

A REVIEW ON TRADITIONAL AND FOLKLORE USES, PHYTO-CHEMISTRY AND PHARMACOLOGY OF ECLIPTA ALBA (L) HASSK

Vipan Kumar Saraswat¹, Sangeeta Verma², Shweta Vijay Musale³,
Mohan Lal Jaiswal⁴

¹Lect. Dept. of Dravya guna, Shri Dhanvantari Ayurvedic College, Chandigarh, Punjab, India

²M.D. Dept. of Swasthvrita, R.G.G.P.G. Ayurvedic College, Paprola, Kangra,

³MD, ⁴Assot. Prof. P.G

Dept. of Dravya guna, National Institute of Ayurveda, Jaipur, Rajasthan, India

ABSTRACT

Eclipta alba has been extensively used traditional medicine for a wide range of ailments of the treatment of coughing, whitening of hair, Treatment of calculus, Disorder of eyes and Asthma, diabetes, gastric problems, inflammatory disorders, skin disorders and to treat the hair growth. Although many of the experimental studies validated its traditional medicinal uses, but employed uncharacterized crude extracts. Thus, it is difficult to reproduce the results and pin point the bioactive metabolite. Hence, there is a need of phytochemical standardization and bio-activity- guided identification of bioactive metabolites. The results of few pharmacological studies and bioactive metabolites already reported in eclipta alba warrant detailed investigation for its potential against diabetes, diuretics, hyperlipdemia, alopecia, oxidative stress related disorders and infections. The outcome of these studies will further expand the existing therapeutic potential of Eclipta alba and provide a convincing support to its future clinical use in modern medicine.

Keywords- Eclipta alba, traditional uses, phytochemistry, pharmacology

INTRODUCTION

Eclipta alba (L.) Hassk. (Asteraceae), a small, branched annual herb with white flower heads, is native to the tropical and subtropical regions of the world. It is used as a tonic and diuretic in hepatic and spleen enlargement. It is also used in catarrhal jaundice and for skin diseases [1]. The plant is commonly used in hair oil all over India for healthy black and long hair. The fresh juice of leaves is used for increasing appetite, improving digestion and as a mild bowel regulator. The plant has a repu-

tation as an antiageing agent in *Ayurveda*. Eclipta alba is used as a general tonic for debility. Externally it is used for inflammation, minor cuts and burns and the fresh leaf-juice is considered very effective in stopping bleeding. Leaf juice mixed with honey is also used for children with upper respiratory infections and also used in eye and ear infections. Eclipta alba is a source of coumestan-type compounds used in phytopharmaceutical formulations of medicines prescribed for treatment of cirrhosis of the liver and infec-

tious hepatitis [2]. *Eclipta alba* is widely used in India as a cholagogue and deobstruent in hepatic enlargement, for jaundice and other ailments of the liver and gall bladder [3]. Coumestan-type compounds, wedelolactone and dimethyl wedelolactone, have been isolated as the main active principles of *Eclipta alba*, both constituents exhibiting antihepatotoxic activity [4-5]. In vivo tests indicate that wedelolactone neutralizes the lethal and myotoxic activities of rattlesnake venom [6]. Wedelolactone (WL) and dimethylwedelolactone (DWL) showed potent activity when were tested in the trypsin inhibition bioassay [7]. From the whole plant of *Eclipta alba*, a new triterpene saponin, namely eclalbatin, together with alpha-amyrin, ursolic acid and oleanolic acid have been isolated [8].

Botanical description-

Eclipta alba (L.) Hassk. (Asteraceae), a small, branched annual herb with white flower heads, is native to the tropical and subtropical regions of the world. Root system is well developed, a number of secondary branches arise from main root, upto about 7 mm in diameter, cylindrical, grayish in colour. Stem is herbaceous, branched, occasionally rooting at nodes, cylindrical or flat, rough due to appressed white hairs, node distinct, greenish and occasionally brownish. Leaf are opposite, sessile to subsessile, 2.2 - 8.5 cm long, 1.2 - 2.3 cm wide, usually oblong, lanceolate, sub-entire, sub-acute or acute, strigose with appressed hairs on both surfaces. Flowers are solitary or 2, together on unequal axillary peduncles; involucre bracts about 8, ovate, obtuse or acute, herbaceous, strigose with appressed hairs; ray flowers ligulate, ligule small,

spreading, scarcely as long as bracts, not toothed, white; disc flowers 21 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. Fruits are achenial cypsella, one seeded, cuneate, with a narrow wing, covered with warty excrescences, brown. Seed are 0.2 - 0.25 cm long, 0.1 cm wide, dark brown, hairy and non-endospermic. [10]

