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# Physicochemical and Pharmacological Activity of Eclipta Alba: Review

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**Abstract:** ***Natural medicines play an important role in each country's system of public health care. The Siddha and unani systems employ 599-699 plants for medicinal reasons. With its comprehensive and methodological approach supported by experimental foundation, conventional wisdom may serve as a new and robust natural 5-reductase inhibitor discovered. Bhringraj is crucial in overall health and in ancient Ayurvedic and Unani medicine systems from the East. The primary ingredients of coumestan derivatives include Eclipta alba. Such as vedololactone [1.7 percent], dimethylvedololactone and dimethylvedololactone. Other ingredients include ecliptal, -amirin, stigmasterol etc. Bhringraj is used as an, antimycotoxic, antihemorrhagic, and anti-blackening hair and growth booster. As a result of the plant's importance in the medical field, as well as its aesthetic and therapeutic uses, its extraction is important. An alcoholic extract of Bhringraj was reported to be non-toxic in rat and mice, when the minimum fatal dosage is more than 2.0 gram/kilogram administered orally and intra-peritoneally in rats. This article discusses the main ingredients, extraction process, phytochemistry, and bioactivity.***

**Keywords:** Eclipta Alba, Natural medicine, Ayurved, unani system

## 1. Introduction

Eclipta Alba (Bhringraj) is a short-branched perennial herbaceous plant with a long history of usage in traditional medicine in many countries, particularly those with tropical and sub-tropical climates. It is a member of the Asteraceae family. It grows naturally as a weeds across India, up to 1700 meters in the Himalaya, usually found in the top of northern plain, pastures, Chota Nagpur highways and areas of Orissa and Bihar, and southern India.[2] It is erect, has more branches, practically hairy, lies on the bud, a short petiole as well as plain leaves. The herb has spicy, pungent and it has a dry taste and is used in Ayurveda to cure inappropriate disorders of Kapha and Vata. There are 600-700 herbs used for medical purposes in Ayurvedic, Siddha and Unani traditions.[1] The WHO (1980) recommends assessing the efficiency of plant in a setting when there is a shortage of synthetic drugs that are safe.[3] This plant's leaves are 2.4-7.4 cm long. It bears little daisy-like white blossoms on long stalks and small, fitting or rounded brown stems. E. alba has been found in India, Bengal, etc.[4] This plant is considered hepatoprotective by the Ayurvedic Pharmacopoeia of India. The complete taxonomic hierarchy is shown below. Bhringraj oil, for example, is a well-known hair tonic for keeping black hair and preventing baldness. Herbs are also beneficial for summer problems.[5] Bhringraj is also used as an anti-inflammatory, hemostatic, emollient and hepatoprotective drug. The leaf extract is used in Ayurvedic treatment a strong liver tonic, and also incorporates some classic elements applications such as athlete's foot. The leaves have been used to cure scorpion stings and to reverse hair loss on the scalp. The Ayurvedic effects of Eclipta alba are shown.

**The ayurvedic effect of Eclipta alba**

| | |
|---|---|
| Rasayana | Rejuvenative |
| Medhya | Promotes the intellect |
| Kesya | Benefits hair |
| Dantya | Benefits the teeth |
| Tvacya | Benefits itching |
| Kusthahaghna | Destroys skin diseases |
| Raktasodhana | Purifies the blood |
| Raktastambhana | Stops bleeding |
| Visaghna Destroys | poisons in the body |
| Caksusya | Benefits the eyes |
| Krmighna | Destroys worms |
| Pandughna | Reduces anaemia |

**Relevance in Ethnopharmacology**

Eclipta Alba has been employed in a variety of tropical and subtropical regions, including India South Americaetc. It is a component in various herbal preparations used to treat liver disorders and has an impact on liver cells growth. It is used to treat liver and spleen enlargement as a tonic and diuretic.[6] It is also used to treat skin problems and catarrhal jaundice.[5]

The alcoholic extract of plant has antiviral properties against the Ranikhet sickness virus. The Eclipta alba plants are excellent remedy for hair growth. Eclipta alba contains -sitosterol, which aids in hair regeneration.[8] The juice of the fresh leave is use to increase appetites, promote digestion, and act as a moderate bowel control. It is regularly used to stimulate bile flow and preserve the parenchyma in viral hepatitis, and it is also widely used to improve memory and learning.[9] In Ayurveda, the herb is known as an anti-aging

agent.[10] It is used to cure debility as a general tonic. It is used to treat edema, small wounds and burns, and the juice of the fresh leaves arethought to be highly pbeneficial in halting bleeding.[11] Eclipta albaWater Extract (complete plant) has highest powerful inhibiting efficacy HIV-1 integrase inhibitor (HIV-1 IN). Given the ethno-medicinal importance of the plants, through data base searches, it is interesting to evaluate ethno-pharmacological information on plant and selected plant constituents.[12]

