A brief lightening on medicinal activity and Pharmacological profile of plant Eclipta prostrata: A Review.

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Abstract: The aim of this study focused on the pharmacological profile of the plant Eclipta prostrata. These activities are wound recuperating, antihyperglycaemic, Alopecia, Hepatoprotective, gum disease, Immunomodulator, cancer prevention agent, hostile to diabetic, antidote venom, Osteoprotective, antidepressant, antibacterial, hostile to HIV, anticancer, cytotoxic and so forth. EcliptaProstrata is little expanded yearly herbaceous plant with an antiquated time conventional drugs utilizes in numerous nations particularly in tropical and subtropical districts. An assortment of synthetic aggravate that are available in various parts of plant including coumestans, alkaloids, thiopenes, flavonoids, polyacetylenes, triterpenes and their glycosides have been confined from this species. This commitment gives a complete survey on pharmacological profile as the therapeutic plant.

Keyword: Review Eclipta prostrata, Pharmacological activity E. prostrata, Eclipta prostrata.

Introduction

Eclipta prostrata normally known as false daisy, yerba de tago, Karisalankanni, and bhringraj, is types of plant in the sunflower family. It is far reaching crosswise over a great part of the world. This plant has round and hollow, grayish roots. The single blossom heads are 6–8 mm (0.24–0.31 in) in width, with white florets. The achenes are compacted and barely winged. This species develops normally in wet places in warm calm to tropical regions around the world. It is broadly circulated all through India, Nepal, China, Thailand, and Brazil. [1] The plant has conventional uses in Ayurveda. It is unpleasant, hot, sharp, and dry in taste. In India, it is known as bhangra or bhringaraj. Wedelia calendulacea is known by similar names, so the white-blossomed E. alba is called white bhangra and the yellow-bloomed W. Calendulacea is called yellow bhangra. [2] Eclipta prostrata contains different phytochemicals, for example, coumestans, polypeptides, polyacetylenes, thiophene subordinates, steroids, sterols, triterpenes, and flavonoids. [3] A much branched, variable, prostrate, ascending or erect, rough-hairy annual herb, upto 90 cm tall with slender, reddish stems covered with short, stiff hairs, rooting at the lower nodes. Flowers throughout the year, a quantitative short-day plant abundant seeders. [4]
Leaves are inverse, basic, harsh, dull green, praise to elliptical lanceolate, 2-10 cm long, 1-3 cm wide, zenith intense or gruff, base lessen, edge whole or somewhat serrate, pubescent, for the most part sessile, the lower leaves once in a while short-petioled, basally swollen hairs on the two surfaces, veins noticeable. Inflorescence: blossom goes to 1 cm in distance across, a group of sessile white blooms, in upper axils or terminal, lone or two heads together. Peduncle, thickened at the best, factor long, 0.5-7 cm long, bushy. Involucral bracts 5-6 green, praise in two columns, external ones 4-6 mm long, internal ones normally shorter, unmistakable, bristly. Beam blossoms minimal, pistillate, ripe, corolla white, ligulate, 2-3 mm long. Circle blossoms various, focal, immaculate, rich, corolla whitish, rounded, minute, 1.5-2 mm long. Stamens five, isolated fibers, anthers mixed to frame a cylinder around the style. Chromosome number: 2n = 22.

Seed light-dark to dark, along the side smoothed achenes, wedge-molded, 2-3 mm long, 0.9 mm wide. Zenith with short, normally white hairs that are effectively severed yet two hornlike projections regularly remain, pappus missing. Whatever remains of the achene is glabrous and secured with numerous little warts. Stems are light green, once in a while purple, with fine, little hairs. Essential or cotyledonary leaves seem light and are inverse, curved to egg formed, with a smooth edge and regularly with short, and pointed, arbitrarily scattered hairs on the lower side. Genuine surrenders are over to 6 mm long, 3 mm wide and inverse. Later leaves resemble the principal genuine leaves and have fine, translucent negligible hairs. They are up to 12 mm long and 5 mm wide, sessile, lanceolate or straight lanceolate and hole or shallowly toothed, and the two surfaces are unpleasant with scattered, firm hairs [30] the present survey accumulates the divided data on the natural science, phytochemistry and pharmacology of this plant. We trust that this data will feature the significance of Eclipta prostrata and give the new heading to analyst later on.

Fig: 1. Eclipta Prostrata.

