Eclipta alba Linn – ‘‘Kesharaja’’ : A Review

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ABSTRACT

The plant Eclipta alba Hassk [Asteraceae] having important role in the traditional Ayurvedic, Unani systems of holistic health and herbal medicine of the east. Eclipta alba Hassk is reported to possess Hepatoprotective, antimicrobial, anti-inflammatory, analgesic, immunomodulatory, antiviral and promoter for blackening and growth of hair. Important source of chemicals is wedelolactone, demethylwedelolactone exhibit antihepatotoxic activities. Hence in view of immense medicinal importance of the plant this review is therefore compile all the information related to Eclipta alba.

Keywords: Eclipta alba, Bhringraj, Asteraceae, Wedelolactone, Hepatoprotective.

INTRODUCTION

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 use¹. The World Health Organization (1980) has also recommended the evaluation of the effectiveness of plants in conditions where there is lack of safe synthetic drugs².

Eclipta alba (Linn) Hassk, family Asteraceae, grows as a common weed throughout India, ascending to 1800 m. in the Himalayas, common in areas of upper gangetic plains, in pasture lands, roadsides in Chota Nagpur, all districts of Bihar and Orissa, Punjab, Western India, South India³.

Vernacular Names

Eng. - Trailing Eclipta.
Hindi - Bhamgra, Mochakand, Babri, Bhangra.
Beng. - Bheemraja, Kesuriya, Kesari, Kesuti, Keshwri.
Guj. - Bhangra, Kaluganthi, Dodhak, Kalobhangro.
Kan. - Garagada, Soppu.
Mal. - Kannunni, Kayyonni.
Mar. - Maka, Bhringuraja.
Tam. - Kaikesi, Garuga, Kanyathakara.
Tel. - Guntakalagara, Guntagalagara.
Arab. - Kadim-el-bint.
Assam. - Bhrngaraja.
Oriya - Kesara, Kesarda.

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PROPAGATION AND CULTIVATION

It grows in wet marshy places. It is easily propagated by seeds. Vegetative propagation of Eclipta alba was tried by stem cuttings. The cuttings were planted after dipping them in IBA and GA solution and observed for 60 days. The results indicated that 100 ppm IBA was effective in producing roots and shoots³.

Description of Plant parts

A. Macroscopic

1. Root – A number of secondary branches arise from main root, up to about 7 mm in dia., cylindrical, greyish.
2. Stem – Herbaceous, branched, occasionally rooting at nodes, cylindrical or flat, rough due to oppressed white hairs, node distinct, greenish, occasionally brownish.
3. Leaf – Opposite, sessile to subsessile, 2.2-8.5 cm long. 1.2-2.3 cm wide usually oblong, lanceolate, sub-acute or acute, strigose with oppressed hair on both surfaces.
4. **Fruit** – Achenial cypsella, one seeded, cuneate, with a narrow wing, covered with warty excrences, brown.

5. **Seed** – 0.2-0.25 cm long, 0.1 cm wide, dark brown, hairy and non-endospermic.

6. **Flower** – Solitary or 2, together on unequal axillary peduncles; involucral bracts about 8, ovate, obtuse or acute, herbaceous, striate with oppressed hairs; ray flowers ligulate, ligule small, spreading, scaracely as long as bracts, not toothed, white; disc flowers tubular, corolla often 4 toothed; pappus absent, except occasionally very minute teeth on the top of achene; stamen 5, filaments epipetalous, free, anthers united into a tube with base obtuse; pistil bicarpellary; ovary inferior, unilocular with one basal ovule.

**Phytochemical Constituents**

The dried leaves of *Eclipta alba* have been reported to contain coumestan derivatives; wedelolactone and demethylwedelolactone, stigmasterol, a-terthienylmethanol, desmethyl-wedelolactone-7-glucoside, unnamed alkaloid, apigenin, luteolin and their glucoside, wedelic acid, 25-ß-hydroxyverazine, ecliptine and nicotine. The percentage of coumestans in the ethyl acetate fraction of the plant was found to be 3.5 % demethylwedelolactone and 15.9 % wedelolactone.

