66	5.85	-	13.00
Candida tropicalis	9.82	8.03	9.36	6.89	-	9.90
Candida kefyr	7.90	7.85	8.34	7.36	-	10.30



The acalypha indica extract was tested against fungus by disk diffusion method with different extract the zone will be formed at 3-4 days the zone was observed the zone is compared with standard antibiotics and documented. The report was shown in table-4. *(Sudhakar Chekuri et al 2018)*

III. CONCLUSION

Acalypha indica was extractedwith acetone, methanol, ethanol, chloroform, water . extract was concentrated by using Rotaraty evaporator. These extracted was tested against bacteria and fungus with different concentration depending upon the organisms by disk diffusion method. The zone of inhibition was observed the ethanol extract and methanolextract gives better activity when compared will acetone, chloroform In both bacteria and fungus. The water extract and chloroform has least activity in all selected microorganisms.

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