Pharmacological Activities

1. Anti-HIV Activities:

SupinyaTewtrakul et al. have been reported the bioassay-guided fractionation for anti-HIV-1 integrase movement prompted the confinement of six mixes from the entire plant concentrate of Ecliptaprostrata separate. They were distinguished as 5-hydroxymethyl-(2,2′:5′,2″)-terthiényltiglate (1), 5-hydroxymethyl-(2,2′:5′,2″)-terthiénylglagolate (2), 5-hydroxymethyl-(2,2′:5′,2″)-terthiénylacetic acid derivation (3), ecliptal (4), orobol (5) and wedelolactone (6). Of these, compound 6 demonstrated the most elevated movement against HIV-1 integrase (IN) with an IC50 estimation of 4.0 ± 0.2 µM, trailed by compound 5 (IC50 = 8.1 ± 0.5 µM), while the four terthiophene mixes (1–4) were latent (IC50 > 100 µM). This investigation bolsters the utilization of E. prostrata in AIDS patients, which is as per its conventional use by Thai customary specialists for restoring blood related maladies. [4]
2. Anti Dermatophytic Activity

Nagabhushan et al. has been reported the development of medication opposition is a major issue in controlling contagious irresistible ailments, in this manner there is a need to search for new medications from different sources to battle with the issue. Numerous plants are utilized in customary medication as restorative specialists which require logical approval. In the present examination, Eclipta prostrata L. a known therapeutic plant of tropics is assessed for antifungal potential against types of human irresistible Microsporum and Trichophyton following CLSI conventions. Endeavors to detach the dynamic rule by TLC uncovered 5 groups; however none of the groups demonstrated action in bioautography, recommending the synergistic impact.\(^{[5]}\)

3. Anti inflammatory Activity

Supinya Tewtrakul et al. have been reported the entire plant concentrate of Eclipta prostrata and its confined mixes were tried for their mitigating impacts against lipopolysaccharide (LPS)-induced nitric oxide (NO), prostaglandin E2 (PGE2) and tumor putrefaction factor-alpha (TNF-α) discharge in RAW264. The component of orobol \((5)\) was found to down-regulate iNOS and COX-2 mRNA articulation in a concentration-dependent way. The present investigation may bolster the customary utilization of Eclipta prostrata for the treatment of inflammatory-related illnesses.\(^{[6]}\)

Kim DS et al. have been reported the Eclipta\Prostrata (EP) and its mixes are known to have a few pharmacological impacts including calming impacts. In the present examination, we showed that EP enhances the dextran sulfate sodium (DSS) - actuated colitis manifestations, for example, body weight reduction, colon length shortening and malady action record. Interpretation was contained in water concentrate of EP. These outcomes show that EP can enhance colitis manifestations through the adjustment of invulnerable capacity in intestinal epithelial cells and recommends that EP has the potential restorative impact to intestinal aggravation.\(^{[15]}\)

Morel LJF et al. have been reported Eclipta prostrata (L.) L. (Asteraceae) has been utilized in Brazilian customary prescription to treat asthma and other respiratory ailments.\(^{[16]}\) Ding S et al. have been reported Tobacco smoke is the main source of the improvement of different lung maladies including lung disease through activating oxidant push and provocative reactions which added to the sores of ordinary human bronchial epithelial (NHBE) cell. Wedelolactone (WEL), a characteristic compound from Eclipta prostrata L., has been found to have the inhibitive consequences for the expansion and development of malignant growths. Our investigation demonstrates that WEL might be another potential defensive operator against CSE-initiated lung damage.\(^{[17]}\)

4. Antioxidant and Anti Cancer

K.R.Arya et al. have been reported, according to WHO gauges, 80% of individuals around the globe utilize restorative plants for the fix and counteractive action of different ailments including malignancy attributable to their simple accessibility and cost adequacy. Eclipta alba has long been utilized in Ayurveda to treat liver ailments, eye illnesses, and hair related scatters. The promising restorative estimation of E. Alba incited us to examine the cell reinforcement, nontoxic, and anticancer capability of its alcoholic concentrate. Further, AEEA has vigorous in vitro cancer prevention agent action alongside high aggregate phenolic and flavonoid substance. In synopsis, our outcomes show that Eclipta alba has colossal potential in reciprocal and elective drug for the treatment of malignant growth.\(^{[7]}\)

