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Research

Phytochemical Screening of Stems of Plants Acalypha wilkesiana, And Cordyline Terminalis Mahatma

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Abstract

The study aims to evaluate the qualitative analysis of *Acalypha wilkesiana* and *Cordyline terminalis mahatma* plant stems. Extract is prepared by Maceration for 48 hours using ethanol. The result obtained for ethanolic extract of *Acalypha wilkesiana* stem shown the presence of Alkaloids, Flavonoids, Tannins, Saponins, Glycosides. The result obtained for ethanolic extract of *Cordyline terminalis mahatma* stem shown the presence of Alkaloids, Tannins, Flavonoids, Saponins, Glycosides, Phenols, Terpenoids.

Keywords: Stems, Flavonoids, Alkaloids, Ethanol, Maceration.

INTRODUCTION

Acalypha wilkesiana

The genus Acalypha encompasses approximately 570 species with a significant portion being weeds while others serve as ornamental plants. It is also known as copper leaf or Irish petticoat, belongs to the family Euphorbiaceae. Native to the South Pacific islands, this plant possesses antimicrobial and antifungal properties. In traditional medicine, its leaves are consumed as vegetables, particularly in managing hypertension due to its diuretic properties and microbial infections.

Studies have demonstrated that the crude phenolic leaf extract of A.wilkesiana contains pharmacologically active compounds, supporting its traditional therapeutic applications against oxidative stress-related ailments, thereby presenting itself as a promising candidate for drug discovery. Acalypha, the fourth largest genus of Euphorbiaceae, encompasses fast-growing, ever green shrubs, trees, and annuals found in tropical to subtropical regions, particularly in Africa, the Americas, and Asia. While a significant portion of the Acalypha genus consists of weeds, others are cultivated as ornamental plants *Acalypha wilkesiana* (AW, a popular medicinal plant has used in traditional medicine to treat a variety of skin disorders including pityriasis versicolor and seborrheic dermatitis.)



Cordyline Terminalis

Cordyline terminalis, also known as Cordyline fruticosa and previously classified under Dracaena terminalis, belongs to the Agavaceae family. It is a significant ornamental plant native to tropical Asia, Australia, and the Pacific Islands, but it is now cultivated globally. The striking purple flowers of C.terminalis have traditionally been employed in the treatment of asthma and nasal growths, with the purple color hinting at the presence of anthocyanins. However, the phytochemical composition of the C.terminalis plant remains largely unexplored.

Cordyline terminalis Kunth, a member of the Liliaceae family, is an evergreen tropical perennial shrub characterized by terminal clusters of elongated leaves. It is primarily cultivated in Tropical Southeastern Asia, Australia, Hawaii, and Bangladesh. Traditionally, this plant has been utilized for various medicinal purposes, including the treatment of cardiovascular bleeding, indigestion, diarrhea, dysentery, skin infections, liver cancer, arthritis, neuritis, and traumatic injuries. Its leaves are particularly employed in addressing inflammation and urinary infections.

Cordyline terminalis are recognized worldwide for their attractive foliage colour, shape and their ability to reduce component of indoor air pollution and remove carbon (iv) oxide CO, which is correlated with lower work performance from indoor

Cordyline terminalis belongs to the family Agavaceae and are important plants widely used for interior decoration across the globe. They have upright multiple unbranched stems with rosettes of arching broad evergreen leaves which forms a heavy but graceful tropical clump.



MATERIALS AND METHODS

COLLECTION OF PLANT MATERIAL

- *Cordyline terminalis Mahatma* (Goodluck plant) stems were collected from Pulla Reddy Institute of Pharmacy, Domadugu (V), SangaReddy (D), Telangana, India.
- *Acalypha wilkesiana* (Copper leaf) stems were collected from PullaReddy Instituite of Pharmacy, Domadugu(V),SangaReddy(D),Telangana,India.

CHEMICALS: Chemicals used in the present studies are Ethanol, Hager's reagent, Wagner's reagent etc., Sodium hydroxide, dil.HCl, 2% $FeCl_3$, chloroform, bromine solution etc..