Roots of *Eclipta alba* have been reported to contain thiophene acetylens such as 5-senecioyl oxymethylene-2-(4-isovalerolxybut-3-ynyl)-dithiophene, 5-tigloyloxymethylene-2-(4-isovalerolxybut-3-ynyl)-dithiophen and 2-(3-acetoxy-4-chloro-but-1-ynyl)-5-(pent-1,3-diylnyl) thiophene, hentriacontanol, stigmasterol, ecliptal, 14:16, 14-heptacosanol.

Stems of *Eclipta alba* contain wedelolactone, wedelic acid, L-terthienyl methanol, apigenin, luteolin. Seeds of *Eclipta alba* contain sterols.

Aerial parts gave 8-amin, luteolin-7-0-glucoside. In addition the aerial parts is reported to contain apigenin, cinnaroside, sulfur compounds, phytosterol, ß-amin in the n-hexane extract, luteolin-7-glucoside and wedelolactone in polar solvent extract.

Twigs of the plant have been reported to contain an unnamed alkaloid.

Whole plant of *Eclipta alba* contain ecliptal [a terthienyl aldehyde], 2-angelolxy methylene-5-[but-3-en-1-ynyl ] dithiophene, 5-isovaleryloxy methylene-2-(4-isovaleryloxybut-3-ynyl) dithiophene, isoflavonoids wedelolactone, desmethylwedelolactone, 7-0-glucoside.

Wagner, polypeptides isolated from the plant yielded cystine, glutamic acid, phenylalanine, tyrosine and methionine on hydrolysis. The whole plant also contain nicotine, alkaloid and stigmasterol.

Zhang and Chen, Zhang have been reported several saponins in the plant viz; eclalbosaponins have been characterized. Ecliptasaponin C was deduced as 3-ß-0-D-glucopyranosyl-19-ß-hydroxy olean-12-ene-28-oic acid 28-0-ß-D-glucopyranosIDE. Ecliptasaponin D was deduced as 3-ß, 16-ß-dihydroxy olean-12-ene-28-oic acid-3-ß-0-D-glucopyranosIDE.

Upadhyay, isolated from the whole plant, a tritepene saponin, named ecralbatin together with ß-amyrin, ursolic acid and oleanolic acid. Eclalbatin was characterized as 3-ß-0-D-glucopyranosyl-3-olean-12-en-28-oic acid, 28-0-ß-D-arabinopyranosIDE.

Bioassay guided fractionation of the methanolic extract of *Eclipta alba* using yeast strains resulted in the isolation of six new steroidal alkaloids. Abdel Kader were identified new alkaloids as 20-epi-3-dehydroxy-3-oxo-5,6-dihydro-4,5-dehydroverazine, ecliptalbine [(20R)-20-pyriddy-l-cholesta-5-ene-3-ß-23-diol], (20R)-4-ß-hydroxyverazine, 4-ß-hydroxyverazine, (20R)-25-ß-hydroxyverazine and 25-ß-hydroxyverazine.
Pharmacological / Biological Activities

1. Hepatoprotective Activity

There have been extensive studies carried out to substantiate the hepatoprotective activity of *Eclipta alba*. Alcoholic extract of the plant is known to show protective effect on experimental liver damage in rats and mice. The plant has been reported to exhibit hepatoprotective action on subcellular levels of functional markers, in inflammation and liver injury. The ethanol / H₂O [1:1] extract of *Eclipta alba* significantly counteracted CCl₄ induced inhibition of the hepatic microsomal drug metabolizing enzyme amidopyrine N-demethylase and membrane bound glucose 6-phosphatase. The loss of hepatic lysosomal acid phosphatase and alkaline phosphatase was significantly restored by the extract. The plant is reported to exhibit a protective effect on carbon tetrachloride induced acute liver damage, by reducing centrilobular necrosis, hydropic degeneration and fatty change of the hepatic parenchymal cells. The ethyl acetate fraction showed improved and effective protection in doses of 20, 40 and 80 mg/kg in rats.