Propagation-[11]

Cultivation of the drug *Bhringraj* is not needed, because it is very common weed of the rainy season growing gregariously on waste place. *Bhringraj* is annual weed hence complete their life history within same year. In this condition, cultivation may be useful. For the cultivation of *Bhringraj* damp clay loamy soil is found most suitable. It has been observed in the playhouses that when the temperature and humidity is more than its yield increase five to ten times. It can be grown at places upto 1200 ft height. It can be cultivated by following two methods:-

1. By growing the nursery seed: By seed growing method the plant are raised through nursery seeds and are transplanted at a distance of 15 cm in the fields. But for better yield the second method is more appropriate.
2. By direct sowing: By direct sowing method the seeds are directly sprinkled in the fields. About 800 gms seeds are required for one hector land.

Phytochemistry-[12]

Phytochemical research carried out on *Eclipta alba* had led to the isolation of phy-

to-sterols, amino acids, furanocoumarins, phenolic components, hydrocarbons, aliphatic alcohols, volatile components and few other classes of secondary metabolites from its different parts

1. Aerial parts- -terthienyl-methanol, 16-polyacetylenic thiophenes, -amyrin, stigmaterol, polypptide, on hydrolysis gave 5-aminoacids-cystine, glutamic acid, phenylalanine, tyrosine, methionine, 5-5-seneciolyloxymethylene-2-(4-isovaleryloxybut-3-nyl)dithiophene, luteolin-7-0-glycoside, wedelolactone, desmethylwedelolactone & its 7-0-glycoside, nicotine stigmaterol polypeptide.
2. Root-heptacosanol, hentriacontanol, stigmaterol, 5-isovaleryloxy methylene-

2-(4-iso-vateroxybut-3-nyl)dithiophene.

3. Leaves-steroidal alkaloides are major alkaloides like as 25-beta hydroxyverazin, 4beta-hydroxyverazin, 20-epi-3-dihydroxy-3-oxo-5,6-dihydro-4,5-dehydroverazin, ecliptalvin(20R)-20pyridyl-cholesta-5-ene-3beta,23diol(20R)-4beta-hydroxyverazin.

Traditional and folklore uses –

Eclipta alba has been extensively used in traditional medicine for a wide range of ailments. All the traditional and contemporary uses of *Eclipta alba* including, *Ayurvedic* classical texts, *nighantu*, reports of different ethno-botanical survey, etc. have been summarized in Table.

Table number. 1

Sr.no.	Ailment/use	Part/preparation use	References
1	Raktapitta (Hemorrhage)	Bhringraj mool kalka with tandulodaka	Ca.Chi-4/68
2	Kasa (Cough)	Kasmardadi yoga	Ca.Chi-18/117
		KafKasghna lehya	A.S.U.4/32
		Svamgni ras	S.S.M. 12/156
3	Palitya(Whitening of hair)	Sahacharadi taila	Ca.Chi- 26/264
4		Mahaneela taila	Ca.Chi-26/269
		Neelidaladi Palithar taila	Su.Chi.25/28,30,32
		Ksheeradi taila	A.H.U.24/37
		Ayoraj and Trifala	A.H.U.24/42
		Bhringraj along with neelini and Trifala	A.S.U.28/18
		Sahcharadi yoga	A.S.U.28/21
5	Vaman (vomting)	Madansadhit Poop	Ca.K-1/25
6	Ashamri rog (Treatment of calculus)	Shobhanjanadi yoga	Su.Chi.7/24

7	Nadi rog (Cinus)	Bhallatakadi taila	
8	Upadansh (TT. of soft chan- cer)	Markavadi yoga	Su.Chi.19/47
9	Vrana (Inflammation)	Swaras of eclipta alba	Su.K.8/56
10	Jwar(Fever)	Patolyadi ghrita	Su.U.39/227
11	Swas rog (Asthma)	Oil prepared from eclipta alba swaras	Su.U.51/29)
12	Twak rog(Skin disorder)	Kushthadi taila	A.H.Chi 19/83
		Oil prepared from eclipta alba leaf	A.H.Chi 20/8
		Panchnimba yoga	A.S.U.21/35
		Markavbhakshan yoga	A.S.U.22/10
13	Netrabhishyand (Cataract)	Mahatriphala Ghrita	A.H.U 13/13
14	Rasayan (Rejuvenation)	Rasayan Kalpa	A.H.U.39/162
		Natsingh Ghrit	A.H.U.39/172-74
15	Pandu (Anemia)	Moorvadi choornam	A.S.U.2/54
16	Dandruff	Neelikadi tail	S.S.M. 9/157
		Bhringraj tail	S.S.M. 9/161
17	Madhumeh (Diabetes)	Mehbandh ras	S.S.M. 12/205
18	Arsha (Piles)	Shankarloha	B. P. M. 5/109
219	Hepatic tonic	juice of the eclipta alba leaves	Dr. K. M. NadKarni- 1954