Kim HY et al. have been reported another terthiophene, 3'- hydroxy-2,2':5',2''-terthiophene-3'- O-β-D-glucopyranoside (1) and another oleanane-type saponin, echinocystic corrosive 3-O-(6-O-acetyl)- β-D-glucopyranoside (7) were disconnected from the flying parts of Eclipta prostrata L. Additionally, five thiophenes \((2-6)\), seven triterpenoids \((8-14)\), two coumestans \((15 \text{ and } 16)\), and four flavonoids \((17-20)\) having recently realized synthetic structures were secluded amid a similar course of this examination. All the disconnects 1-20 were assessed for their cytotoxicity against human ovarian disease cells (SKOV3) utilizing MTT measures.\(^{[18]}\)

Liu QM et al. have been reported the Eclipta prostrata L., (Asteraceae), is utilized in China for both nourishment and drug purposes. Four divisions \(\text{(water, 30% ethanol, 60% ethanol and 90% ethanol)}\) were
All in all, these discoveries exhibit the inhibitory capability of wedelolactone in insusceptible intervened liver damage in vivo.\[9]\n
5. Antimetastatic Effect

Liao MY et al. have been reported the Eclipta prostrata, a conventional Chinese medicine, has been utilized for the treatment of a few maladies. Be that as it may, the sub-atomic component hidden the impacts of Eclipta prostrata separates (EPE) on human oral malignant growth cell metastasis stays hazy. We in this manner analyzed the impacts of EPE on metastasis advancing proteins in oral malignancy. Along these lines, EPE might be utilized to keep the metastasis of oral malignancy, and can possibly be connected to disease treatment.\[8]\n
6. Hepatoprotective Activity

Luo Q et al. have been reported the Eclipta prostrata L. is a customary Chinese home grown prescription that has been utilized in the treatment of liver maladies. In any case, its natural components stay slippery. The current examination intended to research the hepatoprotective impact of wedelolactone, a noteworthy coumarin element of Eclipta prostrate L.. Besides, All in all, these discoveries exhibit the inhibitory capability of wedelolactone in insusceptible intervened liver damage in vivo.\[9\]
Lee MK et al. have been reported hepatic stellate cells (HSCs) have been known to assume a key job in the pathogenesis of liver fibrosis. Action guided fractionation prompted the disconnection of five oleanane-type triterpenoids, echinocystic corrosive (1), eclalbasaponin II (2), eclalbasaponin V (3), eclalbasaponin I (4) and eclalbasaponin III (5). Taken together, antifibrotic action of E. prostrata and its triterpenoids may recommend the restorative possibilities against liver fibrosis. [23]

Song chow lin et al. have been reported the hepatoprotective impacts of Eclipta prostrata(Linn.) were contemplated on intense hepatitis incited in mice by a solitary portion of carbon tetrachloride (31.25 μL/kg, i.p.) or acetaminophen (600 mg/kg, i.p.) and in rodents by a solitary portion of β-D-galactosamine (188 mg/kg, i.p.). The hepatoprotective action was checked by evaluating the serum transaminases (SGOT and SGPT) levels and histopathological changes in the liver of trial creatures. All serological and histopathological impacts of Eclipta prostrata were contrasted and that of Bupleurumchinense DC. [25]

7. Osteoprotective Effect

Deng YT et al. have been reported the echinocystic acid (EA) is a characteristic triterpene enhanced in different herbs and has been utilized for restorative purposes in China. In the present examination, we methodically inspected the impacts of EA on ovariectomy-incited osteoporosis in rodents out of the blue. Three-month-old female ovariectomy (OVX) Sprague-Dawley rodents were utilized to assess the osteoprotective impact of EA. Taking everything into account, EA could avoid decrease of bone mass and quality and enhance the cancellous bone structure and biochemical properties in OVX rodents. Henceforth, EA may fill in as another hopeful or a main compound for against osteoporosis. [11]

Lin XH et al. have been reported Eclipta prostrata, a fragrant plant, is known in Chinese home grown medication for the treatment of different kidney illnesses. An aggregate of 55 mixes, which were the real part (91.7%) of the volatiles, were distinguished by coordinating mass spectra with a mass range library (NIST 05.L). The impacts of unpredictable segments and ethanolic extricate from the flying parts of this plant on the expansion and separation of essential osteoblasts were assessed by the MTT technique and estimating the movement of basic phosphatase (ALP action). These outcomes suggest that E. prostrata can assume a vital job in osteoblastic bone arrangement, and may potentially prompt the advancement of bone-framing drugs. [24]

Xiong-Haolin et al. have been reported Eclipta prostrata, a sweet-smelling plant, is known in Chinese natural drug for the treatment of different kidney maladies. In the present investigation, the unstable segments were detached from the airborne parts of this plant by hydrodistillation and dissected by GC– MS. These outcomes suggest that E. prostrata can assume a vital job in osteoblastic bone arrangement, and may conceivably prompt the improvement of bone-framing drugs. [26]

