

## WEDELIA CHINENSIS (ASTERACEAE)- AN OVERVIEW OF A POTENT MEDICINAL HERB

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### ABSTRACT

The plant *Wedelia chinensis* (*W. chinensis*) belonging to family Asteraceae has great importance in Ayurvedic, Sidhha and Unani Systems of Traditional Medicine. In the present study an important medicinal herb *Wedelia chinensis* was investigated for qualitative and quantitative phytochemical screening using standard methods. Preliminary phytochemical screening of various extracts of the leaves revealed the presence of various classes of compounds such as alkaloids, flavonoids, tannins and phenols. *Wedelia chinensis* is one of the medicinal plants having great potency in treating certain common diseases traditionally. In view of identifying its active components responsible for its medicinal value, attempt is made for the quantitative

analysis of phytochemicals by GC – MS spectroscopy. Various pharmacological activities were found in *W. chinensis* such as antioxidant, anti-inflammatory, analgesic, sedative, antistress, antiulcerogenic, anticancer, antibacterial, antifungal, anticonvulsant, hepatoprotective and androgen suppressing activities

**KEYWORDS:** *Wedelia chinensis*, Hepatoprotective, Traditional Medicine, antidiarrhoeal, antifungal.

### INTRODUCTION

*Wedelia chinensis* is a perennial herb of about 0.3 to 0.9 m height. Leaves are fleshy, usually 4-9 cm long and 2-5 cm wide, irregularly toothed or serrate, usually with a pair of lateral lobes and obviate in shape. Flowers are yellow, tubular in terminal or axillary head and 4-5 cm in diameter (Umashankar *et al*, 2010). Traditionally the fruits, leaves and stem are used in childbirth and in the treatment of bites and stings, fever and infection. The leaves are used in

the treatment of kidney dysfunction, cold, wounds and amenorrhea (Mathew, 1983). *Wedelia chinensis* is a traditionally used medicinal herb in ayurveda, siddha and unani system of medicines (Manjamalai *et al*, 2012). Traditionally, the fruits, leaves and stem are used in child birth and in the treatment of bites and stings, fever and infection. The leaves are used in the treatment of kidney dysfunction, cold, wounds and amenorrhea (Verma *et al*, 2008). The tonic of the leaves is used in cough and cephalagia. Decoction of the plant is used in menorrhagia and skin diseases (Kirthikar *et al*, 2006). The plant has also found its use in inflammations, helminthic diseases and liver disorders (Jalal *et al*, 2012). The plant is scientifically reported to possess antioxidant property which indicates its usefulness in reducing anxiety and stress in emotional conditions (Suresh *et al*, 2010).

Plants contain hundreds or thousands of metabolites. Medicinal and aromatic plants are gifts of nature and are being used against various infections and diseases in the world since past history. World Health Organization (WHO) has defined medicinal plants as plants that contain properties or compounds that can be used for therapeutic purposes or those that synthesize metabolites to produce useful drugs. The most important of these substances include alkaloids, glycosides, steroids, flavonoids, fatty oils, resins, mucilages, tannins, gums, phosphorus and calcium (Nomani *et al*, 2013). A natural origin drugs play an important role in the public health care of any country. World Health Organisation (WHO) has recommended the evolution of the effectiveness of plants in condition where there is lack of safe synthetic drugs. *Wedelia chinensis*, is a drug of natural origin (herbal medicine) and is most popular herbal medicine used in various system of medicine like Ayurvedic, Siddha, Unani system of medicine (Koul *et al*, 2012).

Drugs of natural origin play a significant role in the public health care system of any nation. Indian Materia Medica includes about 2000 drugs of natural origin of which approximately 400 are mineral and animal origin while the rest are of vegetable origin Ayurveda, Siddha and Unani systems 600-700 herbs for medicinal use. The WHO(1980) has also recommended the evaluation of the effectiveness of plants in conditions where there is lack of safe synthetic drugs, *Wedelia chinensis* reputed herbal medicine in Ayurvedic, Siddha and Unani system of medicine. It is a scabrous procumbent perennial soft herb with high camphor like odor and has a gorgeous growth (Ibrahim *et al*, 2013).