Folklore uses

Sr. no.	Uses	Part / preparation use	Locality	References
1	Balya (Tonic and deobstruent)	juice of Bhringraj in the combination of aromatics	Bombay	Kirtikar and Basu-1933
2	Netrabhishyand (New born suffer- ing from catarrh)	two drop of juice of Bhringraj it with eight drop of honey	Bombay	Kirtikar and Basu-1933
3	antiseptic for wound in cattle	Externally	Punjab	Kirtikar and Basu-1933
4	Conjunctivitis	Root	Chota Nagpur	Kirtikar and Basu-1933
5	Constipation	leaves are grounded and mixed with cold water	Gold cost	Kirtikar and Basu-1933

[**Abbreviations** – *ca. chi-* charak samhita chikitsa sthan, *A.S.U-* astang samgrah uttar tantra, *S.S.M-* sharangdhara samhita madhyam khand, *A.h.chi-* astang hriday chikitsa sthan, *A.H.U-* astang hriday uttatantra, *B.P.M-* bhavprakash samhita madhyamkhand, *Su. U.* sushrut samhita uttar tantra, *Su. K.* sushrut samhita kalpasthan, *Su. Chi-* sushrut samhita chikitsa sthan]

Pharmacological reports

1. Anti-inflammatory activity and antimicrobial activity:

The aqueous and ethanolic extracts of the leaves of *Eclipta alba* were evaluated for their anti-inflammatory activity using carrageenan-induced rat paw oedema method in albino rats. The antimicrobial activity was also been performed against the bacteria *Staphylococcus aureus*, *Escherichia coli*, *Proteus vulgaris*, *Pseudomonas aeruginosa* and the fungi *Candida albicans* and *Aspergillus niger* by agar plate disc diffusion method. The results indicated that the ethanolic extracts (200mg/kg) have shown significant anti-inflammatory activity with p value of 0.005 and however, both of the extracts were exhibited moderate antibacterial and antifungal activity against the test organism.[13]

2. Anti-oxidant & cytotoxic activity:

The antioxidant and cytotoxic properties of the extract were assessed by DPPH free radical scavenging method and brine shrimp lethality bioassay, respectively. Disc diffusion technique and food poisoning technique were used to determine the antibacterial and antifungal activity of the extract, respectively. DPPH free radical scavenging effect of extract was compared with standard antioxidant ascorbic acid. IC value was found

1.34µg/ml for extract and 1.03µg/ml for ascorbic acid. LC 50 value of the extract in brine shrimp lethality bioassay was found 94.3µg/ml. Large zone of inhibition were observed in disc diffusion antibacterial screening against gram negative *Salmonella typhi*, *Shigella sonnei*, *Escherichia coli*, *Salmonella paratyphi*, *Pseudomonas sp (I)* & *Pseudomonas sp (II)*, and gram positive *Bacillus subtilis*, *Bacillus cereus*, *Bacillus megaterium* & *Staphylococcus aureus* at the concentration of 1mg/disc. The extract concentration 250µg/disc showed no zone of inhibition to any bacterial strain but 500µg/disc showed a moderate zone of inhibition (8mm) against *Salmonella typhi*. Extract was found nontoxic in acute toxicity test in mice.

3. Anti-hyperglycemic activity

Oral administration of leaf suspension of *E. alba* (2 and 4 g/kg body weight) for 60 days results in significant reduction in blood glucose, glycosylated hemoglobin HbA(1)c. The extract decreases the activities of glucose-6-phosphatase and fructose-1,6-bisphosphatase, and increase the activity of liver hexokinase.[14]

4. Diuretic activity:

Aqueous and alcoholic extracts of the leaf of *Eclipta prostrata* leaves were tested for diuretic activity in rats. The parameters studied on individual rat were body weight before and after test period, total urine volume urine concentration of Na⁺, K⁺ and Cl⁻. *Eclipta prostrata* leaves (100mg/kg of body weight) showed increase in urine volume, cation and anion excretion. Furosemide was used as reference diuretic, the plant extracts did not appear to have renal toxicity or any other adverse effects.

