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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 (sunflower family) has great importance in Ayurvedic, Sidhha and Unani Systems of Traditional Medicine. By studying different literature available on *Wedelia chinensis* shows the fact that it is a popular remedy among the various ethenic groups for the treatment of various ailments. Through the screening of various literature on *Wedelia chinensis* it is observed that *W. chinensis* shows the presence of various active constituents like flavonoids ,diterpenes, triterpenes, saponins and phytosterol. Various pharmacological activities were found in *W. chinensis* such as antioxidant ,anti-inflammatory, analgesic, sedative, antistress, antiulcerogenic, anticancer, antibacterial, antifungal, anticonvulsant, hepatoprotective and androgen supressing activities. This review will emphasis on an overview of the various phytochemical and pharmacological evidences of *W.chinensis* carried so far. Furthermore studies are to be carried out for therapeutic potential which will benefit the mankind.
Keywords: *Wedelia chinensis* , Hepatoprotective, Traditional Medicine, Analgesic.

INTRODUCTION

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 [1,2]. *Wedelia chinensis* (osbeck) Merill, Asteraceae 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 [3,4].

HABITAT AND SYNONYM

Wedelia chinensis is procumbent, perennial herb found in wet places in Uttar Pradesh, Assam, Andhra Pradesh and along the coastal areas [5]. It is found in plains district of Madrass presidency, China and Japan [4]. Generally whole plant is used for treating disease.

Part used: Leaves, stem, whole plant. It is also known by different vernacular names in different regions,

Hindi,(Pilabhangra),Marathi (Pivala bhangra), Sanskrit(Birimagari), Bengali(Bhimra), Kannada(Gargneri). Wedelia chinensis is also knwn as Solidago chinensis.

BOTANICAL DESCRIPTION

[Figure 1: picture of the herb]

It is scabrous procumbent perennial soft herb with high camphor like odour and has a gorgeous growth [3,4].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 cenate-serate , scabrous with short white hairs and base tapering. Heads of flowers, 2-3.2 cm diameter, solitary, peduncles 2.5-15cm long erect, slender, slightly thickened beneath the heads.

TRADITIONAL USES

The literature reveals that various parts of *Wedelia chinensis* have been used as folklore medicine for treating various ailments like hepatoprotective efficacy, cholagouge, jaundice, diarrhoea, couch, cephalahagia, diphtheria and pertussis [6].The decoction of the plant is used a deosurbent and is given in uterine haemorrhage and menorrhagia. Leaves are supposed to work as tonic which is useful in cough, cephalagia, skin disease and alopecia. Infusion of the plant is given in Indo China for treating swelling of abdomen. Decoction of the plant was extensively used by the tribes of Kolli Hills of Namakkal District.Tamil Nadu, India, to reduce the mental tension and also to induce sleep[7]. *Wedelia chinensis* is very specific in treating viral hepatitis. Traditionally the fruit, leaves and stem are used in child birth and in treatment of bites and stings, fever and infection. Leaves are used to treat the kidney dysfunction cold, wound and amenorrhea[8].

Leaves are used in dyeing grey hair and in promoting the growth of hair .*Wedelia chinensis* is also been used as home remedy for treating Osteochondritis dissecans, multiple sclerosis, juvenile arthritis, gouty arthritis, Rheumatic fever etc. Leaves extract are natural alternative to commonly used anti-inflammatory drugs like Dolonex (Piroxicam) Brufen and Voveran [9]

PHYTOCHEMISTRY

Chemical components isolated from the plants are as follows:

Expressed juice of herbs contained an oil soluble black dye, carotene, chlorophyll, tannin, saponin, phytosterol, waxy compound and resin. Indian analysis give negative test for alkaloids but the chinise investigation showed the the presence of alkaloid in the stem, leaves and flowers. Leaves contain isoflavonoids and wedlolactone (analogus to coumestrol an estrogen from clover) [10]. Norwedlolactone is also obtained from alcoholic leaves extract(11). The leaves contain isoflavonoids, bisdesmoside, oleonelic acid saponin and wedloactone.[12]

PHARMACOLOGICAL ACTIVITIES

HEPATOPROTECTIVE ACTIVITIES

Linn SC *et al* 1994- [13] studied the effects of *Wedelia chinensis* extract on liver by inducing hepatotoxicity using three hepatotoxins : carbon tetrachloride and acetaminophen in mice and dextro-Galactosamine in rats. It was concluded that *Wedelia chinensis* showed definite hepatoprotective effect against liver injuries.