**BOTANICAL DESCRIPTION**

**Leaves of *Wedelia chinensis***

It is scabrous procumbent perennial soft herb with high camphor like odour and has a gorgeous growth. It is a perennial herb of 0.3-0.9 m high, stem procumbent at base and rooting at lower nodes. Leaves are opposite, subsessile, 2.5-7.5 by 1-2.8 cm lanceolate-oblong, entire or irregularly crenate-serrate, scabrous with short white hairs and base tapering. Heads of flowers, 2-3.2 cm diameter, solitary, peduncles 2.5-15 cm long erect, slender, slightly thickened beneath the heads (Koul *et al.*, 2012).

**CHEMICAL CONSTITUENTS**

The plant contains alkaloids, saponins, tannin, flavonoids, a lactone, wedelolactone and nor-wedellic acid. Expressed juice of *Wedelia chinensis* contains an oil-soluble black dye, waxy compounds, phytosterols, carotene and resin. The plant also contains inorganic salts, siliceous materials, pectin and mucin (Ghani, 2003).

**MEDICINAL USES**

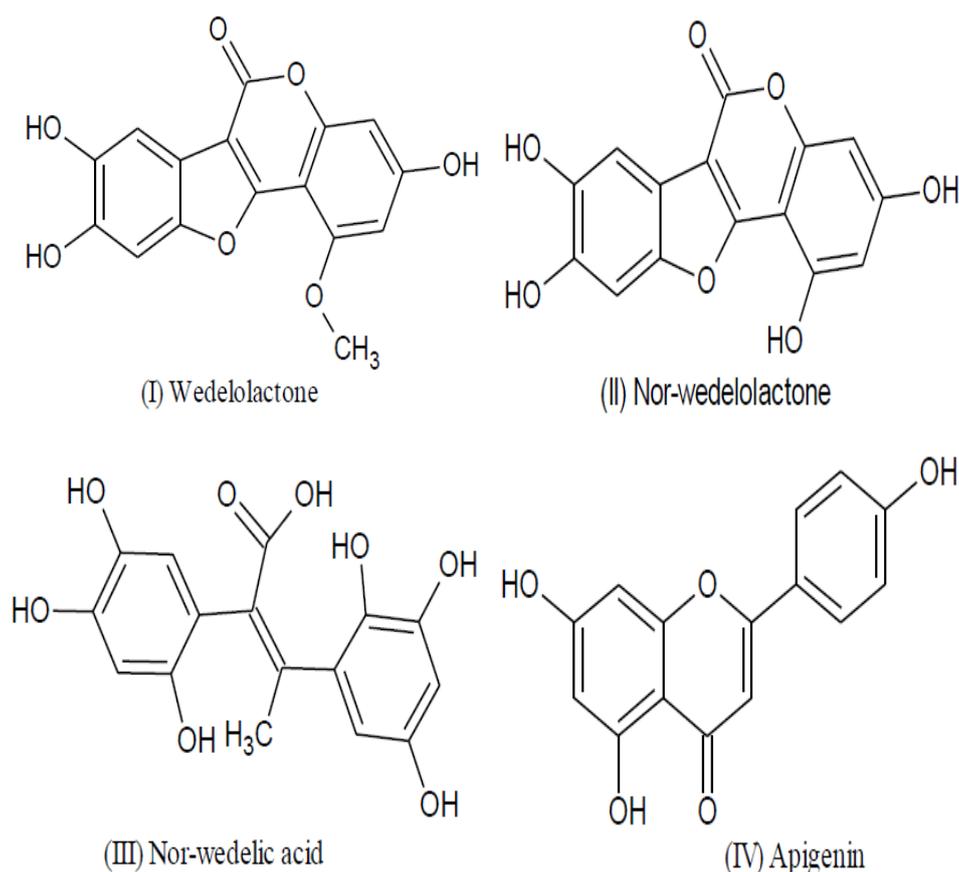
The plant has traditional uses which include kidney dysfunction, cold, wounds healing, amenorrhoea, dizziness, antioxidant, skin disease, cephalgia, apoplexy, inflammatory, multiple sclerosis, antifungal, mental tension, antimicrobial, antistress, anticandidal, jaundice.

**PHYTOCHEMISTRY**

An Indian analysis of the herb gave negative test for alkaloid, but the Chinese investigations showed the presence of an alkaloid in the stems, leaves and flowers. The leaves contain isoflavanoids and wedelolactone (I) (0.05%). The latter is the lactone of 5:6-dihydroxy-2-(2:6-dihydroxy-4-methoxyphenyl) benzofuran-3-carboxylic acid and analogous in structure

to coumestrol an estrogen from clover (Govindchari *et al.*, 1956,1957,1961; Masoodi *et al.*,2011).