5. Anti-hepatotoxic property

Eight groups (I-VIII) comprising each of six albino rats of either sex weighing between 180 and 220 gm were selected. Liver damage was induced in groups II to VII by oral administration of 25% carbon tetrachloride in liquid paraffin at a dose of 1.25 ml/kg daily for five days. Group I served as control and received liquid paraffin daily for 5 days orally. From sixth day onwards, groups II to VII received once daily oral dose of either alcoholic or chloroform extracts of *E. alba*, *T. purpurea* and *B.diffusa* for seven days. The extracts were given at a dose of 200 mg/kg suspended in 0.7% Na-CMC mucilage. Group VIII was the untreated group. Group I and VIII received only the mucilage. On eighth day, sleep time was recorded in animals by injection sodium pentobarbitone at a single dose of 30 mg/kg i., in distilled water. Animals were sacrificed after the study; blood was collected in sterile centrifuge tubes and allowed to clot. Serum was separated and used for the estimation of SGPT, SGOT, SALP and serum bilirubin levels.[15,16,17,18]

6. Anti hyperlipidemic property

It has been reported that in the atherogenic diet induced hyperlipidemic model, the aqueous leaf extract of the *Eclipta.prostrata* was given orally to the rats which significantly reduced total cholesterol, triglycerides, total protein. There was a significant elevation in the high density lipoprotein cholesterol levels. 200mg/kg of extract showed better results compared to 100mg/kg.12 Animal model containing Charles River Sprague-Dawley CD rats. (specific pathogen-free/viral antibody-free Crj/Bgi male, 180 ± 10 g) were fed experimental diets supplemented with 0 mg (control), 25 mg (E25),

50 mg (E50), or 100 mg (E100) of a freeze-dried butanol fraction of *E. prostrata* per kilogram of diet for 6 weeks which reported significant reduction of serum triacylglycerol and total cholesterol, lowdensity lipoprotein-cholesterol levels and elevation in the high-density lipoprotein in the E50 and E100 groups respectively when compared with the untreated control group.[19]

7. Hair growth & Alopecia

Eclipta Alba is used in hair oil preparations since it promotes hair growth and maintains hair black. 10%w/v of *Eclipta alba* was an main ingredient in the preparation of herbal formulation for hair growth. In the reported work Petroleum ether & ethanolic extracts were incorporated into oleaginous cream (water in oil cream base) and applied topically on shaved denuded skin of albino rats. The time (in days) required for hair growth initiation as well as completion of hair growth cycle was recorded. Minoxidil 2% solution was applied topically and served as positive control for comparison. The result of treatment with 2 and 5% petroleum ether extracts were better than the positive control minoxidil. [20] The methanol extract of whole plant when tested for hair growth promoting potential, exhibited dose dependent activity in C57BL6 mice. Pigmented C57/BL6 mice, preselected for their telogen phase of hair growth were used. In these species, the truncal epidermis lacks melanin-producing melanocytes and melanin production is strictly coupled to anagen phase of hair growth. The extract was applied topically to assess telogen to anagen transition. Immunohistochemical investigation was performed to analyze antigen specificity. Animals in anagen phase of hair growth

were positive for FGF-7 and Shh and negative for BMP4, whereas the animals in telogen phase were positive only for BMP4 antigen [21]

DISCUSSION

Bhringraj is a well-known drug from *vedic* period. In *Atharveda*, it is mentioned by the names *Rama* & *Shyama* in *shvitra, palitya*. This explains *keshya* property of *Bhringraj* was known from that period. Ample references of *Bhringraj* are found in *samhita* period in almost all *samhitas*. All these *acharyas* have quoted *keshya* karma of *Bhringraj*. Its generous use is stated in *krimi, kushtha, palitya, kasa, swarabheda, netrarogas, darunaka* & as a *rasayana*.

Bhringraj is *katu, tikta* in taste, *katu* in vipaka & *ushna veerya*. It is *ruksha* & *laghu* in property. It pacifies *vata* & *kapha doshas*. It is useful in *kushtha, visha, shotha, twak rogas, shwitra, shwasa, kasa, shirashoola, hridroga, netrarogas, pandu*, etc. Ethnobotanically it is used in conjunctivitis, toothache, haemorrhage, constipation, as antiseptic, hepatic tonic.

According to modern science, it is anti-inflammatory, antibacterial, antioxidant, anti-hyperglycaemic. Major chemical constituents are steroidal alkaloids 25- β hydroxyverazin, ecliptin, wedelolactone, heptacosanol, stigmaterol, nicotine, glutamic acid, etc.