Murugain P *et al*-2008 (14) studied the hepatoprotective activity of ethanolic extract of *W.calendulaceae* against carbon tetrachloride induced hepatotoxicity in rats .The treatment with ethanolic extract of *Wedlia chinensis* showed dose dependent reduction of carbon tetrachloride induced elevated serum levels of enzymes activities with parallel increase in total protein and bilirubin indicating the extract preserves the normal functional status of liver.

Mishra G *et al* 2009 – [15] studied the hepatoprotective activity of alcoholic and aqueous extracts of *Wedelia chinensis*. It was observed that the alcoholic extract at a dose level of 500µg/Kg was found to be more potent as compared to aqueous extract.

Wagner H *et al* 1986- [16]Ethyl acetate-soluble fraction of the drug *Wedelia chinensis* exhibit antihepatotoxic in the assay employing CCl4-,GaIN-, and Phaloidin-cytotoxicity in rat hepatocytes.It showed a significant stimulatory effect on liver cell regeneration.

Jalal A *et al* 2012 - [17] studied the hepatoprotective activity of *Wedelia chinensis* against carbontetrachloride induced liver damage in rats. It revealed the presence of phytoconstituents such as flavonoids, terppenoids and tanins which might be responsible for hepatoprotection.

CNS ACTIVITY

Suresh V *et al* 2010 – [18] studied the effect of ethanolic extract of *Wedelia chinensis* as a whole plants on the CNS Swiss albino mice and wistar rat. The CNS effects were evaluated by general behaviour. It revealed that the ethanolic extract at 200 and 300 mg/Kg body weight causes a significant reduction in the spontenious activity, exploratory behaviour, muscle relaxant activity and significantly potentiated phenobarbitone sodium-induce sleeping time.

CNS DEPRESSANT

Suresh V *et al* 2010 – [19] investigated the ethanolic extract of *Wedelia chinensis* (whole plant) by a common phytopharmacological tests. It revealed that some phytoconstituents present in the plant showed the reduction in exploratory behaviour in animal which was simillar with the action of other CNS depressing agents.

ANTIMICROBIAL ACTIVITY

Manjamalai A *et al* 2011 – [20] evaluated antifungal and anti-inflamatory effects on methanolic extract of *Wedelia chinensis* leaves.It revealed that the higher concentration of methanolic extract reduces inflammation more as compared to low concentration of methanolic extract. The GC-MS study was performed to find out the major active phytochemical compounds in the essential oil of fresh leaves of *Wedelia chinensis*.

Rehana Banu and Nagrajan N 2010 – [21] studied the antimicrobial activity of *Wedelia chinensis* leaves.It was tested against fifteen (Gram+ve and Gram-ve bacteria) and five fungi using disc diffusion method. Susceptibility of test microbes depends on the solvent used for extraction. It was found that methanolic extract showed the strong antimicrobial activity. Most susceptible Gram +ve bacteria is *steptococus* species. Significant antifungal activity was observed against *Candida albicans* by methanolic extract.

Manjamalai A *et al* 2010 – [22] studied phytochemical constituents and antimicrobial activity of some medicinal plants including ethanolic extact of *Wedelia chinensis.* The antibacterial activity was evaluated against different bacterial strains by detecting minimum inhibitory concentration and zone of inhibiton.

PHYTOCHEMICAL CONSTITUENTS

Manjamali A *et al* 2010 – [22] Performed the quantitative phytochemical analysis by using Gas Chromatography-Mass Spectroscopy technique by the essential oil obtained by hydrodistillation process.The major peaks obtained for *Wedelia chinensis* extract was found to be 10 major peaks .

Meena A.K *et al* 2011 – [23] studied the pharmacological and phytochemical evidences for the plants of *Wedelia chinensis*. It revealed the pharmacological evidences of extract of plant from the wedelia genus giving an over view of most studied biological effects and the known phytochemical compounds.