MiKyeong Lee et al. have been reported one flavonoid, diosmetin (1), and two isoflavonoids, 3′-hydroxybiochanin A (2) and 3′-O-methylorobol (3), were disengaged from the methanol concentrate of Eclipta prostrata L. by a bioactivity-guided fractionation method utilizing essential societies of mouse osteoblasts as an in vitro examine framework. Each of the three mixes essentially expanded osteoblast separation as surveyed by the antacid phosphatase action. [27]

Ya-Ting Deng et al. have been reported echinocystic acid (EA) is a characteristic triterpene improved in different herbs and has been utilized for therapeutic purposes in China. In the present examination, we deliberately analyzed the impacts of EA on ovariectomy-instigated osteoporosis in rodents out of the blue. Henceforth, EA may fill in as another applicant or a main compound for against osteoporosis. [29]

Chia-Jung Hsieh et al. have been reported the bone is the most widely recognized metastatic site of bosom malignancy. Bone metastasis causes torment, pathologic cracks, what's more, seriously decreases the personal satisfaction. Bosom malignancy causes osteolytic bone metastasis, which is subject to osteoclast-mediated boneresorption. This examination is the first to confirm that wedelolactone (WDL), a characteristic coumarin disconnected from plants, can repress bosom cancermediated osteoclastogenesis. Consequently, this examination recommends that WDL might be a potential normal operator for averting and treating bone demolition in patients with bone metastasis because of bosom malignant growth. [42]
8. Anti venom Activity

Pithayanukul P et al. have been reported the butanolic and filtered butanolic separates (PBEs) of Eclipta prostrata were assessed for their immunizing agent venom potential. The butanolic separate, at 2.5 mg per mouse, could totally kill the deadly movement of 2LD50 of MPV venom, yet expanding the portion decreased the impact. The two concentrates mostly repressed the hemorrhagic action yet shown low enemy of phospholipase A2 movement and did not restrain proteolytic action of MPV venom.\[^{31}\]

Bettina M. Ruppellet et al. have been reported we have seen that few plants utilized prevalently as hostile to anti venom indicate mitigating action. From the rundown arranged by Rizzini, Mors and Pereira a few animal categories have been chosen and tried for pain relieving movement (number of bendings) and calming action (Evans blue color dispersion - 1% arrangement) as indicated by Whittle's method (intraperitoneal organization of 0.1 N-acidic acid 0.1 ml/10 g) in mice showed pain relieving and additionally mitigating exercises of shifted power.\[^{32}\]

Walter B. Morset et al. have been reported ethanolic concentrates of the elevated parts of EcliptaProstrata L. (Asteraceae) killed the deadly action of the venom of South American poisonous snake (Crotalus duris susterrificus) when blended in vitro before i.p. The insurance gave against the myotoxic impacts of the venom could be exhibited likewise in vivo, when the venom was preincubated with the concentrate before infusion into mice.\[^{33}\]

Luciana C. Diogo et al. have been reported we hereditarily adjusted Ecliptaalba utilizing Agrobacterium rhizogenes LBA 9402, with the point of creating optional metabolites with pharmacological properties against phospholipase A2 and the myotoxic exercises of snake venom. The scan for neutralizer is defended by the need of discovering dynamic rules that are more effective in killing snake venom and furthermore as an endeavor to supplement serum treatment.\[^{34}\]

Pimolpanpithayanukul et al. have been reored the ethyl acetic acid derivation concentrate of Eclipta prostrata. L. (Asteraceae) was assessed for its antibody potential against Calloselas marhodostoma. Kuhl (Viperidae) (Malayan pit snake, MPV) venom. The somewhat decontaminated ethyl acetic acid derivation remove (PEE) was found to contain 47% wedelolactone as its significant constituent. Both PEE and wedelolactone showed incomplete anti– phospholipase A2 action (21% for PEE and 7% for wedelolactone) and couldn't kill the deadly impact of either 2LD50 or 4LD50 of MPV venom.\[^{35}\]

Paulo A Meloa et al. have been reported the we analyzed the capacity of wedelolactone, heparin and para-bromophenacyl bromide to alienate the myotoxic action in mice of venoms from Crotalus viridis and Agkistrodoncontortrixlaticinctus and two phospholipase A2 myotoxins, CVV myotoxin and ACL myotoxin, confined from them. These outcomes show that wedelolactone, para-bromophenacyl bromide and heparin are opponents of these two phospholipase A2 myotoxins, and that threat by the initial two mixes might be because of a more explicit connection with these proteins than that by the last mentioned.\[^{36}\]