**Phytochemistry of Eclipta Alba**

Saponinstriterpenoid eclbasaponin I, eclbasaponin II, eclbasaponin 3-4, 6 and 8 E. saponins C and D, aclubatinin, are found in the plant E. alba. cumestane, demethylwedelolactone, and the flavonoids apigenin and luteolin 7-glucosidestrycholactone and isodemethylwedelolactone.[13]

Alkaloids found in the aerial parts 25-hydroxyverazine, ecliptalbine, and others trace levels (0.078 percent) of nicotine. Formylterthienyl,-terthionyl, polyacetylenethiophenes, dithienylacetyleneesteres 1, 2 and 3, -sitosterol, stigmasterol, docosterol, stigmastero l-3-O-glucoside, noncosanol, stearic acid, lacaroic acid, 3, 4-dihydroxy acid are also present. Benzoic acid, -amirin, ursolic acid and oleanolic acid are acids.[14] Hydrolysis of plant polypeptides produces cysteine, glutamic acid, phenyl alanine, tyrosine, and methionine. This plant is said to contain nicotine and nicotinic acid.[15] The plant contains xylbosaponin, which is a type of saponin.[16]

**Table 1:** Chemical components of Eclipta alba

| Sl. No | Parts | Chemical Constituents |
|---|---|---|
| 1 | Leaves | Wedelolactone [1.6%], Desmethylwedelolactone, Desmethylwedelolactone 7-glucoside, stigmasterol |
| 2 | Roots | Hentriacontanol, Heptacosanol & Stigmasterol, Ecliptal, Eclalbatin. |
| 3 | Aerial parts | β-amyrin & Luteolin-7-0-glucoside, Apigenin, Cinnaroside,Sulphur compounds, Eclalbasaponins I-VI |
| 4 | Stems | Wedelolactone [17-19], wedelic acid, L-terthienyl methanol, luteolin [18]. |
| 5 | Seeds | Sterols [17-19], Ecliptalbine (alkaloid) |
| 6 | Whole plant | Resin, Ecliptine, Reducing sugar, Nicotine, Stigmasterol, Triterpene saponin, Eclalbatin,Ursolic acid, Oleanolic acid |

**Table 2:** Phytochemical investigation of Eclipta Alba

| SN. No | Chemical Test | Natural plant extract | | |
|---|---|---|---|---|
| | | Leaf | Stem | Root |
| 1 | Alkaloid | + | + | - |
| 2 | Coumestans | + | + | + |
| 3 | Anthraquinones | - | - | - |
| 4 | Phenolics | + | + | + |
| 5 | Saponins | + | + | + |
| 6 | Steroids | + | + | + |
| 7 | Proteins | + | + | + |
| 8 | Amino Acids | + | + | + |
| 9 | Reducing suger | + | + | - |
| 10 | Flavonoids | + | + | + |

**Pharmacological Activity**

**1) Hepatoprotective Activity**

A thorough investigation was conducted to prove Eclipta alba has a hepatoprotective effect. An plant's alcoholic extract has been shown to protect mice and rats from experimentalliver injury.[20] The plant has been shown to have hepatoprotective properties at the ubcellular level of functional indicators in cases of inflammation and liver damage.[21] Ethanol/H2O [1:1] Eclipta alba extract strongly inhibits Inhibition of the hepatic microsomal drugs by CCl4 metabolism enzymes amidopyrin-N-demethylase and membrane bound glucose 6-phosphate.[22] Ethanol/H2O [1:1]. Hepatic lysosomal acid deficient Arc significantly restored phosphatase and alkaline phosphatase. Methanolic Eclipta alba leaves extract and chloroform Eclipta alba roots extract exhibited a substantial reduction in activity and upregulation of lysosomal enzymes by 72.8 percent and 47.96 percent, respectively. The methanolic extract of vital leaves (78.78%) and the alkabasaponintriterpenoid fraction formed from carbon tetrachloride reduced in alkaline fraction (60.65%) increased the level of lysosomal enzymes in the blood.[23] Significant reductions of the triterpenoidalsaponin fraction and the comestan fraction carbon tetra were produced from chloroform extracts (75.5%) and (52.40%), respectively, of the roots. Chloride causes an increase in the level of lysosomal enzymes in the blood Plants are protected against acute liver damage caused by carbon tetrachloride by lowering centrilobular necrosis, hydropic degeneration, and fatty transformation of hepatic parenchymal cells. In rats, the ethyl acetate fraction provided excellent and efficient safety at dose of 19.99, 40.01, and 79.99miligram/kilogram.[24] The plant's coumestan components, wedelolactone and dimethylwedelolactone, have been found to be responsible for carbon tetrachloride, which has considerable hepatotoxic effects, with galactosamine and phalloidin causing liver damage in rats.[25] With an IC of 2.5 M, wedelolactone has been found to be a potent and selective 5-lipoxygenase inhibitor, and this dosage is mediated by an oxygen radical scavenging mechanism.[26]



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**2) Central nervous system Activity**

