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

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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 eclipeta 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 catarhal 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 reputation 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 cholagogne 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 antihapatotoxic 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 oppressed white hairs, node distinct, greenish and occasionally brownish. Leaf are opposite, sessile to sub-sessile, 2.2 - 8.5 cm long, 1.2 - 2.3 cm wide, usually oblong, lanceolate, sub-entire, sub-acute or acute, strigose with oppressed hairs on both surfaces. Flowers are solitary or 2, together on unequal axillary peduncles; involucral bracts about 8, ovate, obtuse or acute, herbaceous, strigose with oppressed 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 baccapellary; 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 clayor loamy soil is found most suitable. It has been observed in the playhouses that when the temperature and humidity is more then its yeild 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 trough 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- α-terthienyl-methanol, 16-polyacetylenic thiophenes, β-amyrin, stigmasterol, polypptide, on hydrolysis gave 5-aminoacids-cystine, glutamic acid, phenylalanine, tyrosine, methionine, 5-5-senecioyloxymethylene-2-(4-isovaleryloxybut-3-ynyl)dithiophene, luteolin-7-0-glycoside, wedelolactone, desmethylwedelolactone & its 7-0-glycoside, nicotine stigmasterol polypeptide.

2. Root-heptacosanol, hentriacontanol, stigmasterol, 5-isovaleryloxymethylene-2-(4-isovaleryloxybut-3-ynyl)dithiophene.

3. Leaves-steroidal alkaloids are major alkaloids 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>
<thead>
<tr>
<th>Sr.no.</th>
<th>Ailment/use</th>
<th>Part/preparation use</th>
<th>References</th>
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<tbody>
<tr>
<td>1</td>
<td>Raktapitta (Hemorrhage)</td>
<td>Bhringraj mool kalka with tandulodaka</td>
<td>Ca.Chi-4/68</td>
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<td>2</td>
<td>Kasa (Cough)</td>
<td>Kasmardadi yoga</td>
<td>Ca.Chi-18/117</td>
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<td></td>
<td>Kaf Kasghna lehya</td>
<td>A.S.U.4/32</td>
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<td>Svamgni ras</td>
<td>S.S.M. 12/156</td>
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<td>3</td>
<td>Palitya(Whitening of hair)</td>
<td>Sahacharadi taila</td>
<td>Ca.Chi- 26/264</td>
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<td>4</td>
<td></td>
<td>Mahaneela taila</td>
<td>Ca.Chi-26/269</td>
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<td></td>
<td>Neelidaladi Palithar taila</td>
<td>Su.Chi.25/28,30,32</td>
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<td>Ksheeradi taila</td>
<td>A.H.U.24/37</td>
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<td></td>
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<td>Ayoraj and Trifala</td>
<td>A.H.U.24/42</td>
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<td></td>
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<td>Bhringraj along with neelini and Trifala</td>
<td>A.S.U.28/18</td>
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<td></td>
<td></td>
<td>Sahcharadi yoga</td>
<td>A.S.U.28/21</td>
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<tr>
<td>5</td>
<td>Vaman (vomting)</td>
<td>Madansadhit Poop</td>
<td>Ca.K-1/25</td>
</tr>
<tr>
<td>6</td>
<td>Ashamri rog (Treatment of calculus)</td>
<td>Shobhanjanadi yoga</td>
<td>Su.Chi.7/24</td>
</tr>
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<td>Sr. no.</td>
<td>Uses</td>
<td>Part / preparation use</td>
<td>Locality</td>
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</tr>
<tr>
<td>1</td>
<td>Balya (Tonic and deobstruent)</td>
<td>juice of Bhringraj in the combination of aromatics</td>
<td>Bombay</td>
</tr>
<tr>
<td>2</td>
<td>Netrabhishyand (New born suffering from catarrh)</td>
<td>two drop of juice of Bhringraj it with eight drop of honey</td>
<td>Bombay</td>
</tr>
<tr>
<td>3</td>
<td>antiseptic for wound in cattle</td>
<td>Externally</td>
<td>Punjab</td>
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<tr>
<td>4</td>
<td>Conjunctivitis</td>
<td>Root</td>
<td>Chota Nagpur</td>
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<tr>
<td>5</td>
<td>Constipation</td>
<td>leaves are grounded and mixed with cold water</td>
<td>Gold cost</td>
</tr>
</tbody>
</table>
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 1.34ig/ml for extract and 1.03ig/ml for ascorbic acid. LC 50 50 value of the extract in brine shrimp lethality bioassay was found 94.3ig/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 250ig/disc showed no zone of inhibition to any bacterial strain but 500ig/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, antihyperglycaemic. Major chemical constituents are steroidal alkaloids 25-ß hydroxyverazin, ecliptin, wedelolactone, haptacosanol, stigmasterol, 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 hyperlipidimic, Diuretic activity, hair growth and alopecia.

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Source of support: Nil
Conflict of interest: None Declared