



A review on important medicinal plant and uses in *Acalypha Indica* Linn

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Abstract

Euphorbiaceae is an important family which contains numerous medicinal plants. Most of the people in developing countries still today, relies on traditional medicine based largely on species of plants in human being and animals for their primary health care. The family Euphorbiaceae is one of the largest family of flowering plants comprising of plants with over 300 genera and 800 species. *Acalypha indica* important plant of this family, because these plants have different compounds, steroids, alkaloids that have showed different activities in human being and animal.

Keywords: Medicinal plant, flavonoid, *Acalypha indica*, euphorbiaceae, phenolic compounds

Introduction

Plants for human health care still remain the most widely used medication system in developing and least developed nation. Population rise, insufficient supply of drugs, unaffordable cost of treatments, side effects of several allopathic drugs and development of resistance to currently used drugs for diseases have led to increased emphasis on the use of plant materials as a source of medicines for wide variety of human ailments [1]. Different types of plants used to treat various types of diseases that reveals the most up to date findings in understanding of biological significance of their bioactive compounds used [2].

Despite all the progress in synthetic chemistry and biotechnology, plants are still in an indispensable source of medicinal preparations both preventive and curative. World health organization consultative body of medicinal plants have formulated a definition of medicinal plants in the following way, a medicinal plant is any plant which in one or more of its organ, contains substances that can be used for therapeutic purposes or which is a precursor for synthesis of useful drugs [3]. Medicinal plants, also called medicinal herbs, include a various types of plants used in herbalism and some of these plants a medicinal activities. These medicinal plants are considered as a rich resources of ingredients which can be used in drug development and synthesis [4].

Medicinal Uses of *Acalypha Indica*

Acalypha indica plant leaves used to treat cough, earache, headache, syphilitic ulcer, anti parasiticide, constipation, rheumatoid, pneumonia, emetic [5, 6, 7, 8]. The juice from the whole plant is used to treat bronchitis, snakebites, pneumonia [9, 10]. Besides the plant leaves were made into paste alone and used to treat many ailments which include dermatological problems, wounds, chest pain, burns, snake bite and itching where as the root paste applied to alleviate fungal infections, while total plant paste used against diuretic, constipation, skin problems, severe cough [11, 12]. Also, leaves were used to prepare a decoction for the treatment of asthma, intestinal lavage, cough, dysentery, cold, liver and kidney cleaning, as laxative, against intestinal worms and for stomach-ache [13]. Other parts of this plant like the stem prepared as a decoction against

haemorrhoids. A decoction from the entire plant ingested to treat earache, toothache, burns and wheezing [14]. Along with juice, paste and decoction, the other sources also practiced which include infusion, sap and powder [15].

Analgesic Activity

Acalypha indica has analgesic properties as proven by [16]. Conducting *in vivo* studies on mice. They used a writhing reflex method developed by [17]. To determine the analgesic activity of the *Acalypha indica* hexane extract. Acetic acid was used to induce pain right after the extract was orally administered to the mice. The injection of acetic acid will cause trauma to the whole body in two phases, the first phase will release serotonin and histamine while the second phase will involve prostaglandins in the inflammatory exudates in plant extract [18]. The anti-inflammation, antioxidant and phytochemicals in the fresh plant may be responsible for this inhibition.

Anti Cancer Activity

Acalypha indica plant extract also has the ability to become an anticancer plant as reported by [19]. Three types of cancer cell lines have been tested with *Acalypha indica* leaf extracts including KB – oral cavity cancer, MCF7 – breast cancer and PC3 human prostate cell cancer. In addition, a recent study has revealed the quercitol could participate in several important mechanisms as potential anti-cancer drugs via arrest or reverse pathways [20].

Antidiabetic Activity

Acalypha indica has potential as an anti diabetic activity when the plant is used in the treatment [21]. The whole plant of *Acalypha indica* can be used as an herb for antidiabetic activity. In their practice, the *Acalypha indica* roots alone is used to treat high blood sugar levels, whereas in the studies, the whole plant has proven to be high effective. This is possible due to the root containing small amount of cyanogenic secondary metabolites compared to the aerial part [22].

