IJLSR (2019), Vol. 5, Issue 4 **Review Article**

IJLSR INTERNATIONAL JOURNAL OF LIFE SCIENCES AND REVIEW

Received on 01 April 2019; received in revised form, 23 April 2019; accepted, 27 April 2019; published 30 April 2019

A COMPREHENSIVE REVIEW OF *MIKANIA CORDATA* (ASTERACEAE)

Saiara Sajita Sajid [1], Afsana Karim Anika [1], M. An Nayem Jahan [1] and Pritesh Ranjan Dash [*2]

Department of Pharmacy [1], BRAC University, Dhaka - 1342, Bangladesh.
Department of Pharmacy [2], Jahangirnagar University, Dhaka, Bangladesh.

ABSTRACT: *Mikania cordata* which belongs to the family Asteraceae is a medicinal plant that has been widely distributed through Southeast Asia and Eastern Africa. It possesses various therapeutic properties which include – anti-inflammatory, anti-ulcer, bronco-dilating, analgesic, antibiotic, anti-diarrheal, hepatoprotective, epidermal or skin protective, coagulative, anticarcinogenic, CNS depressant, anti-stress, cytotoxic, insect and scorpion bites and so on. As per from our study, there is no other review paper available till now regarding the pharmacological properties of this plant. Therefore, our paper is the first one to report a review on *Mikania cordata*. In this paper, along with the pharmacological properties, the other necessary features regarding the plant can be well acknowledged and can be utilized for further research and study purposes.

Keywords: *Mikania cordata*, Pharmacological properties, Phytochemical constituents

Correspondence to Author:
Pritesh Ranjan Dash

Ph.D. Student, Department of Pharmacy, Jahangirnagar University, Savar, Dhaka - 1342, Bangladesh.

E-mail: pritesh.ju@gmail.com

INTRODUCTION: Bangladesh has an extraordinary assorted variety in plants, including 449 therapeutic plants. Kavirajes use some of the familiar medicinal plants to heal people. The precise number of used plants is still obscure. The utilization of medicinal plants is prompted to some extent by the presence of different tribes like Chakma, Marma, Rakhain, Tipra, Garo, Khashia with cultural diversity. In light of the conviction of individuals in the unstoppable force of nature, this conventional endeavor to treatment has got through the colossal take-over of present-day prescription frameworks.

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.IJLSR.5(4).49-59

The article can be accessed online on www.ijlsr.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.IJLSR.5(4).49-59

As a result, the learning behind the use of therapeutic plants has gone down from progenitors to forerunners. For the application of some medicinal plants, some specific groundwork and validation protocols have been resolved [1, 2]. *Mikania cordata* is about 10 m long and treated as a more powerful weed than *M. micrantha*. It is a fast developing, entangling perennial vine which entangles itself around youthful tree crops, covering them and framing thick, tangled masses.

Also, this plant can restrain the growth of other plants. Vegetative reproduction is the essential method of spreading; however, proliferation can also be done by the breeze-borne achenes. Roots can shape at stem nodes, and even on small stem fragments with a solitary node. Stem fragments can be scattered by cultivation and different other methods. Leaves are since quite a long-petioled, deltoid-ovoid or ovate heart-shaped, 4 to 10 cm in length, with a pointed tip, rounded, heart-shaped, or truncate base, and toothed edge.

Heads are 4-flowered, cylindric, 6 to 9 mm in length, borne in compound inflorescences. Achenes are smooth, glandular, straight oval, and 2.5 to 3 millimeters in length. Pappus is made out of one arrangement, whitish or salmon-hued [2]. The plant is used as a cover crop to prevent erosion and the leaves are used in some places as a soup vegetable and can be used as cattle fodder. In southern Nigeria, a decoction is given for coughs, and the leaf-juice is a remedy for sore eyes. In Portuguese East Africa, the Tongas use the plant as a remedy for snake and scorpion bite. An infusion of the plant is given in affections of the stomach and intestines. In Malaysia, the leaves are used for rubbing on the body against itches. In Java, they are used for poulticing the wound of circumcision and other wounds [2].

Ecology: *Mikania Cordata* is an infamous obtrusive vine occurring up to 2000 m height. It grows mostly in spots, accepting high precipitation, presumably 1,500 mm or more; inclines toward rich, clammy soil; once in a while develops in dry zones; and flourishes in the open, aggravated places. Thus, this plant is usually found in young secondary forests, in backwoods clearings, in manor tree yields, fallow or dismissed grounds, and along waterways and streams, squander regions, steep hillside, and even mountainsides from whence winds most likely spread the seeds to new regions. The species will develop in the fractional shade, however, can't endure dense shade. A lot of seeds are transported by the breeze or by clinging to human attire or the hair of creatures. Vegetative propagation can happen from broken stem sections that might be removed and transported by machinery or by precipitation run-off.

Distribution: The plant is dispersed all through Southeast Asia and Eastern Africa, however right now is intrusive in numerous parts of the world [2].