9. Hypolipidemic activity

Dhandapani, R. et al. Have been reported in atherogenic diet instigated hyperlipidemic display, the rodents getting treatment with the watery concentrate of the leaves of E. Prostrata indicated critical decrease in all out cholesterol, triglyceride, add up to protein and rise in high thickness lipoprotein cholesterol. The fluid concentrate of E. Prostrata was found to have huge hypolipidemic movement. The outcomes likewise recommend that E. Prostrata leaf separate at 100 and 200 mg/kg b.wt. focuses is a magnificent lipid-bringing down specialist.\[^{38}\]

C. SanthoshKumari et al. have been reported the plant Eclipta prostrata is utilized in the conventional restorative practices of India to treat hepatic illnesses and hyperlipidemia. The aggregate alcoholic concentrate of the plant when tried for antihyperlipidemic potential, showed a portion subordinate movement in pale skinned person rodents when contrasted with standard medications. The movement was surveyed by concentrate the lipid profiles of serum, liver and heart of the control and medication treated creatures. The outcomes loan support to the conventional utilization of EcliptaProstrata in the treatment of hyperlipidemia.\[^{39}\]
10. Antimicrobial activity

Jbakht et al. have been reported the weakness of nine microbial species to an antimicrobial concentrate from Eclipta alba was screened utilizing the well dispersion measure. Three distinct volumes (24, 30 and 36 µl/well) were tried. Investigation of the information uncovered that all concentrates from Eclipta alba demonstrated antimicrobial exercises. A N-butanol portion demonstrated inhibitory exercises against every one of the nine microbial species. Tests separated with oil ether, dichloromethane, methanol or water had shifting dimensions of restraint against a portion of these microorganisms. Erwinia carotovora was the most helpless Gram-negative bacterium, while Salmonella typhi and Escherichia coli were exceptionally safe among the Gram-negative microscopic organisms.40

Venkatesan Gopieshkhanna et al. have been reported the antimicrobial movement of saponin portions from the leaves of Gymnema sylvestre and Eclipta prostrata was assessed against pathogenic microorganisms and growths in an in vitro condition. The unadulterated saponin divisions were observed to be more viable against tried bacterial pathogens when contrasted with rough saponin parts. The present investigation recommends that the saponin parts G. sylvestre and E. prostrata have huge antibacterial and antifungal action. Our outcomes further recommend that saponins of G. sylvestre and E. Prostrata can be utilized as a potential fungicide against pathogenic organisms.41

11. Discussion

Chronic diseases such as neurodegeneration, cardiovascular disorder, diabetes, and cancers have become major health issues in numerous countries and demand considerable healthcare resources. These diseases mainly result from endogenous production of oxidative species. UV radiation is an exogenous ROS-inducing factor and also a critical factor in the initiation and development of a number of skin diseases.43 E. prostrata offers many favorable prospects for both traditional and modern medicine and potential herbal therapy for many diseases. The present review demonstrates that E. prostrata showed a broad spectrum of pharmacological activities, such as antidementia, antivenom, anti-HIV, antihyperlipidemic, antimicrobial, antihyperglycemic, antitumor, and antimyotoxic effects. However, new results may increase the current therapeutic significance of E. prostrata and promote their future use in modern medicine.