Anti Inflammatory Activity

Acalypha indica plant extract can be have as an anti-inflammatory medicine in the human body [23]. Identified

this activity of the *Acalypha indica* in the long even rats by using ethanolic extract. The ethanolic extract exhibited similar results to the standard drug used in the experiment. The flavanols inside *Acalypha indica* like standard drug quercetin also played a key role as a potential anti obesity drug [24].

Anti Ulcer Activity

These are phytochemicals in the methanolic extract of *Acalypha indica* that are capable of inhibiting ulcer activity based on the treatment of the swiss albino rats [25]. They identified the ulcer inhibition activity by studying the reaction of pylorus ligation and swiss albino rats. The comparison between extract and standard showed that *Acalypha indica* plant extract has anti ulcerogenic properties since the different value is small. Major secondary metabolites in the extract such as the alkaloid and steroid provide basic information for anti-ulcer activity [26].

Wound Healing Activity

Acalypha indica has wound healing property in whole plant. The healing mechanism of *Acalypha indica* plant extract which has fair wound healing properties and poor tensile strength, thus lowering the maturation rate of collagen [27].

Anti Viral Activity

Acalypha indica methanolic extracts was tested against two types of virus that is herpes simplex virus types and vesicular stomatitis virus on the He La cells. further studies is required with different virus species to gather more information related to *Acalypha indica* plant that can act as an anti-viral agent.

Anti Venom Activity

The anti venom activity derived from *Acalypha indica* can treat with *Daboia russelii* venom. The anti oxidant activity of the different extracts of *Acalypha indica* is one of the mechanism of venom inactivation and inhibition [28]. The *Daboia russelii* snake is found in Asian countries especially in India, Sri Lanka, Bangladesh, Myanmar and Nepal [29].

Anti Oxidant Activity

There are three types of assays used for antioxidant measurements for measuring the antioxidant activity. The whole *Acalypha indica* plant has antioxidant activities, especially the phytochemicals from semi-polar, polar and non polar groups [30].

Anti Obesity Activity

Obesity is one of the significant peril factors for metabolic disorder and syndrome of energy balance and basically well thought out as a disarray of lipid metabolism, which includes hypertension and hyperlipidaemia potentially leading to type 2 diabetes mellitus, non alcoholic fatty liver diseases and cardio vascular diseases [31]. The ethanolic extract exhibited similar results to the standard drug used in the experiment. The flavanols inside *Acalypha indica* like standard drug quercetin also played a key role as a potential anti obesity drug [32].

Anti Bacterial Activity

Most therapeutic studies that have been reported on *Acalypha indica* are related to the anti-bacterial activities. There is conflict when identifying the in habitation method,

positive and negative controls and experiment preparation methods because the studies differ from one another [33].

Anti Fungal Activity

Aspergillus flavus, *Aspergillus Niger*, *Candida albicans*, *Candida glabrata*, *Candida tropicalis* and *Penicillium chrysogenum* have been used to test whether *Acalypha indica* has an anti fungal activity or not these tests were conducted [34, 35]. The phenols and flavonoids in *Acalypha indica* are expected to be the source of anti fungal activity based on the previous studies [36]. for anti Fungal activity, extraction from water like a decoction is recommended since fungi are affected by any phytochemical drugs. flaw of the whole plant is suggested to treat Fungal infections in the human body [37].

Conclusion

The consumption of *Acalypha indica* as an ethnomedicinal herb has been discussed and identified with relevant pharmacological studies and phytochemical contents. The plant is applicable for treatment depending on the therapeutic treatments are as anti-cancer, antiinflammatory, anthelmintic, antibacterial, antidiabetes, antihyperlipidemic, antiobesity and antivenom and wound healing properties. The pharmacological study of the *Acalypha indica* and various phytochemical compounds responsible for it which have been reported. The whole plant of *Acalypha indica* have been used in conventional medicine and traditional medicine for decades and the studies done yet have intensified the medical practices. However, more clinical and pathological studies as needed to conducted to investigate the unexploited potential of the plant.