Scientific Classification:

Kingdom: Plantae
Class: Magnoliopsida
Subclass: Asteridae
Order: Asterales
Family: Asteraceae
Genus: Mikania Willd.
Species: *M. cordata* (Burm. f.) B.L. Rob

FIG. 1: DIFFERENT PARTS OF *MIKANIA CORDATA*

Common Names: English: climbing hemp-weed. Senegal: Wolof, The Gambia: Manding-Mandinka Guinea-Bissau: Manding-Mandinka [3].

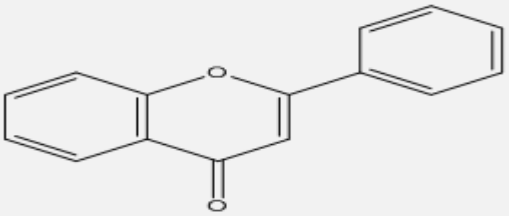
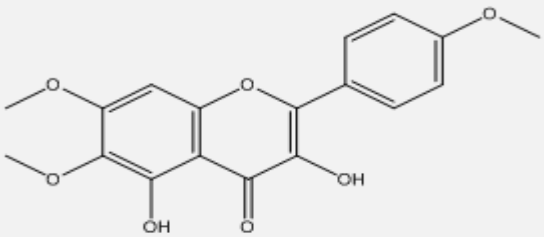
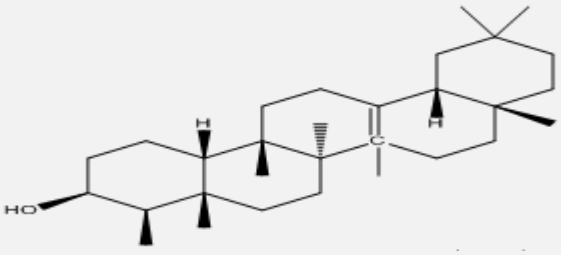
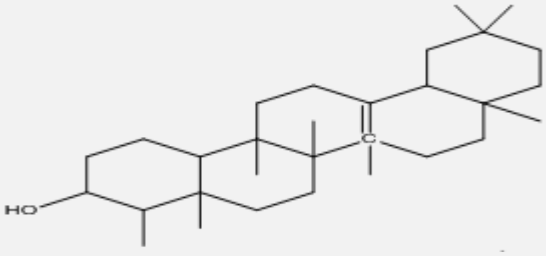
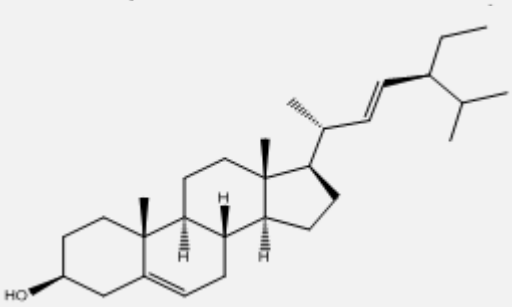
Other Local Names: English: Heartleaf hempvine, Mile a minute. Philippines: Bikas [2].

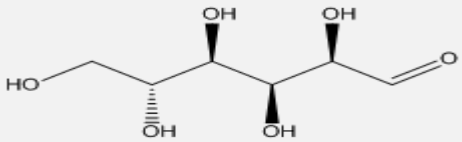
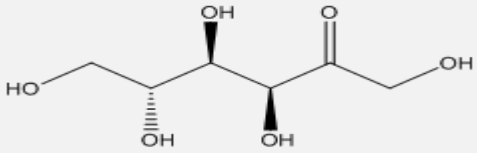
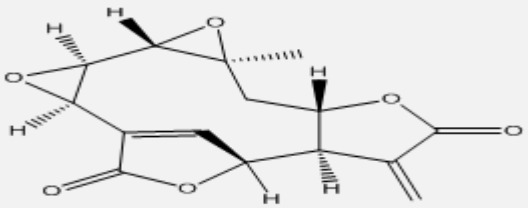
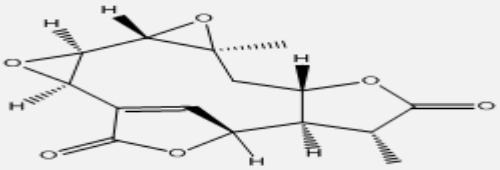
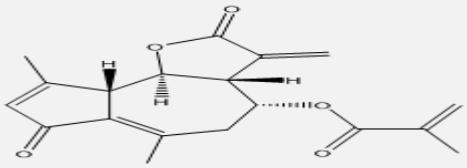
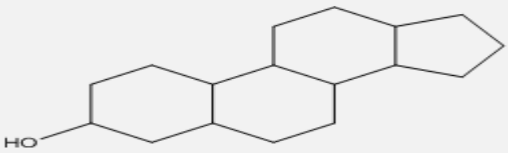
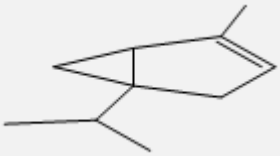
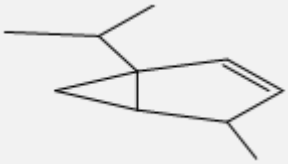
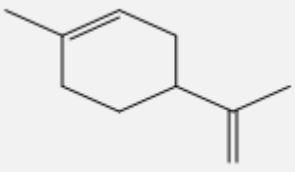
Synonyms: *Eupatorium cordatum* Burm. f., *Eupatorium trinitarium* var. *volubilis* (Poepp.) M. Gómez, *Eupatorium volubile* Norona, *Eupatorium volubile* (Poepp.), *Mikania volubilis* (Vahl) Willd. *Mikania volubilis* Poepp [3].