Aqueous extracts of E. Alba and its hydrolyzed fraction at dosages of 300 miligram / kilogram and 300 miligram / kilogram, respectively, did not show any tropical activity in rats, according to research.[27]

**3) Antimicrobial Activity**

According to research, Eclipta alba has hepatitis B viral abilities. The shoot extract was shown to be antibacterial against Staphylococcus aureus and Eclipta coli.[27]

**4) Analgesic and anti-inflammatory activity**

The plant possesses anti-inflammatory and bronchodilator qualities due to its coumarin components. Further research validated the analgesic efficacy of Eclipta alba.[28] The analgesic effect of ethanolic and alkaloidal extracts of Eclipta alba on albino rats Eclipta alba was investigated.[29] Standard experimental designs include the acetic acid induced model, the tail clip method, and the tail flick method Response writing was utilised to show that both ethanol and extracts and whole alkaloids provided good analgesic efficacy in all analgesia models examined.[30]

**5) Immunomodulatory Activity**

Early research found that methanolic extracts of Eclipta alba had immune-modulating properties.[31] In vitro, wedelolactone and dimethylwedelolactone inhibit trypsin derived from Eclipta alba.[32]

**6) Alopecia and Hairs Growth**

E. Alba is used to make hairs oil because it promotes hairs development and maintain hair black. A key of component in the creation of herbal formulations for hair growth was 10% w/v Eclipta alba.[33] Alopecia is a dermatological disease that has psychosocial consequences for those who experience hair fall.[34] E. alba is a well-known ayurvedic herb used to promote hairs growth Petroleum ether and ethanolic extract were mixed in oleaginous cream and administered topically to the shaved skin of albino rat. Both the onset of hair growth and the time (in days) required to complete the hair growth cycle were documented. A 2% solution of minoxidil was administered topically as a positive control for comparison. Therapy with 1.99 percent and 4.99 percent petroleum ether extracts had greater outcomes than positive control minoxidil 1.99 percent treatment.[35] reported a quantitative investigation of hair growth after treatment with petroleum ether extracts [5%], with a greater number compared to controls [47 13] of hair follicles in the anagenic phase [69 4].

**7) Anticancer activity**

In Swiss albino mice, Eclipta albamethanolic extract was investigated for antitumor activity against Ehrlich Acutes carcinoma. Ecliptalba extract was given orally on the first day at dosages of 250 and 500 miligram/kilogram body weight and was continued for nine days. In experimental animal models, anticancer efficacy was assessed by measuring tumor volume, tumor cell count, viable tumor cell count, non-tumor cell count, survival period, and improved life span. When compared to EAC-bearing mice, the extract improved life span and repaired hematological markers. Thus, in the animal models studied, methanolic extracts of Eclipta alba demonstrated anti-cancer efficacy.[36] Coumestans have also been linked to phytoestrogen activity. Soybeans and clover contain these chemicals. It is used as a dietary supplement in many countries as a Chemoprotective agent in the treatment of breast and prostate cancer. Desicifin-C (saponin) recently isolated from E. prostrata has been shown to exhibit anticancer-cytotoxic action at doses of 50 g/ml in HeLa and Vero cell lines.

**8) Insecticidal & Other pharmacological activities**

The inchinocytic acid derivative from the Eclipta alba methanolic extract has been shown to have antifibrotic action.[38] Antibacterial activity of Ecliptaprostrataethanolic and ethyl acetate fractions against E. coli, Klebsiellapneumoniae, Shigella dysentery, etc were investigated.[40] A non-plant is mixed with E. prostrata substance used to wash malnourished infants for up to nine days and used as self-medication by AIDS patients in southern Thailand. E. Alba is often used in combination with other plants to cure a variety of ailments, including Amalaki, Sariva and Triphala for high pitta hair issues; Manjistha, Kutki for hepatitis and liver diseases; and Shankhpushpi for mental diseases caused by excessive. Turmeric, neem and liquorice are used to treat skin problems.

## 2. Conclusion

With its comprehensive and methodological approach supported by experimental foundation, conventional wisdom may serve as a new and robust discovery of natural 5-reductase inhibitor. Plant extracts showed potential 5-reductase inhibitory action in the laboratory. The Eclipta alba plant has both aesthetic and therapeutic benefits. Based on our findings, we believe that extracts from these herbs may be beneficial for alopecia. This study enhances our understanding of the plant's cosmetic applications in the treatment and control of baldness, as well as. Plant components and B vitamins are used in the manufacture of hair growth gels, creams and lotions. The formulations are screened, and findings show that they are visually appealing, homogenous and easily dispersible, and that they significantly inhibit the 5-reductase enzyme in an in-vitro model compared to many commercial formulations. In addition, HPTLC and HPLC methods were employed to measure the plant biomarkers included in the formulation. The findings also showed that the inhibitory effect of the 5-reductase enzyme formulation outperformed the commercial hair gel formulation.

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