The leaves contain isoflavonoids, bisdesmosidic oleanolic acid saponins and wedelolactones (Govindachari *et al.*, 1985; Khare *et al.*, 2007; Masoodi *et al.*, 2011; Haldar *et al.*, 2011). Norwedelolactone (II) has also been isolated from alcoholic extract of leaves (Bhargava *et al.*, 1970; Masoodi *et al.*,2011).Norwedelic acid (III) (5, 6-dihydroxy-2 (2', 4', 6'-trihydroxyphenyl)-benzofuran-3-carboxylic acid) (Govindachari *et al.*, 1985; Masoodi *et al.*, 2011).



The essential oil of the aerial parts of the *Wedelia chinensis* Merrill was analyzed by GC and GC/MS. Nineteen compounds have been identified accounting for 94% of the oil. It was made up of mainly monoterpenes hydrocarbons (50.6%), sesquiterpenes hydrocarbons (22.5%), oxygenated sesquiterpenes (20.3%) with only small amounts of oxygenated monoterpenes (0.7%). The main constituents were found to be pinene (21.7%), spathulenol (20.3%) and limonene (14.3%)(Garg *et al.*, 2005). Luteolin, apigenin, wedelolactone and indole-3- carboxyaldehyde were also reported (Lin *et al.*, 2007).

## PHARMACOLOGICAL ACTIVITIES

The plant is also claimed to be used as antifungal, antimalarial, antibacterial, antidepressant, antioxidant, antidiabetic and used in wound healing in traditional system of Indian medicine.

### Antimicrobial

Lim *et al.* (2013) studied and tested against three pathogenic Gram positive bacteria (*Bacillus cereus*, *B. subtilis* and *Staphylococcus aureus*) and three pathogenic Gram negative bacteria (*Escherichia coli*, *Proteus rettgeri* and *Pseudomonas aeruginosa*) by the disk diffusion assay and broth dilution methods. The extract exhibited favourable antibacterial activity against the bacterial cells but was more potent against Gram positive bacteria with the minimum inhibition concentration of 3.12 to 6.25mg/ml compared to the Gram negative bacteria which had minimum inhibition concentration values of 25mg/ml.

### Hepatoprotective

Naveen *et al.* (2012) evaluated for its hepatoprotective effect in cadmium chloride- induced (3mg/kg, i.v) hepatotoxicity in albino rats. The Liv-52,2ml/kg/p.o used as a standard drug. Rats treated with CdCl<sub>2</sub> showed a significant hepatic damage as observed from elevated serum level of hepatospecific enzymes SGOT, SGPT and Total bilirubin as well as severe alteration in different liver parameters. Treatment with the aqueous extract of *Wedelia chinensis* leaves caused significant protection against cadmium chloride-induced hepatotoxicity by decreasing the serum enzyme levels and bilirubin in a dose responsive manner. In histopathology, the cadmium chloride-induced histological changes were reduced by extract treatment in a dose dependent manner.

Jalal *et al.*(2012) studied its efficacy against carbon tetrachloride (CCl<sub>4</sub>) induced hepatotoxicity in Wister rats albino. The ethanolic extract of *Wedelia chinensis* (EEWC) at doses of 250mg/kg p.o and 500mg/kg p.o were administered to CCl<sub>4</sub>treated rats and the hepatoprotective activity was assessed using biochemical parameters like aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphate (ALP), total bilirubin and total protein along with histopathological studies of liver tissues. The treatment with EEWC showed dose dependent reduction of CCl<sub>4</sub> induced elevated levels of serum enzymes and total bilirubin along with parallel increase in total protein indicating the recovery of hepatic cells. Histopathological study of EEWC treated animals showed normal hepatic cords without any cellular necrosis and fatty infiltration.

**Antioxidant activity**

Manjamalai *et al.* (2011) evaluated the antioxidant activity of essential oils from *Wedelia chinensis* (Osbeck) in vitro and in vivo lung Cancer bearing C57BL/6 mice. In all the in vitro assays, a significant correlation existed between the concentrations of the essential oil and percentage inhibition of free radicals. The in vivo studies also has shown a very good antioxidant property for the essential oil during cancer development. From, these results the essential oil can be recommended for treating disease related to free radicals.