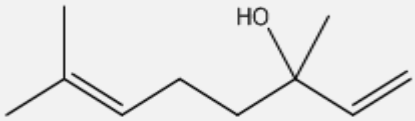
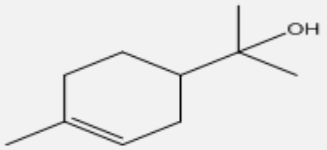
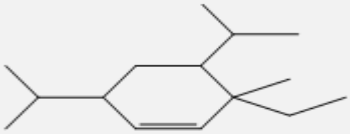
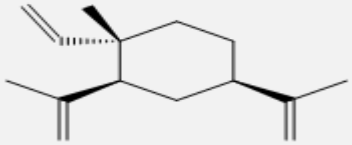
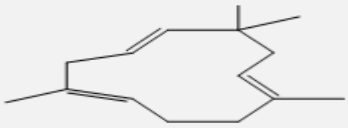
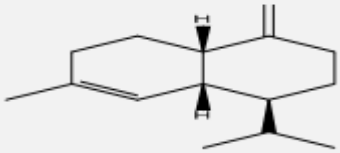
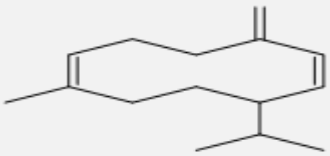
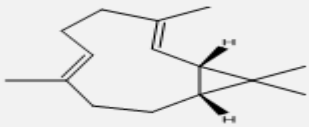
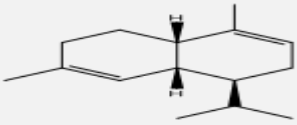
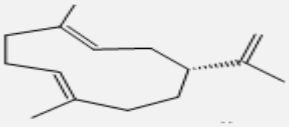
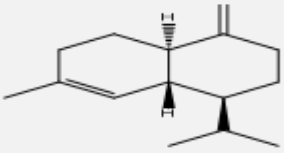
Chemical Constituents: Kiang and his fellow mates had isolated flavones, mikanin with epifriedelinol from the roots. In the case of leaves and stems, they have isolated with fumaric acid. In another study carried out by Sim and Chem mikanin was characterized as 3, 5-dihydroxy-4', 6, 7- trimethoxyflavone [4]. However, further study

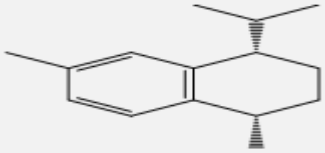
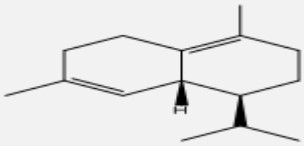
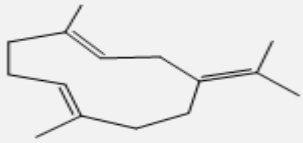
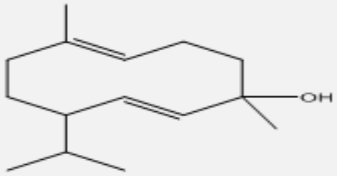
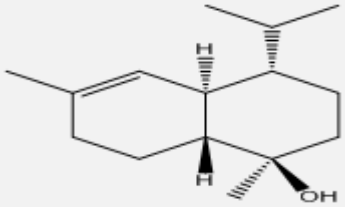
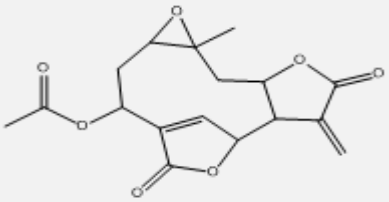
shows the presence of mikanolide, and dihydro mikanolide in related species *M. Scandens* wild carried out by Herz along with his colleagues [5]. Furthermore, Pelisse and his colleagues reported in their study that the leaf oil and extract contained β-caryophyllene (11.8% and 12.6%) and germacrene D (21.6% and 59.8%) as major components along with several compounds [6]. Aguinaldo and his fellow mates had isolated germacranolides including 11β-Hydroxy-13-chloromikanolide, 11β-Hydroxy -13 -chloromikanolide acetate, 3β-Hydroxydeoxymikanolide, cordatolide, 6α-Hydroxycordatolide from the leaves of *M. Cordata* collected from Philippines [7]. Moreover, Studies done by Bricon and Herz along with his colleagues have found the presence of germacranolide- type sesquiterpenoids, mikanolide, dihydromikanolide, scandenolide, dihydroscandenolide, miskandenin, dihydromikanolide along with sterols, triterpenoids, and flavonoids [7].