REQUIREMENTS: Stems of plants *Cordyline terminalis mahatma* and *Acalypha wilkesiana*.

DRYING OF STEMS

- Collected stems are air dried for 3-4 days, until powdery consistency is obtained.
- Extraction: It is defined as process of isolation of soluble material from an insoluble residue by treating with a solvent.
- Extraction method used here is **Maceration technique.**

MACERATION: The process of extraction in which powdered size reduced drug is soaked in suitable solvent or mixture of solvents till the solvent penetrates into the drug is called Maceration.

The process of maceration is as follows:

Plant material (crushed or cut small or moderately coarse powder) placed in a closed vessels

↓

Whole of the selected solvent (Menstruum) is added allowed to stand for 7 days shaking occasionally
Liquid strained off

↓

Solid residue (marc) pressed (recover as much as occluded solution) strained and expressed liquids mixed
Clarified by subsidence and filtration

↓

Evaporation and concentration.

ALKALOIDS

Hager's Test: For this test procedure, a few drops of Hager's reagent (saturated picric acid solution) should be added to 2 ml of the respective plant extract. The formation of a bright yellow precipitate indicates the presence of alkaloids.



Dracaena terminalis mahatma



Acalypha wilkesiana

Wagner's Test: To a few ml of the filtrate, add 1 or 2 ml of Wagner's reagent alongside the test tube. A distinct brown or yellow precipitate signifies a positive test result.





Mayer's Test: Few drops of Mayer's reagent were added to 1 ml of extract.A yellowish or white precipitate was formed, indicating the presence of alkaloids.

Dragendorff 's test: By adding 1 ml of Dragendorff"s reagent to 2 ml of extract, an orange red precipitate was formed, indicating the presence of alkaloids.

FLAVONOIDS

Sodium Hydroxide Test: Add two to three drops of sodium hydroxide to 2ml of the extract. Initially, observe a deep yellow color, which can be rendered colorless by the addition of a few drops of dilute hydrochloric acid (HCl), indicating the presence of flavonoids.





Dracaena terminalis mahatma **Acalypha wilkesiana**

Shinoda's Test: About 0.5 of each portion was dissolved in ethanol, warmed and then filtered.Three pieces of magnesium chips was then added to the filtrate followed by few drops of conc HCl. A pink, orange, or red to purple coloration indicates the presence of flavonoids.

Lead-acetate Test: To perform the test, introduce a few drops of an aqueous basic lead acetate solution into 1ml of the alcoholic extract within a test tube. If the formation of a reddish-brown voluminous precipitate occurs, it signifies the presence of flavonoids.

TANNINS

Ferric chloride test

Add a few drops of 2% $FeCl_3$ to the test tube containing the crude extract. Confirm the presence of tannins by observing the development of a blue-green color.



Dracaena terminalis mahatma

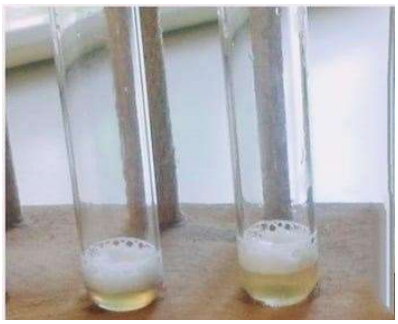


Acalypha wilkesiana

SAPONINS

FoamTest

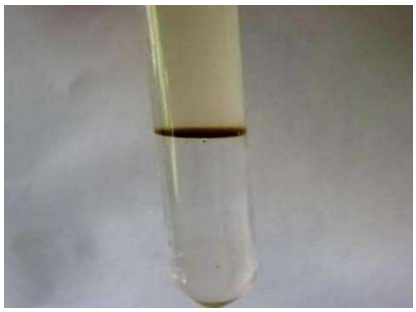
Dilute 1 ml of the extract solution with distilled water to 20 ml and shake the mixture in a graduated cylinder for 15 minutes. The formation of stable foam indicates the presence of saponins in both the plants as shown in the figure below.



