

## ECLIPTA ALBA (LINN.) HASSK. – A REVIEW

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### Description of *Eclipta alba* (Linn.) Hassk. Plant

Annual herbaceous plant, commonly known as *false daisy*. It is an erect or prostrate, the leaves are opposite, sessile and lanceolate.

*Stems* : Approx. 50 cm tall, single from base but with many spreading branches, from fibrous roots, strigose, herbaceous, sub succulent, erect or ascending, often rooting at lowest nodes, purplish in strong sun. The

stems often form roots from the nodes when floating in the water.

*Leaves*: Opposite, sessile, lanceolate, shallow serrate to 13 cm long, 3. cm broad, strigose, acuminate.

*Flowering*: The tiny white flowers and opposite leaves is good characteristics for identifying this species in the field.

**Botanical Name:** *Eclipta alba* (Linn.) Hassk.

**Family:** Asteraceae

### Vernacular Names

Sanskrit	Bringaraj
Hindi	Bhangraa
Assamese	Kehraj
Bengali	Kesuriya
Tamil	Karisalanganni
English	Kadimulbirt
Marathi	Maarkwa
Telugu	Galagara

**Full Taxonomic Hierarchy of *Eclipta alba* (Linn.) Hassk.**

Kingdom	Plantae
Sub-kingdom	Viridaeplantae
Infra-kingdom	Streptophyta
Sub-division	Spermatophytina
Infra-division	Angiosperm
Class	Magnoliopsida
Super order	Asteranae
Order	Asterales
Family	Asteraceae
Genus	<i>Eclipta</i> L.
Species	<i>Eclipta alba</i> (L.) Hassk.

**Stem and leaves of *Eclipta alba* (Linn.) Hassk.****Flower and leaves of *Eclipta alba* (Linn.) Hassk.**

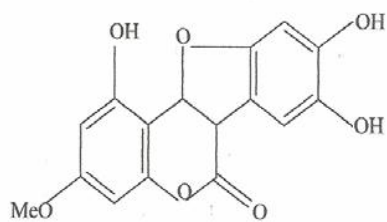
## DISTRIBUTION

It is found as a common weed widely distributed throughout India, China, Thailand and Brazil. There are three kinds of *Eclipta alba* the white-flowering, the yellow-flowering and the black-fruited, but all three grow throughout India by marshes, rivers and lakes or on the foothills of the Himalayas. It is commonly found in waste places, marshy lands, hedges and roadsides, particularly in the more tropical parts of the country. It is also found in other eastern countries including Indonesia, Sri-Lanka, Philippines, Nepal, and Malaysia where it grows well in clay and moist ground, paddy fields, water courses, tanks, north in plain and hilly regions. It contains active principles which include coumestans, alkaloids, flavonoids, glycosides, polyacetylenes and triterpenoids. The leaves contain stigmasterol,  $\beta$ -terthienylmethanol, wedelolactone, desmethylwedelolactone and desmethylwedelolactone-7-glucoside.<sup>[1]</sup> The roots contains hentriacontanol and heptacosanol. The aerial part is reported to contain a phytosterol,  $\beta$ -amyrin in the n-hexane extract and luteolin-7-glucoside,  $\beta$ -glucoside of phytosterol, a glucoside of a triterpenic acid and wedelolactone in polar solvent extract. Nicotine and nicotinic acid are reported to occur in this plant.<sup>[2]</sup>

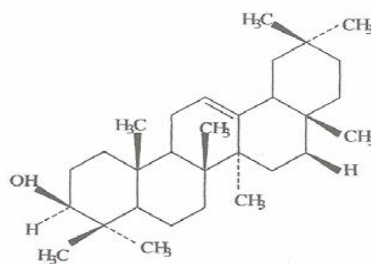
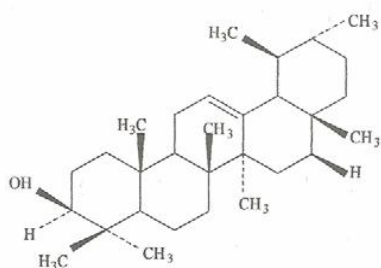
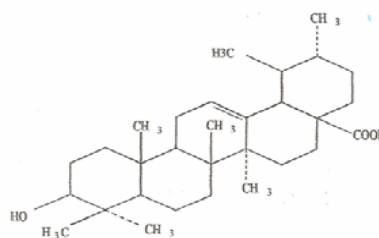
### Phytoconstituents: *Eclipta alba* (Linn.) Hassk.