TABLE 1: IMPORTANT CHEMICAL CONSTITUENTS ISOLATED FROM *MIKANIA CORDATA* EXTRACTS [4-7]

S. no.	Name of the constituents	Chemical Structure
1	Flavone	
2	3,5-Dihydroxy-4',6,7-trimethoxyflavone (mikanin)	
3	Epifriedelanol	
4	Friedelan	
5	Stigmasterol	

6	Glucose	
7	Fructose	
8	Mikanolide	
9	Dihydromikanolide	
10	Sesquiterpene Lactone	
11	Sterol	
12	α-thujene (terpene)	
13	β-thujene (terpene)	
14	Limonene (mono terpene)	

15	Linalol (terpene)	
16	α-terpineol	
17	δ-elemene (Sesquiterpene)	
18	β-elemene (sesquiterpene)	
19	α-humulene (sesquiterpene)	
20	ϒ-muurolene (sesquiterpene)	
21	Germacrene D	
22	bicyclogermacrene	
23	α-muurolene (sesquiterpene)	
24	germacrene A	
25	ϒ-cadinene (Sesquiterpene)	

26	cis-calamenene	
27	δ-cadinene (Sesquiterpene)	
28	Germacrene B	
29	Germacrene D-4-ol	
30	α-cadinol (sesquiterpenoid)	
31	Scandenolide (sesquiterpene lactone)	

Pharmacological Properties:

Anti-Inflammatory Properties: A study conducted by Siddique implied that, the essential oil (50 mg/kg) which was extracted from *Mikania cordata* showed an anti-inflammatory activity during the anti-inflammatory activity screening by producing 72.80% edema inhibition at 4 hours after administration of carrageenan (inflammatory agent) which was later compared with that of standard phenylbutazone (87.87%) [8].

Moreover, the extract produced significant writhing inhibition in acetic acid-induced writhing in mice at the oral dose of 125 and 250 mg/kg body weight ($p<0.001$) which was compared to the standard drug diclofenac sodium at the dose of 25 mg/kg of body weight [4]. In Taiwan, the plant is used to resolve swellings. In Malaysia, it is used to calm itches, and in Indonesia, it is used to heal wounds.

According to Haque, the methanolic extract of *Mikania cordata* of 800mg/kg, 1200 mg/kg, *n*-hexane, DCM fraction had been used to assess the analgesic and anti-inflammatory activity properties using acetic acid-induced writhing test and formalin-induced paw licking test. She also implied that *Mikania cordata* could significantly decrease acetic acid-induced writhing episodes and acute and delayed phases of formalin-induced pain in mice in dose-dependent manner comparable to that produced by indomethacin and aspirin respectively [9]. Furthermore, Herbert discussed a study where the evaluation of the healing potency of the extract was carried out on twenty individuals with acute

superficial injuries in phase II clinical trial and showed a significant ($p<0.01$) wound treatment index of 5.43 ± 0.37 and a percentage reduction index of 28.26 ± 4.14. The standard treatment drug mupirocin also showed a significant difference ($p<0.01$) with a treatment index of 4.47 ± 0.26 cm and a wound percentage reduction index of 21.68 ± 3.76. Paired sample correlations showed no significant difference ($p>0.01$) between those treated with *M. cordata* and those treated with mupirocin. Therefore, the overall result of this study reveals that the herbal ointment of *Mikania cordata* is safe and as pharmacologically competent as Mupirocin and can be used as a treatment for superficial injuries [10].

In addition to that, Bhattacharya also implies in his article that, the methanolic fraction of the root extract of *Mikania cordata* was found to exhibit an inhibitory effect on carrageenin and other mediators induced edema. For example, there was a significant inhibition of protein exudation, an increase in peritoneal capillary permeability and leucocyte migration in inflammatory conditions. Moreover, the extract significantly inhibited both cotton pellet and carrageenin-induced granuloma formation and was effective in experimentally induced arthritic conditions and turpentine-induced joint edema [11]. Significant enhancement of the healing process was also found to occur in acetic acid-induced chronic gastric lesions in experimental animals [12]. In South-Eastern Asia, leaves are known to be used to itch and wounds**.**

Anti-Ulcer Activity: According to Pal, the methanolic fraction of the root extract *M. cordata* was found to possess significant anti-ulcer activity in different experimental models. In preventive tests, the extract showed significant protective action in gastric lesions induced by acetylsalicylic acid, serotonin, and indomethacin in experimental rats. Moreover, significant protection was observed with the extract in chemically-induced duodenal lesions. Significant facilitation of the healing process was also found to occur in acetic acid-induced chronic gastric lesions in experimental animals [13].

In an article, Bishayee implied that the effect of the methanolic fraction of *Mikania cordata* root extract was investigated for its possible ulcer protective activity in male Sprague-Dawley rats. Oral administration of this extract (50, 100, or 150 mg/kg) significantly prevented the occurrence of water immersion stress-induced gastric ulcers in a dose-responsive manner. The extract also dose-dependently inhibited gastric ulcers induced by ethanol, aspirin, and phenylbutazone. The ED_{50} values of the extract in the above four ulcer models were found to be 95.1, 109.7, 125.5, and 136.2 mg/kg, respectively. The volume, acidity, and peptic activity of the gastric juice in pylorous-ligated rats were not altered upon administration of the extract (100 or 150 mg/kg), but it significantly and dose-dependently promoted the gastric mucus secretion in normal as well as stress and ethanol-induced ulcerated animals.