Lead-acetate Test: The 1 ml extract was subjected to treatment with a 1% lead acetate solution. The detection of the formation of white precipitates serves as an indication of the presence of saponins.

GLYCOSIDES

Keller-Kiliani Test: Mix a solution of glacial acetic acid (4.0 ml) with 1drop of a 2.0% $FeCl_3$ mixture, 10ml of the aqueous plant extract, and 1ml of concentrated H_2SO_4. Observe the formation of a brown ring between the layers, indicating the presence of cardiac steroidal glycosides in *Acalypha wilkesiana.*



BORNTRAGER'S TEST

- Mix 1 gram of the drug with 5-10 ml of dilute HCl. Boil on a water bath for 10 minutes and filter. Extract the filtrate with CCl_4/ benzene, add an equal amount of ammonia, and shake. Observe the ammonical layer for the formation of a pink or red color, indicating the presence of an anthraquinone moiety.
- Cordyline terminalis mahatma shows the presence of Anthraquinone Glycosides where as Acalypha wilkesiana shows the presence of Cardiac glycosides.

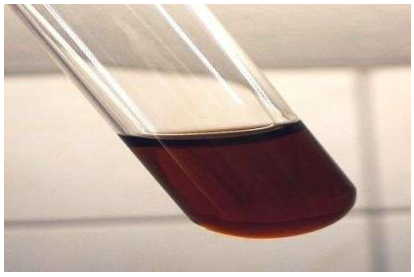
PHENOLS

Ferric chloride Test: To 1 ml of the filtrate, add a few drops of $FeCl_3$. The emergence of a dark green color signifies the presence of phenols in Cordyline terminalis mahatma



TERPENOIDS

Salkowski test: 5 ml extract was mixed with 2 ml of chloroform, and 3ml of concentrated sulfuric acid was cautiously added to form a layered structure. A positive result for the presence of terpenoids was indicated by the formation of a reddish-brown coloration at the interface. Terpenoids are found in Cordyline terminalis mahatma.



Liberman-Burchard Test: Extract is mixed with acetic anhydride, and concentrated sulfuric acid is added. This creates two layers with browning at the junction. The upper green layer indicates the presence of steroids, while the lower layer signifies the presence of terpenoids.

RESINS

One ml of various solvent extract were treated with few drops of acetic anhydride solution followed by 1 ml of conc. H_2SO_4. Resins give colouration ranging from orange to yellow.

CARBOHYDRATES

Molisch's Test: Add few drops of Molisch's reagent to the extract dissolved in distilled water.1 ml of conc. H_2SO_4 is added by the side of the test tube then allow the mixture to stand for two minutes. Dilute with 5 ml of distilled water. Formation of a red or dull violet color at the inter phase of the two layers indicates the presence of carbohydrates.

FIXED OILS

Add 0.5 N Alcoholic Potassium Hydroxide to the extract. Then add a drop of Phenolphthalein followed by heating on water bath for 1-2 hrs. The formation of soap or partial neutralization of alkali indicates the presence of Fixed oils.

RESULTS AND DISCUSSION

Phytochemical screening of plants *Cordyline terminalis mahatma* and *Acalypha wilkesiana* using ethanol as solvent the extract shown the following results.

S.No	Cordyline terminalis mahatma	Acalypha wilkesiana
Alkaloids	+	+
Flavonoids	+	+
Tannins	+	+
Saponins	+	+
Glycosides	+	+
Phenols	+	-
Terpenoids	+	-
Resins	-	-
Carbohydrates	-	-
Fixed oils	-	-

CONCLUSION

Conclusion of the study of phytochemical screening of stems of plants Cordyline terminalis mahatma and Acalypha wilkesiana reveals that Cordyline terminalis mahatma shows the presence of Alkaloids, Flavonoids, Tannins, Saponins, Phenols, Anthraquinone glycosides and Terpenoids. Acalypha wilkesiana shows the presence of Alkaloids, Flavonoids, Tannins, Saponins and Cardiac glycosides.