Reference

1. Flora of North America, Eclipta Linnaeus, Mant. Pl. 157, 286. 1771.[1]
2. Flora of China, li chang Eclipta prostrata (Linnaeus) Linnaeus, Mant. Pl. 2: 286. 1771.[1]
3. Altervista Flora Italiana, Falsamargherita , false daisy, tattoo plant,Ecliptaprostrata (L.) L.[1]
4. Puri, H. S. 2003. Rasayana: Ayurvedic Herbs for Longevity and Rejuvenation. Taylor & Francis, London. pages 80-85.[2]
5. Chung, I. M; Rajakumar, G; Lee, J. H; Kim, S. H; Thiruvengadam, M (2017). "Ethnopharmacological uses, phytochemistry, biological activities, and biotechnological applications of Eclipta prostrata" (https://www.hindawi.com/journals/isrn/2014/385969/). Applied Microbiology and Biotechnology. 101 (13): 5247–5257. doi:10.1007/s00253-017-8363-9 (https://doi.org/10.1007%2Fs00253-017-8363-9). PMID 28623383 (http://www.ncbi.nlm.nih.gov/pubmed/28623383)[3].
6. Tewtrakul, S., Subhadhirsakul, S., Cheenpracha, S., & Karalai, C. (2007). HIV-1 protease and HIV-1 integrase inhibitory substances from Eclipta prostrata. Phytotherapy Research, 21(11), 1092–1095. doi:10.1002/ptr.2252[4]
7. Nagabhushan, Raveesha, K. A., &Shrisha, D. L. (2013). Antidermatophytic activity of Eclipta prostrata L. against human infective Trichophyton and Microsporum spp. International Journal of Chemical and Analytical Science, 4(2), 136–138. doi:10.1016/j.ijcas.2013.05.003[5]
8. Tewtrakul, S., Subhadhirsakul, S., Tansakul, P., Cheenpracha, S., & Karalai, C. (2011). Antinflammatory Constituents from Eclipta prostrata using RAW264.7 Macrophage Cells. Phytotherapy Research, n/a–n/a. doi:10.1002/ptr.3383[6]
9. Yadav, N. K., Arya, R. K., Dev, K., Sharma, C., Hussain, Z., Meena, S., … Singh, R. K. (2017). Alcoholic Extract of Ecliptaalba Shows In Vitro Antioxidant and Anticancer Activity without
Exhibiting Toxicological Effects. Oxidative Medicine and Cellular Longevity, 2017, 1–18. doi:10.1155/2017/9094641

10. Liao, M.-Y., Chuang, C.-Y., Hsieh, M.-J., Chou, Y.-E., Lin, C.-W., Chen, W.-R., … Yang, S.-F. (2018). Antimetastatic effects of Eclipta prostrata extract on oral cancer cells. Environmental Toxicology. doi:10.1002/tox.22577

11. Luo, Q., Ding, J., Zhu, L., Chen, F., & Xu, L. (2018). Hepatoprotective Effect of Wedelolactone against Concanavalin A-Induced Liver Injury in Mice. The American Journal of Chinese Medicine, 46(04), 819–833. doi:10.1142/s0192415x1850043x

12. Deng, Y., Kang, W., Zhao, J., Liu, G., & Zhao, M. (2015). Osteoprotective Effect of Echinocystic Acid, a Triterpene Component from Ecliptaprostrata, in Ovariectomy-Induced Osteoporotic Rats. PLOS ONE, 10(8), e0136572. doi:10.1371/journal.pone.0136572

13. Nakatani K; Kusanagi T, 1991. Effect of photoperiod and temperature on growth characteristics, especially heading or flower bud appearance of upland weeds. Weed Research(Tokyo), 36(1):74-81;23Ref

14. Kim, D.-S., Kim, S.-H., Kee, J.-Y., Han, Y.-H., Park, J., Mun, J.-G., … Hong, S.-H. (2017). Ecliptaprostrata Improves DSS-Induced Colitis through Regulation of Inflammatory Response in Intestinal Epithelial Cells. The American Journal of Chinese Medicine, 45(05), 1047–1060. doi:10.1142/s0192415x17500562

15. Morel, L. J. de F., Azevedo, B. C. de, Carmona, F., Contini, S. H. T., Teles, A. M., Ramalho, F. S., … Pereira, A. M. S. (2017). A standardized methanol extract of Ecliptaprostrata (L.) L. (Asteraceae) reduces bronchial hyperresponsiveness and production of Th2 cytokines in a murine model of asthma. Journal of Ethnopharmacology, 198, 226–234. doi:10.1016/j.jep.2016.12.008

16. Ding, S., Hou, X., Yuan, J., Tan, X., Chen, J., Yang, N., … Jia, X. (2015). Wedelolactone protects human bronchial epithelial cell injury against cigarette smoke extract-induced oxidant stress and inflammation responses through Nrf2 pathway. International Immunopharmacology, 29(2), 648–655. doi:10.1016/j.intimp.2015.09.015

17. Kim, H.-Y., Kim, H. M., Ryu, B., Lee, J.-S., Choi, J.-H., & Jang, D. S. (2015). Constituents of the aerial parts of Ecliptaprostrata and their cytotoxicity on human ovarian cancer cells in vitro. Archives of Pharmacal Research, 38(11), 1963–1969. doi:10.1007/s12272-015-0599-2