Additionally, Paul said that the alkaloidal fraction obtained from an ethanolic extract of the leaves of *Mikania cordata* exhibited significant *in-vivo* antiulcer activity in diclofenac sodium-induced gastric erosions in Long Evans rats [15]. Furthermore, Partha stated in one of his studies that, in Chonia, Tangail, young leaves are fried in oil and eaten by persons suffering from gastric pain [14].

Bronco-Dilating Effect: Mollik implied in an article that, *Mikania cordata* is used to treat several respiratory tract disorders such as asthma, bronchitis, pneumonia, cold, cough, mucus, influenza, tonsillitis and sore throat [15].

Analgesic Effect: According to Rahman, carrageenan-induced rat paw edema assay and yeast-induced hyperthermia assay were also carried out to evaluate anti-nociceptive properties of oil and extracts from *Mikania cordata*. The essential oil (50 mg/kg), chloroform extract (800 mg/kg) and ethyl acetate extract (800 mg/kg) showed potent peripheral anti-nociceptive activity having 47.33%, 29.33% and 16.65% of writhing inhibition, respectively, comparable with standard diclofenac (52.0%).

Essential oil (50 mg/kg), chloroform extract (800 mg/kg) and ethyl acetate extract (800 mg/kg) presented promising central anti-nociceptive activity as well having 95.86%, 79.18% and 42.37% elongation of reaction time, respectively, at 90 min after administration of essential oil, ethyl acetate extract and 60 min after administration of

chloroform extract. Moreover, the methanolic extract of *Mikania cordata* of 800 mg/kg, 1200 mg/kg, n-hexane, DCM fraction has been used to test the analgesic and anti-inflammatory activity properties using Acetic acid induced writhing test and formalin-induced paw licking test. *Mikania cordata* can significantly attenuate acetic acid-induced writhing episodes and acute and delayed phases of formalin-induced pain in mice in a dose-dependent manner comparable to that produced by indomethacin and aspirin respectively [16].

Antibiotic Activity: Khatun discussed about the antibiotic activity of the plant *Mikania cordata* in her article. The ethanolic extract of this plant was tested by using disc diffusion method. It showed significant antibacterial activity against *S. aureus*, *Bacillus cereus*, *Escherichia coli*, and *Shigella sonnii* with a zone of inhibition in between 30 to 35 mm [17]. According to Nayeem, the extract showed antibacterial activity against some types of microorganisms upon which the extract was employed [4].

Nasrin also discussed the test which was conducted to determine antibacterial activities of this plant in her article. The extract was tested against four gram-positive and six-gram negative bacteria at three concentrations (500, 800, 1000 µg $disc^{-1}$) through the disc diffusion method. The extract showed moderate antibacterial actions, which increase with the increase of the sample concentration. The maximum antimicrobial potential was found against *Shigella flexneri*, and no sensitivity was found for *Klebsiella sp.* On the contrary, gram-positive bacteria exhibited more susceptibility to the extract than gram-negative bacteria [18].

Anti-Diarrheal Properties: Ali demonstrates about the antidiarrheal properties which are related to the functions of the gastrointestinal tract. According to his article, diarrhea was induced in mice by oral administration of castor oil (0.5 ml) 30 min after the administration of the extract. During a 4 h study, the number of diarrheal feces and percentage inhibition of the extract (200 and 400 mg/kg body weight) was determined. Loperamide (3 mg/kg body weight) served as standard, and it belonged to the positive control group. The extracts showed potent anti-diarrheal activity as well as achieved statistically significant p-value ($p<0.01$ and $p<0.05$) compared to control group [19].

Hepatoprotective: A Liver injury, which is instigated by carbon tetrachloride was scrutinized to observe the response of *Mikania cordata* root extract on it for the hallmark of functional efficiency of the liver cells. Lipid peroxidation, serum glutamate oxaloacetate transaminase (SGOT), serum glutamate pyruvate transaminase (SGPT) and serum lactate dehydrogenase (LDH) were used. At a dose of 10 mg/kg, 7.8% inhibition of lipid peroxide levels in the liver, the homogenate was taken, but at the optimum dose level of 150 mg/kg, the reluctance was more distinguished (68.7%).

In the case of lipid peroxide levels in the hepatic lipid fraction, the inhibitory values were 4.3% and 30.4% at the low and the high (optimum) doses tested respectively. Maximum inhibition of the increased enzyme levels was observed (*i.e.*, SGOT, 15.6%; SGPT, 13.4%; LDH, 22.8%) at a dose of 150 mg/kg. Thus, it was found that during carbon tetrachloride administration *Mikania cordota* root extract induced recovery from the damage caused in liver tissue [20]. To verify the potency of the *Mikania cordata* root extract in the tissue repair activities in mice intoxicated with carbon tetrachloride, further experiments were also carried out. Total plasma protein, albumin, globulin, blood urea, hepatic microsomal ribonucleic acid (RNA), and cytochrome P-450 level were evaluated. Albumin was decreased, and globulin level was increased due to the administration of acute single intraperitoneal CCI, (1 ml of 20% v/v in olive oil kg body weight).