References

1. Betancur Galvos LA, Morates GF, Forero JE, Roldan J. Cytotoxic and antiviral activities of Colombian medicinal plant extracts of the euphorbia genus. *Memorias do instituto Oswaldo cruz*,2002;97(4):541-546.
2. Gillespie LJ, Armbruster WS. A Contribution to the *Guianan Flora, Dalechampia, Haematostemon, Omphalea, Pera, Plukenetia, and Tragia* (Euphorbiaceae) with notes on Sub family "*Acalypha indica*". Smithsonian contributions to Botany,1997;86:6-7.
3. Davidson Hunt I. Ecological ethnobotany: stumbling toward new practices and paradigms. *MASAJ*,2000;16:13-14.
4. Kumar S, Malhotra R, Kumar D. *Euphorbia hirta*: Its chemistry, traditional and medicinal uses, and pharmacological activities. *Pharmacognosy Reviews*,2010;4(7):58-61.
5. Helton LR. Folk medicine and health benefits: and Application perspective. *J cult divers*,1996;3:123-128.
6. Stone BC. The Flora of Guam. A manual for the identification of the vascular plants of the Island. *Micronesia*,1970;6:1-659.
7. Bagul RM. Status report on wild medicinal plants of satpuda forest east Maharashtra India. Lulu Publication, 2016.
8. Jayaprakash R, Ravi TK. Evaluation of anti-arthritis activity of the root extract of *Acalypha indica* Linn. Using *in vitro* techniques. *Int. J. Phytopharm*,2012;2:169-173.