**Analgesic activity and Anti-inflammatory**

Suresh *et al.* (2006) studied the analgesic activity by hot plate and acetic acid induced writhing methods to assess its analgesic activity. The extract was also evaluated for its by using on carrageenan, mediators such as histamine and serotonin induced paw oedema and cotton pellet induced granuloma tests for its effect on acute and chronic phase inflammation models in rats, as well as analgesic activity in mice. It was found that the extract caused an inhibition on the writhing response induced by acetic acid in a dose dependent manner. Dose of 500 mg/kg and aspirin could block the writhing response by 51.92% and 68.68% ( $p < 0.001$ ), respectively.

Grace *et al.* (2011) reported anti-inflammatory effect was due to Carvocrol-46% and trans-Caryophyllene-14% as major phytochemical constituents which may be responsible for its antifungal and anti-inflammatory properties.

**Wound healing activity**

Verma *et al.* (2008) evaluated would healing activity of rats using excision, incision and dead space wound models. The parameters studied include rate of wound contraction, period of complete epithelialization, tensile strength of incision wound and, granulation tissue dry weight. Its ethanolic extract was found to possess significant wound healing activity, which was evidenced by decrease in the period of epithelialization, increase in the rate of wound contraction, skin breaking strength, granulation tissue dry weight, and its breaking strength.

**Anticancer activity**

Lin *et al.* (2014) reported on Ethyl acetate extract of *Wedelia chinensis* inhibits tert-butyl hydroperoxide-induced damage in PC12 cells and D-galactose-induced neuronal cell loss in mice, An ethyl acetate extract of *W. chinensis* (EAW) was prepared and analyzed by HPLC.

The neuroprotective potential of EAW was assessed by tert-butylhydroperoxide (t-BHP)-induced damage in PC12 cells and D-galactose-induced damage in mouse cortex.

## CONCLUSION

There are number of plants which are used traditionally by the tribal people of India but they are not been validated. Thus an alternative approach by natural remedies to allopathic medications as they cause undesirable side effects. From this study, it is clear that the medicinal plants play a vital role against various diseases. This review revealed that *Wedelia chinensis* leaves could be used to prevent from microbial and fungal, ulcer, diabetes, depression, hepatoprotective, antidiarrhoeal. A variety of botanical products have been isolated and reported to possess that activity. Hence the review study is concluded that the herbal drug *Wedelia chinensis* is a promising plant possessing antiulcer, antifungal, antidiarrhoeal, anti-diabetic, anti-microbial, antidepressant activity, hepatoprotective and it has been proved by different animal models in the near future too.

## REFERENCES

1. Bhargava K.K, Krishnaswamy N.R, Seshadri T.R. Isolation of dimethyl wedelolactone and its glucoside from *Eclipta alba*. *Indian J Chem.*, 1970; 8: 664-665.
2. Garg S.N, Gupta D, Jain S.P. Volatile constituents of the aerial parts of *Wedelia chinensis* Merrill. from the north Indian plants. *J Essent Oil Res.*, 2005; 17: 364-365.
3. Ghani, A. Medicinal Plants of Bangladesh with chemical constituents and uses. 2nd edition, Asiatic Society of Bangladesh, 5 old Secretariate road, Nimtali, Dhaka, Bangladesh, 2003.
4. Govindchari TR, Nagarajan K, Pai BR. Chemical examination of *Wedelia calendulaceae*, Structure of Wedelolactone. *J Chem Soc.*, 1956; 629-632.
5. Govindchari TR, Nagarajan K, Pai BR, Parthasarathy PC. Chemical investigation of *Wedelia calendulaceae*, Part-II, The position of the methoxyl group in Wedelolactone. *J Chem Soc.*, 1957; 545-547.
6. Govindchari TR, Nagarajan K, Parthasarathy PC. Chemical examination of *Wedelia calendulaceae*-IV, Synthetic analogues of Wedelolactone. *Tetrahedron*, 1961; 15: 129-131.
7. Govindachari TR, Premila MS, The benzofuran norwedelic acid from *Wedelia calendulaceae*. *Phytochemistry*, 1985; 24: 3068- 3069.