Thus, it decreased the overall albumin globulin ratio. After treating the mice with CCL, a lower blood urea level was also observed. The features which were initially found to be dose-dependent were reversed when the root extract was pretreated with A1h. However, the results were in the dose range of 10 and 50 mg/kg. The level of hepatic microsomal RNA (42.2%; pCO.001) and cytochrome P-450 content (70.2%; pcO.001) that were altered in CCC-induced liver damage were improved by the *Mikania cordata* root extract (at 150 mg/kg). Thus, it is considered that *M. cordata* root extract may deviate the deleterious effects of

CCI, protect the liver cells and activate the hepatic reticuloendothelial system-mediated defense mechanism as well as the regeneration of protein synthesis [21].

Although, there has been very little or no effect on hepatic microsomal cytochrome P-450 and cytochrome b, contents as well as NADPH cytochrome c reductase activity on oral administration of a methanolic extract of this plant root (50, 100 or 150 mg/kg for 4, 8 or 12 weeks), somehow it had an induction of uridine diphosphate glucuronyltransferase activities of liver microsomes. The activities of microsomal uridine diphospho glucose dehydrogenase reduced nicotinamide adenine dinucleotide (phosphate): quinine reductase and cytosolic glutathione s-transferases with a concomitant elevation in the contents of reduced glutathione were significantly increased by the extract. These dose-dependent effects were maintained during 12 weeks of the extract treatment. It was observed from the results that the intracellular contents of active intermediates of various xenobiotics including chemical carcinogens would be reduced by the specific enhancement of drug-detoxifying enzymes in the liver of rats treated with the plant extract [22].

Epidermal or Skin Protective: Tribe Seminoles also uses *M. cordata* indigenously to treat itchy skin as well as for circumcision, wounds, and tumors [23]. Brine shrimp lethality bioassay helps to evaluate the cytotoxic activity of the ethanolic extract of *M. cordata* leaves. The LC_{50} and LC_{90} values of the extract were 102.09 and 971.63 µg/ml, respectively. Previously, this cytotoxic activity of the extract of *M. cordata* leaves was done, and the same data was found [24, 4]. Plants collected from different areas show different results due to geographical and climate changes. The brine shrimp bioassay for *M. cordata* shows that less toxic leaves will show more effect. This shows that intake at low doses is safe, but at higher doses, it may cause hazardous effects.

For detection of antitumor compounds in plant materials, the BSLB has been used as a simple biological test. For crude extracts, LC_{50} values less than 1000 ppm are considered powerful for plant-derived antitumor compounds, *M. cordata* leaves ethanolic extract is considered as a promising candidate. Minerals such as potassium, iron, magnesium, zinc, and manganese are present in the highest amount. On the other hand, phosphorus and sulfur were present in very low amount. In disease conditions and biological processes, minerals play a significant role. An essential component of several enzymes is zinc and is used for proper reproduction, wound healing, skin integrity, bone metabolism, and proper functioning of taste and eyesight [25].

Coagulative Properties: *Mikania cordata* has properties which aid to restrain leukotriene and synthesis of platelet-activating factor [26]. It has been found in an ethnobotanical survey that traditionally, in villages of Bangladesh, *Mikania cordata* plant leaves are used to cease peripheral bleeding [27].

Anti-Carcinogenic Property: A study done by Bishayee and Chatterjee indicated that *M. cordata* root extract, an antihepatotoxic agent, had a profound influence on at least several of the enzymes involved directly or indirectly in the metabolism of carcinogens. The activities of UDPGT measured using 4-NP or PPT as substrate was elevated during the entire course of study, and these effects were found to be dose-dependent. Moreover, the results were significant at 8^{th} or 12^{th} week with a dose of 100 or 150 mg/kg Sturtevant found in his work that *M. cordata* is used indigenously by the tribe Seminoles to treat tumor [23].

CNS Depressant Property: Bhattacharya S. and his fellow mates had found in their study, a root extract of *Mikania cordata* in doses of 25 mg/kg and above altered some of the behavioral responses in mice. The animals became remarkably quiet, and there was a considerable decrease in locomotors activity, which lasted nearly 1.5 to 2 h. They had also found that the root extract in a dose of 100 mg/kg (i.p.) caused a significant reduction in spontaneous locomotor activity in mice. Moreover, there was a 58.63% inhibition of spontaneous motility following the root extract treatment (as compared to control) [10].

Anti-Stress Property: Research study done by Bishayee and Chatterjee implies that the animals pretreated with *M. cordata* root extract were able to counteract a variety of stressful conditions. The

study showed there was a marked increase in the duration of swimming performance not only in normal but also in adrenalectomized mice [28].