PLANT TISSUE CULTURE

Madhwan S *et al* - 1995 [24] established the rapid multiplication of *Wedelia chinensis* a valuable medicinal hearbs. It was observed that cut stem of the plantswere treated with IBA and GA and concluded that 100ppm IBA treatment greatly enhances root production and quick establishment of cut stem.

Mrtin KP *et al* 2003 – [25] study the high frequency axillary bud multiplication and ex vito rooting of *Wedelia chinensis*. An efficient protocol was achieved for rapid propogation of *Wedelia chinensis* (Osbeck) Merr. Through axillary bud proliferation and ex-vitro rooting.Excision and culture of node of node segments from in vitro shoots on medium supplemented with the same concentration of growth regulators developed more than 30 shoots within 40 days. It was concluded that rooting exvitro by direct transfer of shoots from multiplication medium exhibited 89% survival. Use of commercial sugar and tap water and also the removal of in vitro rooting reduce the propogation cost 50-70%. The protocol enables to harvest more than 50 000 plantlets within 150 days from asingle node explant.

Rahman MM and Bhand SK 2011 - [26] developed a protocol for in vitro culture and rapid propogation of *Wedelia chinensis*. Three different explants of *Wedelia chinensis* were grown on MS basal medium supplemented with different combinations and concentration of of cytikinin and auxin. The in vitro developed complete plantlets were acclimatized in outer environment through successive phases of acclimatization. On an average 80% of the seedling s could be finally established in pots.

ANTIOXIDANT ACTIVITY

Manjamali *et al* 2012 – [27] studied the antioxidant activity of essential oil from *Wedelia chinensis in vitro* and *in vivo* by lung cancer bearing C57BL/6.It showed a significant co-relation existing between the concentration of essential oil and percentage of inhibition free radicals. It revealed that essential oil can be recommended for treating diseases related to free radicals and to prevent cancer treatment.

ANTICANCER ACTIVITY

Gupta M *et al* 2007 – [28] evaluated the methanolic extract of *Wedelia calundalaceae* for its anticancer activity against Ehrlich Ascites carcinoma in swiss albino mice. The extract increases the life span of EAC treated mice and restore the hematological parameters as compared with EAC bearing mice.

SaiT CH *et al* 2009- [29] studied the biological effects *in vivo of Wedelia chinensis* extract on prostate cancer. It was concluded that the anti- cancer action of *Wedlia chinensis* extract was due to three active compounds that inhibit the androgen receptor signalling pathway and the oral administration of the extract impeded cancer tumour genesis.

ANDROGEN SUPRESSING ACTIVITY

Lin FM *et al* 2007- [30] found that compounds from *Wedelia chinensis* synergistically supresses the androgen activity and growth in prostate cancer cells. It revealed that synergistic effects of active compound in *Wedelia chinensis* which demonstrated their potential in Prostate Cancer prevention and therapy.

WOUND HEALING ACTIVITY

Verma N *et al* 2008- [31] studied the effects of ethanolic extract of leaves of *Wedelia chinensis* in excision, incision and dead space wound model . 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 brekiang streangth, granulation tissue dry weight and its breaking strength.

ADAPTOGENIC AND ANTISTRESS ACTIVITY

Verma N *et al 2009*- [32] studied the effect of Ethanolic extract of *Wedelia chinensis* leaves on stress induced changes in brain neurotransmitter and enzymes mono amine oxidase level in albino rat. It is observed that they possess mobilizing activity against cold immobilizing stress induced changes in neurotransmitter and enzymes.

SEDATIVE ACTIVITY

Prakash T *et al* 2008 [33] studied the neuropharmacological activities of the methanolic and aqueous extract of stem of *Wedelia calandulaceae* in rat and mice. The aqueous and methanolic extract produced a significant prolongation of pentobarbital induced sleeping time which reduces the spontenous mortor activity (SMA) and exploratory behavior. It also showed the prolong onset of the phase of seizure activity. It revealed that the extract contained an agent with neuropharmcological activity that may be sedative in nature.