18. Liu, Q.-M., Zhao, H.-Y., Zhong, X.-K., & Jiang, J.-G. (2012). Ecliptaprostrata L. phytochemicals: Isolation, structure elucidation, and their antitumor activity. Food and Chemical Toxicology, 50(11), 4016–4022. doi:10.1016/j.fct.2012.08.007

19. Chan, C.-F., Huang, W.-Y., Guo, H.-Y., & Wang, B. R. (2014). Potent Antioxidative and UVB Protective Effect of Water Extract of Eclipta Prostrata L. The Scientific World Journal, 2014, 1–8. doi:10.1155/2014/759039

20. Chung, I.-M., Rahuman, A., Marimuthu, S., Kirthi, A., Anbarasan, K., & Rajakumar, G. (2015). An Investigation of the Cytotoxicity and Caspase-Mediated Apoptotic Effect of Green Synthesized Zinc Oxide Nanoparticles Using Ecliptaprostrata on Human Liver Carcinoma Cells. Nanomaterials, 5(3), 1317–1330. doi:10.3390/nano5031317

21. Kim, D.-I., Lee, S.-H., Choi, J.-H., Lillehoj, H. S., Yu, M.-H., & Lee, G.-S. (2008). Thebutanol fraction of Ecliptaprostrata (Linn) effectively reduces serum lipid levels and improves antioxidant activities in CD rats. Nutrition Research, 28(8), 550–554. doi:10.1016/j.nutres.2008.05.003

22. Lee, M. K., Ha, N. R., Yang, H., Sung, S. H., Kim, G. H., & Kim, Y. C. (2008). Antiproliferative activity of triterpenoids from Ecliptaprostrata on hepatic stellate cells. Phytomedicine, 15(9), 775–780. doi:10.1016/j.phyto.2007.10.004

23. Lin, X.-H., Wu, Y.-B., Lin, S., Zeng, J.-W., Zeng, P.-Y., & Wu, J.-Z. (2010). Effects of Volatile Components and Ethanolic Extract from Ecliptaprostrata on Proliferation and Differentiation of Primary Osteoblasts. Molecules, 15(1), 241–250. doi:10.3390/molecules1501241

24. Lin, S., Yao, C., Lin, C., & Lin, Y. (1996). Hepatoprotective Activity of Taiwan Folk Medicine: Ecliptaprostrata Linn. against Various Hepatotoxins Induced Acute Hepatotoxicity. Phytotherapy Research, 10(6), 483–490. doi:10.1002/(sici)1099-1573(199609)10:6<483::aid-ptr884>3.0.co;2-2

25. Lin, X.-H., Wu, Y.-B., Lin, S., Zeng, J.-W., Zeng, P.-Y., & Wu, J.-Z. (2010). Effects of Volatile Components and Ethanolic Extract from Ecliptaprostrata on Proliferation and Differentiation of Primary Osteoblasts. Molecules, 15(1), 241–250. doi:10.3390/molecules1501241
26. Lee, M. K., Ha, N. R., Yang, H., Sung, S. H., & Kim, Y. C. (2009). Stimulatory constituents of Ecliptaprostrata on mouse osteoblast differentiation. Phytotherapy Research, 23(1), 129–131. doi:10.1002/ptr.2566 [27]

27. Chan, C.-F., Huang, W.-Y., Guo, H.-Y., & Wang, B. R. (2014). Potent Antioxidative and UVB Protective Effect of Water Extract of Ecliptaprostrata. The Scientific World Journal, 2014, 1–8. doi:10.1155/2014/759039 [28]

28. Deng, Y., Kang, W., Zhao, J., Liu, G., & Zhao, M. (2015). Osteoprotective Effect of Echinocystic Acid, a Triterpene Component from Ecliptaprostrata, in Ovariectomy-Induced Osteoporotic Rats. PLOS ONE, 10(8), e0136572. doi:10.1371/journal.pone.0136572 [29]

29. Zimdahl RL; Lubigan RT; Moody K; Mabbayad MO, 1989. Seeds and seedlings of weeds in rice in south and southeast Asia. Manila, Philippines; International Rice Research Institute, 63 pp. [30]

30. Pithayanukul P, Lovachirasuwan S, Bavovada R, Pakmanee N, Suttisri R. Anti-venom potential of butanolic extract of Ecliptaprostrata against Malayan pit viper venom. JEthnopharmacol. 2004 Feb;90(2-3):347-52. DOI: 10.1016/j.jep.2003.10.014. [31]