CONCLUSION

The extensive literature survey revealed *Eclipta alba* is an important medicinal plant used for the ethno-medical treatment of *swas, kas, madhumeh, udar rog, keshya* and *twak rog*. Pharmacological studies carried out on the fresh plant materials, crude extracts and isolated components of *Eclipta*

alba provide a pragmatic support for its numerous traditional uses. Recent studies have been focused on evaluating the anti-diabetic, Anti hyperlipidemic, Diuretic activity, hair growth and alopecia.

REFERENCES

1. *The wealth of india: raw materials*. 1952, csir, new delhi.
2. murphy, r.c., hammarstrom, s., samuelsson, b. and leukotriene, c. 1979 a slow reacting substance from marine mastocytoma cells. *proc. natl. acad. sci., usa*, pp. 4275-4279.
3. Orning, l., hammarstrom, s., samuelsson, b. and leukotriene, d. 1980 a slow reacting substance from rat basophilic leukemia cells. *proc. natl. acad. sci., usa*, pp. 2014-2017.
4. wagner, h., geyer, b., kiso, y. and rao, g.s. 1986 coumestans as the main active principles of the liver drugs *eclipta alba* and *wedelia calendulacea*. *planta med.*, 52, 370-373.
5. franca, s.c., bertoni, b.w., and pereira, a.m.s. 1995 antihepatotoxic agent in micropropagated plantlets of *eclipta alba*. *plant cell tiss. organ. cult.*, 40, 297-299.
6. mors, w.b., nascimento, m.c., parente, j.p., silva, m.h., melo, p.a. and suarez-kurtz, g. 1989 neutralization of lethal and myotoxic activities of south american rattlesnakes venom by extracts and constituents of the plant *eclipta prostrata*. *toxicon.*, 27, 1003-1009.
7. syed, s.d., deepak, m., yogisha, s., chandrashekar, a.p., muddarachappa, k.a., d'souza, p., agarwal, a. and venkataraman, b.v. 2003 trypsin inhibitory effect of wedelolactone and demethyl-

- wedelolactone. *phytother. res.*, 17, 420-421.
8. upadhyay, r.k., pandey, m.b., jha, r.n. and pandey, v.b. 2001 eclalbatin, a triterpene saponin from *eclipta alba*. *j. asian nat. prod. res.*, 3, 213-217.
 9. sawant, m., isaac, j.c., and narayanan, s. 2004 analgesic studies on total alkaloids and alcohol extracts of *eclipta alba* hassk. *phytother. res.*, 18,2, 111-113.
 10. the ayurvedic pharmacopoeia of india vol 2nd
 11. p.c. sharma, m.b.yeine, t.j.dennis, database on medicinal plant used in ayurveda, vol 2nd new delhi, 2000
 12. p.c. sharma, m.b.yeine, t.j.dennis, database on medicinal plant used in ayurveda, vol 2nd new delhi, 2000
 13. muthu kumaran peraman, p. ramalingam, and bapatla jnn sai, european journal of experimental biology, 2011, 1 (2):172-177
 14. j.ananthi,a. prakasam,k.v. pugalendi yale journal of biology and medicine 76 (2003), pp. 97-102.
 15. mehra p. n. and nanda s. s. indian j. pharm., 30, 284(1968).
 16. khin m. m., nyout n. and khin t. m. toxicol. appl.pharmacol, 45 (3), 723 (1978).
 17. joglekar g. v. and balwani j. h. maharashtra med. j.,14, 271 (1967).
 18. bhargava k. k., krishnaswamy w. r. and seshadri t. r. indian j. chem., 8, 664 (1970)
 19. dae-ik kima, sung-hyen lee, jin-ho choia, hyun soon lillehoj, mi-hee yu, gun-soon lee. the butanol fraction of *eclipta prostrata* (linn) effectively reduces serum lipid levels and improves antioxidant activities in cd rats. nutrition research. 2008; 28: 550–54.
 20. roy rk, mayank thakur, dixit vk. hair growth promoting activity of *eclipta alba* in male albino rats. arch dermatol res. 2008; 300: 357-64.
 21. kakali dattaa, anu t. singha, ashok mukherjee, beena bhata, b. rameshb, anand c. burman, journal of ethnopharmacology 124 (2009) 450–456

CORRESPONDING AUTHOR

Dr. Vipin Kumar Saraswat

Email: vipan.sar@gmail.com

Source of support: Nil

Conflict of interest: None Declared