Moreover, another study of them showed, both swimming and immobilization stress significantly increased the activity of SDH in the brain ($p<0.01$) and liver ($p<0.05$) tissue when compared to the corresponding non-stress control. When *M. cordata* root extract pretreated animals were subjected to swimming or immobilization stress, the enzymatic activity of SDH in both brain and liver was further increased as compared to corresponding stress control values. These results were found to be dose dependent and only significant ($p<0.05$ or 0.01) with a dose of 100 or 150 mg/kg [29].

Cytotoxic- Activity: Nayeem and his colleagues studied the general cytotoxic effect of *mikania cordata* extract on brine shrimp *Artemia salina* where six doses of plant extract (10, 20, 40, 80, 160 and 320 µg/ml) in 5% DMSO seawater were tested. In brine shrimp lethality bioassay, the extract showed lethality against the brine shrimp nauplii. It showed a higher mortality rate at higher concentrations gradually [4]. Ali with his fellow mates, had done another study on the lethality of the crude extract of *Mikania cordata* leaves to brine shrimp against *Artemia salina.* After 24 h, they observed apparent *in-vitro* toxicity in brine-shrimp lethality bioassay comparing standard drug vincristine sulfate [21].

Insect and Scorpion Bites: Sastri stated that, in Assam (India), the local herbal practitioners (Kabiraj) uses the leaf juice of *M. cordata* in the case of insect and scorpion sting [30]. Moreover, Quisumbing, E. in his book stated regarding the use of *Mikania cordata* plant in scorpion bites [31].

CONCLUSION: *Mikania cordata* is contending with as well as discharging allelochemicals to developed harvests.

In this review, we fundamentally exhibited the potential pharmacological impacts and uses of an obtrusive weed named *Mikania cordata*. If we can control the use of this plant and use it legitimately then we will probably treat different afflictions. For example, inflammation, diarrhea, GIT issue, liver dysfunctions, CNS problems, blood coagulating issues and even illnesses related with bacteria or different microbes. To guarantee the genuine assurance of pharmacological properties of this plant and to give fundamental medications as a type of meds to treat those diseases expressed previously, proper and adequate research ought to be accessible.

ACKNOWLEDGEMENT: Authors are grateful to Jahangirnagar University, Department of Pharmacy, Savar, and Dhaka, Bangladesh for providing the necessary facility to carry out the study.

CONFLICT OF INTEREST: Authors declare no conflict of interest.

REFERENCES:

1. Ghani A: Medicinal plants of Bangladesh: Chemical constituents and uses, Asiatic Society of Bangladesh, Edition 2nd, 1998; 467.
2. Bardhan S, Ashrafi S and Saha T: Commonly Used Medicinal Plants in Bangladesh to treat different infections. Journal of Immunology and Microbiology 2018; 2(1): 3.
3. Burkill H: In the useful plants of West Tropical Africa. Kew Royal Botanic Gardens,Kew, England, Edition 2nd, Vol. 1, 1985: 855
4. Nayeem AA, Khatun A, Rahman MS and Rahman M: Evaluation of phytochemical and pharmacological properties of *Mikania cordata* (Asteraceae) leaves. Journal of Pharmacognosy and Phytotherapy 2011; 3(8): 118-23.
5. Herz W, Santhanam PS, Subramaniam PS, and Schmid JJ: The structure of mikanolide, a new sesquiterpene dilactone from mikaniascandens (L.) Willd. Tetrahedron Letters 1967; 8(32): 3111-15.
6. Pélissier Y, Marion C, Koné D, Brunel JF, Fofana H and Bessière JM: Volatile constituents of the leaves of *Mikania cordata* (Burm.f.) B.L. Robinson var. cordata (Asteraceae). Journal of Essential Oil Research 2001; 13(1): 31-32,
7. Aguinaldo AM, Yamauchi AFT and Padolina WG: Germacranolides of *Mikania cordata*. Phytochemistry 1995; 38(6): 1441-43.
8. Siddiqui SA, Rahman A, Rahman MO, Akbar MA, Rouf ASS, Ali MA, Al-Hemaid, FMA and Farah MA: Evaluation of anti-nociceptive, anti-inflammatory and antipyretic potential of *Mikania cordata* (Burm. f.) Robinson in experimental. Saudi Journal of Biological Sciences 2018; 25: 1049-55.
9. Chang CW, Chang WT, Liao JC, Chiu YJ, Hsieh MT and Peng WH. Analgesic and Anti-inflammatory activities of *Cissus repens* in mice. Evidence Based Complementary and Alternative Medicine 2012; 12.
10. Herbert BE, Bagares LM, Galang RR, Garcines K, Go SS and Jalamana MA: Safety and efficacy of herbal ointment formulated with methanolic extract of *Mikania cordata* as treatment for acute superficial injury. Journal of Pharmacognosy and Phytochemistry 2014; 2(4): 11.
11. Bhattacharya S, Pal S and Chaudhury AKN: Pharmacological Studies of the anti-inflammatory profile of *Mikania cordata* (Burm) B. L. Robinson root extract in rodents. Phytotherapy Research 1992; 6: 255-60.