9. Hada BS, Katewa SS. Ethnomedicinal plants used against various diseases in Jhalawar district of Rajasthan, India. *Journal of Global Biosciences*,2015;4:2077-2086.
10. Pushpangadan P, Atal CK. Ethnomedicinal botanical investigations in Kerala. Some primitive tribals of western ghats and their herbal medicine. *J. Ethno pharmacol*,1984;11:59-77.
11. Bushra R, Asiam N. An overview of clinical pharmacology of Ibuprofen. *Oman med J*,2010;25:155-161.
12. HO RB. Antioxidant role of geraniin in lipid peroxidation of human LDL. *Journal of life sciences*,2004;4:180-187.
13. Saha R, Ahmed A. Hypoglycemic Effects of *Acalypha indica* Linn. Plant extracts on streptozotocin induced diabetes in rat. *IJPSR*,2011;2:2934-2937.
14. Majulatha K. Comparative study of leaves and roots ethanolic extracts of *Acalypha indica* on peptic ulcers induced by physical and chemical agents in rodents. *URI. Phytomedicine*,2013;1:19-25.
15. Malathi R, Ganesan V. Environmental benign route in the synthesis of palladium nano particles using leaves of *Acalypha indica* L. *Int J Pharm Bio Sci*,2015;6:603-610.
16. Vogel H. Drug discovery and evaluation pharmacological assays. Springer science and business media, 2007.
17. Crunkhorn P, Meacock S, Singh V. Mediators of the inflammation induced in the rat paw by carrageenin. *Br. J. Pharmacol*,1971;42:392-402.
18. Junior A, Zanil C. Biological screening of Brazilian medicinal plants. *Braz. J. Sci. P*, 2000, 367-373.
19. Mc Diarmid RW, Campbell JA, Toure T. Snake species of the world, a taxonomy and geographic reference,1999;1:12-14.
20. Ali AM, Mackeen MM, El Sharkawy SH, Abdul Hamid J, Ismail NH, Ahmad F, *et al.* Antiviral and cytotoxic activities of some plants used in Malaysian indigenous medicine. *Pertanika journal of Tropical Agricultural science*,1996;19:129-136.
21. Reddy JS, Rao PR, Reddy MS. Wound healing effects of *Heliotropium indicum*, *Plumbago zeylanicacum* and *Acalypha indica* rats. *J. Ethnopharmacol*,2002;79:249-251.
22. Ibrahim AM. *In vitro* evaluation and wound healing cream formulation of *Acalypha indica* Linn ethanolic extract, Department of Biosciences and Health Sciences. University Teknologi Malaysia, 2016.
23. Ganeshkumar M, Ponrasu T, Krithika R, Iyappan K, Gayathri US, Suguna L. Tropical application of *Acalypha indica* accelerates rat cutaneous wound healing by up-regulating the expression of type I and III collagen. *J. Ethnopharmacol*,2012;142:14-22.
24. Naik R, Nemani H, Pothani S, Pothana S, Satyavani M, Qadri SS, *et al.* Obesity-alleviating capabilities of *Acalypha indica*, *Pergularia demia* and *Tinospora cardifolia* leaves methanolic extracts in WNIN/QR-ob rats. *Journal of Nutrition and intermediary metabolism*,2019;16:P.100090.
25. Rao R. Traditional knowledge and sustainable development. Key role of ethnobiologists. *Ethnobotany*,1996;8:14-24.
26. Martin GJ. Ethnobotany – A People and plants conservation manual. Parthenon publishing group casterton hall, Carnforth Lancashire, England, 1995.
27. DineshKumar B, VingenshKumar P, Bhuvaneshwaran S, Analara M. Phytopharmacology of *Acalypha indica*: A Review. *International journal of Biosciences, Alternative and Holistic Medicine (IJBSAHM)*,2000;1:27-32.
28. Sivasankari B, Anandharaj M, Gunasekaran P. An ethnobotanical study of indigenous knowledge on medicinal plants used by the village people Thoppampatti, Dindigul district. Tamilnadu, India. *J. Ethnopharmacol*,2014;153:408-423.
29. Savithramma N, Sulochana C, Rao K. Ethnobotanical Survey of plants used to treat asthma in Andhra Pradesh, India. *J. Ethnopharmacol*,2007;113:54-61.
30. Scaffidi A, Alagar D, Bohrab B, Ghisalberti EL, Flematti G. Identification of the cat attractants Isodihydronepetalactones and isoiridomyrmecin from *Acalypha indica*. *Aust. J.chem*,2013;69:169-173.
31. Joy B, Mathew M, Awaad A, Govil J, Singh V. Anti-Oxidant studies and chemical investigation of ethanol extract of *Acalypha indica* Linn. *Drug plants*,2010;1:261-279.
32. Sanseera D, Nieatananum W, Liawruangrath B, Liawruangrath S, Baramee A, Trisuwan K, *et al.* Anti oxidant and anticancer activities from aerial parts of *Acalypha indica* Linn. Chiangmai University. *Journal of Natural Sciences*,2012;11(2):157-168.
33. Rahman MA, Bachar SC, Rahmatullah M. Analgesic and anti inflammatory activity of *Acalypha indica* Linn. *Pak. J. Pharm. Sci*,2010;23:256-258.
34. Wang D, Zhang S, Chang Z, Kong DX, Zuo Z. Quercitol: Global status and basic research. *Natural products and Bio Prospecting*, 2017, 1-10.
35. Hungeling M, Lechtenberg M, Fronczek FR, Nahrstedt A. Cyanogenic and non cyanogenic pyridine glucosides from *Acalypha indica* (Euphorbiaceae). *Phytochemistry*,2009;70:270-277.
36. Sakthi SS, Geetha M, Saranraj P. Pharmacological screening of *Daturametel* and *Acalypha indica* for its antifungal activity against pathogenic Fungi *International Journal of pharmaceutical science and health care*,2011;2:15-30.
37. Soruba E, Vickram S, Ramesh Pathy M, Karikan K, Balasundaram S. Anti oxidant anti bacterial and anti inflammatory activity of *Acalypha indica* and *Terminalia chebula*. An *In-vitro* analysis. *Research journal of pharmaceutical, Biological and chemical sciences*,2015;6:180-182.