31. Bettina M. Ruppelt Edna F. R. Pereira Lilia C. GonçalvesNuno A. Pereira. Pharmacological screening of plants recommended by folk medicine as anti-snake venom: I. Analgesic and anti-inflammatory activities. Mem. Inst. Oswaldo Cruz vol 86 suppl 2 Rio de Janeiro 1991, doi.org/10.1590/S0074-02761991000600046. [32]

32. Walter B. Mors Maria CéliadoNascimentoJosé Paz Parente Maria Helenada Silva Paulo A. Melo G. Suarez-Kurtz. Neutralization of lethal and myotoxic activities of South American rattlesnake venom by extracts and constituents of the plant Ecliptaprostrata (Asteraceae). Toxicon Volume 27, Issue 9, 1989, Pages 1003-1009, doi.org/10.1016/0041-0101(89)90151-7. [33]

33. Luciana C. Diogo Renata S. Fernandes Silva Marrusci Danilo L. Menaldo Patrícia G. Roberto Paula V. F. Matangulo Paulo S. Pereira Suzelei C. França Silva Guiulatti Andreimair M. Soares Miriam V. Lourenço. Inhibition of Snake Venoms and Phospholipases A2 by Extracts from Native and Genetically Modified Eclipta alba: Isolation of Active Coumestans, doi.org/10.1111/j.1742-7843.2008.00350.x. [34]

34. Pimolpan Pithayanukul, Bunmun Lapett, Rapepol Bavovada, Narumol Pakmanee & Rutt Suttisri. Inhibition of Proteolytic and Hemorrhagic Activities by Ethyl Acetate Extract of Ecliptaprostrata. Against Malayan Pit Viper Venom, Journal Pharmacological Biology Volume 45, 2007 - Issue 4, Journal Pharmaceutical Biology Volume 45, 2007 - Issue 4, Pages 282-288, doi.org/10.1080/13880200701214805. [35]

35. Paulo A Melo a Charlotte L Ownbyb. Ability of wedelolactone, heparin, and para-bromophenacylbromide to antagonize the myotoxic effects of two crotaline venoms and their PLA2 myotoxins, Toxicon volume 37, Issue 1, January 1999, Pages 199-215, doi.org/10.1016/S0041-0101(98)00183-4. [36]

36. Akhtar Nahid, Choudhury Neelabh, Kumar Navneet. Evaluation of antioxidant and antimicrobial potentials of Ecliptaprostrata collected from the Nepal region, The Pharma Innovation Journal 2017; 6(11): 04-07. [37]

37. Dhandapani, R. Hypolipidemic activity of Ecliptaprostrata (L.) L. leaf extract in atherogenic diet induced hyperlipidemic rats. NICSAIR PUBLICATIONS Research Journals Indian Journal of Experimental Biology (IJB) IJEB Vol.45 [2007] IJEB Vol.45(07) [July 2007]. [38]

38. Kumari, C. S., Govindasamy, S., & Sukumar, E. (2006). Lipid lowering activity of Ecliptaprostrata in experimental hyperlipidemia. Journal of Ethnopharmacology, 105(3), 322–325. doi:10.1016/j.jep.2005.10.031. [39]

39. JEHAN BAKHT, AMjad ISLam and MOhammad SHAfi, ANTIMICROBIAL POTENTIALS OF ECLIPTA ALBA BY WELL DIFFUSION METHOD, Pak. J. Bot., 43: 169-174, Special Issue, December, 2011 (Medical Plants: Conservation & Sustainable use) [40]

40. Gopieshkhanna, V., & Kannabiran, K. (2008). Antimicrobial activity of saponin fractions of the leaves of Gymnemasylvestre and Ecliptaprostrata. World Journal of Microbiology and Biotechnology, 24(11), 2737–2740. doi:10.1007/s11274-008-9758-7. [41]

41. HSIEH, C.-J., KUO, P.-L., HOU, M.-F., HUNG, J.-Y., CHANG, F.-R., HSU, Y.-C., HSU, Y.-L. (2014). Wedelolactone inhibits breast cancer-induced osteoclastogenesis by decreasing Akt/mTOR signaling. International Journal of Oncology, 46(2), 555–562. doi:10.3892/ijo.2014.2769. [42]
42. A. R. Svobodova, A. Galandakova, J. Sienska, D. Dolezal, J. Ulrichova, and J. Vostalova, “Acute exposure to solar simulated ultraviolet radiation affects oxidative stress-related biomarkers in skin, liver and blood of hairless mice,” Biological & Pharmaceutical Bulletin, vol. 34, pp. 471–479, 2011.