Wagner et al. [1986] confirmed that the coumestan constituents of the plant wedelolactone and demethylwedelolactone are responsible for the potent antihepatotoxic activities in carbon tetrachloride, glucosamine and phalloidin induced liver damage in rats. Wedelolactone has been reported to be a potent and selective 5-lipoxygenase inhibitor with an IC₅₀ of 2.5 µM and it does so by an oxygen radical scavenging mechanism.

2. C. N. S. Activity

Studies indicated that the aqueous extract of *Eclipta alba* and its hydrolyzed fraction at a dose of 300 mg/kg and 300 mg/kg p.o. respectively showed nootropic activity in rats.

3. Antimicrobial Activity

Studies revealed the antihypertensive properties of *Eclipta alba*. The shoot extract showed antibacterial activity against staphylococcus aureus and *Eclipta Coli*.

4. Antinociceptive Activity

An alcoholic extract of the plant showed antinociceptive effect in a dose of 200 mg/kg in rats due to the coumarin compounds.

5. Antiinflammatory and Analgesic Activity

The plant has been reported to possess anti-inflammatory and bronchodialator activities, due to the coumarin compounds. Further studies reported confirmed analgesic activity of *Eclipta alba*.

6. Immunomodulatory Activity

Preliminary studies revealed the immunomodulatory activity of *Eclipta alba*. Wedelolactone and demethylwedelolactone isolated from *Eclipta alba* exhibited trypsin inhibition in vitro. Both compounds showed potent activity with IC₅₀ values of 2.9 and 3.0 µg/ml, respectively.

7. Antiviral Activity

The alcoholic extract has shown antiviral activity against Ranikhet disease.

8. Hair Growth Activity

Roy et al. have been reported quantitative analysis of hair growth after treatment with petroleum ether extract [5 %] exhibited greater number of hair follicles in anagenic phase [69 ± 4] which were higher as compared to control [47 ± 13]. Treatment with 2% and 5 % petroleum ether extracts were better than the positive control minoxidil 2% treatment.

9. Miscellaneous Activity

Further, Trasina, an Ayurvedic herbal formulation comprising of Withania somnifera, Tinospora cordifolia, *Eclipta alba*, Ocimum sanctum, Picrorhiza kurroa and Shilajit induced a dose related decrease in STZ hyperglycemia and attenuation of STZ induced decrease in islet SOD activity.

It has also been reported that in alloxan induced diabetic rats the oral...
administration of the leaf suspension of Eclipta alba in a dose of 2 and 4 gm/kg resulted in significant reduction in blood glucose, glycosylated hemoglobin, and an increase in the activity of liver hexokinase 41.

Further, studies have revealed that the aqueous extract of Eclipta alba and its and its hydrolyzed fraction at a dose of 300mg/kg and 30 mg/kg p.o; respectively provided protection against cold restraint induced gastric ulcer formation in rats 32.

Ethanolic extract of leaves Eclipta alba has been evaluated for its would healing activity in either anaesthetized wistar rats at two different doses [ 150 and 300 mg/kg ] using incision, excision and dead space wound model. Enhanced wound healing activity may be due to free radical scavenging action of the plant and the enhanced level of antioxidant enzymes in granuloma tissue 42.

The plant also exhibited antitumor, deobstruent, spasmogenic, Hypotensive properties. The juice of fresh leaves mixed with neem oil, applied locally, promotes hair growth; the herbs extract boiled with coconut oil promotes hair growth and the black pigment of the herb makes grey hair black. The water extract of the plant at absolute concentration tested on sitotroga cerebella ova recorded strong ovi-cuma longa 43 was applied locally on skin affections.

The juice of fresh Eclipta alba was used for washing wounds and soft tissue wounds 44. The juice of fresh leaves mixed with neem oil, applied locally, promotes hair growth; the herbs extract boiled with coconut oil promotes hair growth; the black pigment of the herb makes grey hair black. The water extract of the plant at absolute concentration tested on sitotroga cerebella ova recorded strong ovi-cuma longa.

Ayurvedic Properties and Action

Rasa - Katu, Tikta
Guna - Ruksa, Tikshna
Virya - Usna
Vipaka - Katu
Doshaghnata - Kaphavatashamaka
Karma - Vatahara, Kaphahara, Amahara, Balya, Rasayana, Kesya, Tvacya, Dantya, Caksusya, Visahara 30, 43.