ANTI-OSTEOPROTIC (post menopausal)

Shirwaikar A *et al* 2006 – [34] studied the two dose level on anti-osteoporotic effect of ethanolic extract of *Wedelia calandulaceae* in the ovariectomized rat model of osteoporosis . It was concluded that the methanolic extract of *W.calandulaceae* have a definite protective effect.

CHEMOPREVENTIVE

Haldar PK *et al* 2011 – [35] studied the chemopreventive effect of methanoic extract of *W.calandulaceae* (MEWC) in swiss albino mice. MEWC treatment markedly reduce tumor incidence and prolong life span of sarcoma bearing mice as compared to 20-MC (methylchloanthrene) control. Therefore *W.calandulaceae* possess remarkable chemopreventive efficacy in swiss mice.

ANALGESIC AND ANTI-INFLAMMATPRY ACTIVITY

Wagner H *et al* 1984- [36] studied that Wedlolactone from *W. calandulaceae* was found to possess 5-lipoxygenase and caspase inhibitory activities. It revealed that *Wedelia chinensis* is having potent analgesic and anti-inflamatory effects and therapeutic efficacy of *Wedelia chinensis* extract on animal models which are comparable with those of standard drugs such as Morphine, Aspirin and Indomethacine .

INSECTICIDAL

Masoodi MH *et al* 2011 – [37] studied the alcoholic extract of *Wedelia chinsnsis* and found that it gives very good results to protect the plant against *Plutella xylostella*. All the experiments showed the important role of repellant effect on the pests. The ethyl acetate extract of *Wedelia calendulaceae* showed potent insecticidal activity against pests.

ANTIHELMINTIC, FEBRIFUGE AND ANTICONVULSANT ACTIVITY

Mishra G *et al* 2011- [38] found that ethanolic and aqueous extract of whole plant of *Wedelia chinensis* at a dose level of 250, 500, 750 mg/kg body weight was performed in mice by using MES and PTZ methods. It was concluded that *Wedelia chinensis* extract may have anticonvulsant activity.It has been used earlier as febrifuge and as antihelminthic.

ANTIULCEROGENIC ACTIVITY

Hedge DA *et al* 1994- [39] studied the antiulcerogenic and mucosal protective agent .Gastric anti ulcer and ulcer healing effect of the ethanolic and aqueous extract of dried leaves of *W.calandulaceae* was found to be significant . Effect of aqueous extract is more pronounced than ethanolic extract.

IMMUNOMODULATORY EFFECT

Koul S and Khosa Lal R 2013- [40] investigated the immunomodulatory action of ethanolic extract of *Wedelia chinensis* (EEWC) whole plant .It was observed that the oral EEWC at a dose level of 200 and 400 mg/kg body weight significantly inhibit Sheep red blood cell induced delayed type hypersensivity reactions and significantly increase the phagocytic index. It was also noted that significant dose related decrease in sheep erythrocyte specific haemoaglutination antibody titre. It was concluded all doses exhibited protection in humoral immunity procedures and EEWC possesses potential for augmenting immune activity by scellular and humoral mediated mechanism.

CONCLUSION

The above collected information regarding *Wedelia chinensis* match with the available text. Natural products from folk remidies have contributed significantly in the discovery of modern drugs and can be an alternative source for the discovery of novel structure s with better safety and efficacy. Ethno botanical and traditional use of natural compounds particularly of plant origin gets popular in recent years as they are tested for their efficacy and believe to be safe for human use. It is a good method for the research of new molecules for the treatment of various disease. Through studying the literature on *Wedelia chinensis* it is analyzed that it is popular in the treatment of various ethnic group, such as Ayurveda and traditional practioner for the treatment of various ailments.

On exhaustive survey on *Wedelia chinensis* it was found that this herb has been used for various activities which potentiated the folklore use for treating mankind.The ethanobotanical and the traditional use of natural drug has been used for long ages because of its effective therapeutic value, as the drugs from the synthetic origin possess side effects. The presence of various active constituents of this plant showed various potent effects but still the exploration of the exact moiety is required to study the mechanism behind these activities. Thus this review will give an insight of various possible activities carried out and the activities which can be carried out for its attribution which will emphasize on standardization and biological need of the species for the healing of ailments with better result and safer dose.

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