8. Grace V.M.B, Manjamalai. A, Antioxidant Activity of Essential Oils from *Wedelia chinensis* (Osbeck) in vitro and in vivo Lung Cancer Bearing C57BL/6 Mice, Asian Pacific Journal of Cancer Prevention, 2012; 13.
9. Haldar P.K, Bhattacharya S, Dewanjee S, Mazumdera U.K. Chemopreventive efficacy of *Wedelia calendulaceae* against 20- methylcholanthrene-induced carcinogenesis in mice. Environ Toxicol Pharmacol, 2011; 31: 10-17.
10. Ibrahim D, Hong L.S, Kuppan N, Potent Anticandidal Activity of the Methanolic Extract of *Wedelia Chinensis* leaves Against Pathologic Candida Albicans, Int J Pharm Bio Sci., 2013; 4: 120–130.
11. Jalal A.A, Selvakumar. S, Nallathambi. R, Jeevaparakash. G, Dheivanai. S.L, Senthilvelan. S, Hepatoprotectiveactivity of *Wedelia chinensis* against carbon tetrachloride induced liver damage in rats, International Journal of Phytopharmacology., 2012; 3: 121-125.
12. Khare C.P. Indian medicinal plants: An illustrated dictionary. Heidelberg: Springer; 2007; 716.
13. Kirthikar K.R, Basu B.D. Indian Medicinal Plants. Dehradun: International Book Distributors, 2006; 1324-45.
14. Koul S , Pandurangan A, Khosa R.L, *Wedelia chinensis* (Asteraceae) - An overview Asian Pacific Journal of Tropical Biomedicine, 2012; S1169-S1175.
15. Lim S.H, Darah .I, Nithianantham.K, Effects of Methanol Extract of *Wedelia chinensis* Osbeck (Asteraceae) Leaves against Pathogenic Bacteria with Emphasise on *Bacillus cereus*, Indian J Pharm Sci., 2013; 75: 533–539.
16. Lin F.M, Chen L.R, Lin E.H, Ke F.C, Chen H.Y, Tsai M.J, Compounds from *Wedelia chinensis* synergistically suppress androgen activity and growth in prostate cancer cells. Carcinogenesis., 2007; 28: 2521-2529.
17. Lin W.L, Wang S.M, Ho Y.J, Kuo H.C, Lee Y.J, Tseng T.H, Ethyl acetate extract of *Wedelia chinensis* inhibits tert-butyl hydroperoxide-induced damage in PC12 cells and D-galactose-induced neuronal cell loss in mice, BMC Complement Altern Med., 2014; 14: 491.
18. Manjamalai. A, Jiflin G.J, Grace berlin V.M, Study on the effect of essential oil of *Wedelia Chinensis* against microbes and inflammation, Asian Journal of Pharmaceutical and Clinical Research., 2012; 5: 0974-2441.
19. Masoodi M.H, Ahmad B, Wali A.F, Zargar B.A, Dar M.A, Recent developments in phytochemical and pharmacological studies of *Wedelia calendulaceae*-A review. Indian J Nat Prod., 2011; 27: 3-7.

20. Mathew. K M. Flora of Tamilnadu-carnatic. The Rapinat Herbarium, St. Josephs College, Trichirapalli, 1983; 392.
21. Naveen V.K, Sree S.K, Hepatoprotective Activity of *Wedelia Chinensis* (Osbeck) Merr. on Cadmium induced Liver Toxicity in albino rats, Journal of Scientific Research in Pharmacy., 2012; 1: 41-45.
22. Nomani. I, Mazumder A, Chakraborty GS ,*Wedelia chinensis* (Asteraceae)- An Overview Of A Potent Medicinal Herb, International Journal of PharmTech Research., 2013; 5: 957.
23. Suresh. V, Kumar. R.M, Suresh. A, Kumar. N.S, Arunachalam. G, Umasankar. K, CNS Activity of Ethanol Extract of *Wedelia chinensis* in Experimental Animals, International Journal of Pharmaceutical Sciences and Nanotechnology, 2010; 3: 11.
24. Umashankar K, Suresh V, Kumar R.M, Suresh A, Arunachalam G, CNS activity of ethanol extract of *Wedelia chinensis* in experimentals animals, International journal of pharmaceutical sciences and nanotechnology, 2010; 3: 113-543.
25. Verma. N, Khosa R.L, Garg. V.K, Wound healing activity of *Wedelia chinensis* leaves, Pharmacologyonline, 2008; 2: 139-145.
26. Verma N, Koche V, Tiwari K.L, Mishra SK. Plant regeneration through organogenesis and shoot proliferation in *Trichodesma indicum* (Linn) R. Br. a medicinal herb. Afr J Biotechnol, 2008; 7: 3632-7.