Classical Use

Bhringaraja powder 1 part, black sesamum seeds half part, Aamalaka ( Emblica officinalia ) half part, classically know as Bhringaraja churna, was prescribed as a rejuvenating and age-sustaining tonic.

Bhringaraja was also used as a detoxifying deobstruent and antisep tic herb in vitiated blood, anaemia, splenic and liver enlargements, catarrhal jaundice, hyperacidity, gastritis, dysentery, nightblindness, eye diseases 12, toothache, laxative 43.

The juice of Eclipta alba was used for washing wounds and soft chance ( Gadanigraha ). The powder of the root and Haridraa ( Curcuma longa ) was applied locally on skin affections.

The oil extract of leaves was prescribed by charaka and sushrutha for anointing the head, for hair growth and for giving natural colour to grey hair. Neelibhringadi Tailam ( Sahasrayoga ) is prescribed for promoting hair growth and for giving natural colour to grey hair.

In Unani medicine the juice of leaves is prescribed in skin diseases, cough, rheumatism, bronchitis, allergic urticaria, inflatulence, colic and liver affections. The seeds are used in sexual debility and aphrodisiac. Externally the paste of leaves is applied over swellings 8. The root is used as an emetic and purgative 10.

Use in Western Herbal

The herb was first mentioned in the Chinese Tang Medica of 65 AD. A decoction is used to invigorate the liver, greying of hair, staunch bleeding, spermatorrhoea, menorrhagia.

In the Caribbean, the juice is taken for asthma, bronchitis; dizziness, vertigo, blurred vision, skin problems 8.

Toxicity Studies

In studies the conducted the alcoholic extract of Eclipta alba shows no signs of toxicity in rats and mice; and the minimum lethal dose was found to be greater than 2.0 gm/kg when given orally and intraperitonially in mice 26.

Clinical Studies

The herbal drug Tefroli, containing extracts of the plant in combination with others, when administered to the patients of viral hepatitis, produced improvement and good results 46.

There has been clinical studies conducted that prove the effectiveness of Eclipta alba therapy in jaundice in children 47, and Bhringaraja Ghanasatwavati on the patients of kothashakhasrits kamala with special reference to hepatocellular jaundice 48.

Formulations and Preparations

Bhringaraja ghrita, Bhringaraja taila, Bringarajadi churna, Bringarajadya ghrita, Mahavatadvhansana rasa, Shadabindu taila, Nilikadya taila, Nilabringadi taila, Ashwakunchaki rasa, Anandabhairava rasa, Sutashekhara rasa 43, Bhringarajasava, Tekaraja marica 44.

Suggested Combinations

1. 1-2 gm of the drug in powder form for decoction with others.
2. 1-2 ml of the drug in juice form. Used for abhyanga.
3. 1-2 ml of the drug in juice form. Used externally for sirobhanga.

Dosage

1. 3-6 ml of the drug in juice form.
2. 12-36 gm of the drug in powder form for decoction 44.

Therapeutic Category

Hepatoprotective 49,50.

Safety Aspects

The drug is traditionally considered to be safe in the dosage mentioned 52.

Conclusion

Eclipta alba is quick-growing and popular herb. It is a traditionally important medicinal plant.

- Eclipta alba produce antiviral, antibacterial, spasmogenic, hypotensive, ovicidal, antileprotic, analgesic, antioxidant, antipyretic, antihaeomorrhagic, anticancer, hepatoprotective, antihepatotoxic.

- Eclipta alba is promoter for blackening and growth of
hair.

- Active constituent isolated from plant of Eclipta alba, wedelolactone and demethylywedelolactone are responsible for the potent antihapatotoxic activities in carbon tetrachloride, galactosamine and phallolidin induced liver damage in rats.

- *Eclipta alba* rich of chemical constituent which have therapeutic and medicinal value like wedelolactone, demethylywedelolactone, ecliptal, ecallosaponins I-IV, hentriacontanol, 14-hepatocosanol, luteolin-7-0-glucoside, alkaloids and polypeptides.

The detail research on clinical study of plant extract as well as Ayurvedic / herbal formulation required.

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