12. Bhattacharya S, Pal S and Chaudhury AKN: Neuro-pharmacological studies on *Mikania cordata* root extract. Planta Medica 1988; 54(6): 483-7.
13. Pal S, Bhattacharya S, and Chaudhuri AKN: The effects of *Mikania cordata* (Burm) B. L. Robins. root extract on gastro-duodenal ulcer models in rats and guinea pigs. Phytotherapy Research 1988; 2(4): 180-82.
14. Paul RK, Jabbar A and Rashid MA: Antiulcer activity of *Mikania cordata*. Fitoterapia 2000; 71(6): 701-03.
15. Partha P and Hossain ABME: Ethnobotanical investigation into the mandi ethnic community in Bangladesh. Bangladesh J Plant Taxon 2007; 14(2): 129-45.
16. Mollik MAH, Hossan MS, Paul AK, Rahman MTU, Jahan R and Rahmatullah M: A comparative analysis of medicinal plants used by folk medicinal healers in three districts of Bangladesh and inquiry as to mode of selection of medicinal plants. Ethnobotany Research and Applications 2010; 8: 195-18.
17. Khatun R, Nasrin L, Roy S, Tantry MA and Rahman MAA: comparative antimicrobial evaluation of available *Mikania species* in Bangladesh. International Journal of Plant Research 2017; 7(2): 36-38.
18. Nasrin F and Hakim ML: *In-vivo* antidiarrheal study of ethanolic extracts of *Mikania cordata* and *Litsea monopetala* leaves. Bangladesh Journal of Pharmacology 2015; 10: 562-65.
19. Ali MS, Islam MS, Rahman MM, Islam MR, Sayeed MA and Islam MR: Antibacterial and cytotoxic activity of ethanol extract of *Mikania cordata* (Burm. F.) B.L. Robinson leaves. Journal of Basic and Clinical Pharmacy 2011; 2(2): 103.
20. Mandal PK, Bishayee A, Mukherjee JR and Chatterjee M: *Mikania cordata* root extract in the inhibition of lipid peroxidation and reduction of enzyme leakage in mice with carbon tetrachloride induced liver damage. Phytotherapy Research 1992; 6(4): 227-29.
21. Mandal PK, Bishayee A, and Chatterjee M: Stimulation of tissue repair by *Mikania cordata* root extract in carbon tetrachloride-induced liver injury in mice. Phytotherapy Research 1993; 7(1): 103-05.
22. Bishayee A and Chatterjee M: Anticarcinogenic biological response of *Mikania cordata*: reflections in hepatic biotransformation systems. Cancer Letters 1994; 81(2): 193-200.
23. Sturtevant WC: The Mikasuki Seminole: Medical Beliefs and Practices. A Ph.D. Thesis submitted to Yale University 1954: 166.
24. Ali MS, Islam MS, Rahman MM, Islam MR, Sayeed MA and Islam MR: Antibacterial and cytotoxic activity of ethanol extract of *Mikania cordata* (Burm. F.) B.L. Robinson leaves. Journal of Basic and Clinical Pharmacy 2011; 2(2): 103-107.
25. Barua N, Absar N, Paul S, Barua A, Gazi MY, Saha M, Islam MS and Belaly JM: *In-vitro* phytochemical, cytoxicity and mineral composition analyses of *Micania cordata* (Bumr.f.) B.L. Robinson leaves. International Journal of Biosciences (IJB) 2014; 5(8): 154-60.
26. Ysrael MC and Croft KD: Inhibition of leukotriene and platelet activating factor synthesis in leukocytes by the sesquiterpene lactone scandenolide. Plant Med 1990; 56(3): 268-70.
27. Rahmatullah M, Mollik MAH, Ali M, Abbas MFB, Jahan R, Chowdhury M, Seraj S, Miajee ZUMEU, Azad AK, Bashar ABMA and Chowdhury AR: An ethnomedicinal survey of Vitbilia village in Sujanagar sub-district of Pabna district, Bangladesh. American-Eurasian Journal of Agricultural and Environmental Sciences 2010; 4(3): 302-08.
28. Bishayee A and Chatterjee M: Anti-stress potential of *Mikania cordata* root extract in mice. Pharmaceutical Biology 2008; 32(2): 126-34.
29. Bishayee A and Chatterjee M: Mechanism of anti-stress activity of *Mikania cordata* root extract in Albino mice. Pharmaceutical Biology 2008; 33(3): 215-21.
30. Sastri BN: The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products, Raw Materials. vol. 6, Council of Scientific and Industrial Research, New Delhi, India, 1951; 114(2950): 49.
31. Quisumbing EA: Medicinal Plants of the Philippines. Katha Publications, Quezon City, 1978: 990.

How to cite this article:
Sajid SS, Anika AK, Jahan MAN and Dash PR: A comprehensive review of *Mikania cordata* (Asteraceae). Int J Life Sci & Rev 2019; 5(4): 49-59. doi: 10.13040/IJPSR.0975-8232.IJLSR.5(4).49-59.