REFERENCES

1. Adesina SK, Idowu O, Ogundaini AO, Oladimeji H, Olugbade TA, Onawunmi GO, Pais M. Antimicrobial constituents of the leaves of Acalypha wilkesiana and Acalypha hispida. Phytotherapy Research. 2000 Aug;14(5):371-4.https://onlinelibrary.wiley.com/doi/abs/10.1002/1099-1573(200008)14:5%3C371::AID-PTR625%3E3.0.CO;2-F
2. Adesina SK, Idowu O, Ogundaini AO, Oladimeji H, Olugbade TA, Onawunmi GO, Pais M. Antimicrobial constituents of the leaves of Acalypha wilkesiana and Acalypha hispida. Phytotherapy Research. 2000 Aug;14(5):371-4.https://onlinelibrary.wiley.com/doi/abs/10.1002/1099-1573(200008)14:5%3C371::AID-PTR625%3E3.0.CO;2-F
3. Madziga HA, Sanni S, Sandabe UK. Phytochemical and elemental analysis of Acalypha wilkesiana leaf. Journal of American Science. 2010;6(11):510-4.
4. Kingsley O, Marshall AA. Medicinal potential of Acalypha wilkesiana leaves. Advances in Research. 2014 Jul 2;2(11):655-65. http://geographical.go2journals.com/id/eprint/2179/
5. Oguoma OM, Igwe CU, Nwaoguikpe RN, Asiwe ES. Chemical Characterization of Crude Phenolic Leaf Extract of Acalypha wilkesiana. https://doi.org/10.52403/ijrr.20230340
6. Quds T, Ahmed S, Ali MS, Onocha PA, Azhar I. Antiemetic activity of Acalypha fimbriata Schumach. &Thonn., Acalypha ornate Hochst., and Acalypha wilkesiana cv. Godseffiana Muell Arg. Phytopharmacol. 2012;3:335-40.
7. Gilman EF. Acalypha wilkesiana. University of Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, EDIS; 2003. https://scholar.archive.org/work/r6p6b3kpozhd5m45lyhzs7yvby/access/wayback/https://journals.flvc.org/edis/article/download/113347/108523
8. Katibi OS, Aboh MI, Salawu AO, Kola-Mustapha A, Olatunji LA. Anti-fungal activity of Acalypha wilkesiana: A preliminary study of fungal isolates of clinical significance. African Journal of Infectious Diseases. 2022;16(1):21-30. https://www.ajol.info/index.php/ajid/article/view/246636
9. Adaku C, Skaar I, Byamukama R, Jordheim M, Andersen ØM. Anthocyanin profile and antioxidant property of anti-asthma flowers of Cordyline terminalis (L.) Kunth (Agavaceae). Natural Product Communications. 2020 May;15(5):1934578X20922637. https://journals.sagepub.com/doi/abs/10.1177/1934578X20922637
10. Firoj Ahmed FA, Das PK, Islam MA, Rahman KM, Rahman MM, Selim MS. Antibacterial activity of Cordyline terminalis Kunth. leaves. J.Med.Sci.2003; 3(5-6):418-422. https://www.cabidigitallibrary.org/doi/full/10.5555/20043064359
11. Olosunde OM, Adeleke AM, Amusat AS, Ogundiran OB. Growth response of Dracaena fragrans and Cordyline terminalis to growing medium. International Journal of Agri Science. 2014;4(12):525-530. https://www.cabidigitallibrary.org/doi/full/10.5555/20153325884
12. Shankar S, Settu S, Segaran G, Sundar RD, Ravi L. Phytochemical constituents of Dracaena mahatma leaves and their anti-bacterial, anti-oxidant and anti-inflammatory significance. Biotechnology Research and Innovation. 2018 Jan 1;2(1):1-8.

https://www.sciencedirect.com/science/article/pii/S2452072118300248