1. *Coumestans* – Wedelolactone (0.5 – 0.55%), desmethylwedelolactone and desmethylwedelolactone-7-glucoside.
2. *Terpenoids and their glycosides* - Eclalbasaponins VII–X (Taraxastane triterpene glycosides), eclalbasaponins I–VI (Oleanane triterpene glycosides), ecliptasaponins C and D (Triterpenoid glycosides), trihydroxytaraxastane glycosides and their sulphated saponins,  $\beta$ -amyrin, oleanolic acid and ursolic acid.
3. *Alkaloids* - Verazine [(20S)(25S)-22,26-imino-cholesta-5,22(N)-dien-3-ol] and ecliptalbine [(20R)-4-hydroxyverazine].
4. *Sterols* - Stigmasterol, daucosterol and stigmasterol-3-O-glucoside.
5. *Flavonoids* - Luteolin-7-glucoside, luteolin and apigenin.
6. *Sesquiterpene lactones* - 5-hydroxymethyl-(2, 2':5', 2'')-terthienyl tiglate, 5-hydroxymethyl-(2,2':5',2'')-terthienyl agelate, 5-hydroxymethyl-(2,2':5',2'')-terthienyl acetate.
7. *Terthienyl aldehyde* – Ecliptal.
8. *Fatty alcohols* – Hentriacontanol and Heptacosanol.
9. *Saponins* - Eclalbatin (Triterpene saponin) and dasyscyphin C.
10. *Phenolic acids* - Protocatechuic acid and 4-hydroxy benzoic acid.

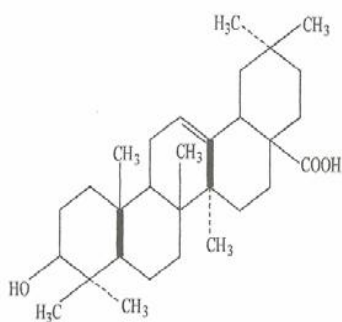
### Chemical structure: Phytoconstituents.<sup>[3]</sup>



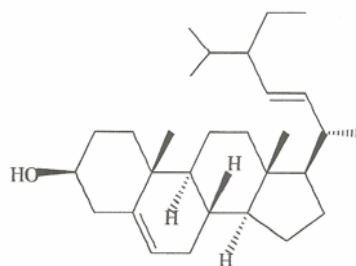
Structure of Wedelolactone

Structure of  $\alpha$ -amyrinStructure of  $\beta$ -amyrin

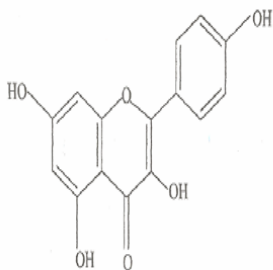
Structure of Ursolic acid



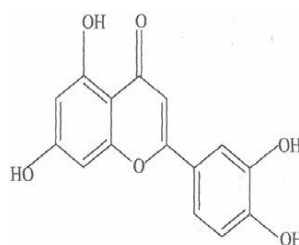
Structure of Oleanolic acid



Structure of Stigmasterol



Structure of Apigenin



Structure of Luteolin

### Chemical constituents: *Eclipta alba* (L.) Hassk. Herb.

- 1. Leaves:** Wedelolactone [1.6%], stigmasterol, desmethylwedelolactone-7-glucoside.<sup>[4]</sup>
- 2. Roots :** Hentriacontanol<sup>[5]</sup>, heptacosanol<sup>[6]</sup> and stigmasterol<sup>[5]</sup>, ecliptal.<sup>[6]</sup>
- 3. Aerial parts:**  $\beta$ -amyrin and luteolin-7-O-glucoside<sup>[7]</sup>, apigenin

cinnaroside, sulphur compounds<sup>[8]</sup>, eclalbasaponins.

**3. Stems:** Wedelolactone.<sup>[9]</sup>

**4. Seeds:** Sterols<sup>[9]</sup>, ecliptalbine.

**5. Whole plant:** Resin, ecliptine, reducing sugar<sup>[9]</sup>, nicotine, stigmasterol<sup>[1]</sup>, triterpene saponin, eclalbatin, ursolic acid, oleanolic acid.<sup>[10]</sup>

#### **Pharmacological activity of chemical constituents of *Eclipta alba* (Linn.) Hassk.**

**1. Wedelolactone (Leaves):** Antihepatotoxic<sup>[1,11]</sup>, antibacterial<sup>[12]</sup>, trypsin Inhibitor, antivenom<sup>[13]</sup>, antiasthmatic, selective 5-lipoxygenase inhibitor with an IC<sub>50</sub> of 2.5 μM.<sup>[1]</sup>

**2. Eclalbasaponins (Whole plant):** Hair revitalizing<sup>[14]</sup>, antiproliferative<sup>[15]</sup>, antiangiogenic.<sup>[16]</sup>

**3. Desmethylwedelolactone (leaves):** Antihepatotoxic<sup>[1]</sup>, antihemorrhagic<sup>[17]</sup>, antivenom<sup>[13]</sup>, anticancer.<sup>[15]</sup>

**4. Eclalbatin (Root, plant):** Antioxidant.<sup>[18]</sup>

**5. Ecliptalbine, verazine (Stem):** Lipid lowering, analgesic .

**Studies on Anti-inflammatory activities of *Eclipta alba*:** The extract of *Eclipta Alba* was administered orally to investigate anti-inflammatory activity.<sup>[19]</sup> The anti-inflammatory activity which estimated by using carrageenan induced paw edema model. Inflammation occurs due to activation of platelet activation factors and release of pro-inflammatory mediators such as prostaglandins, kinins, tumor necrosis factors and nitric acid. The extract of *Eclipta Alba* has the potent inhibitor of the pro-inflammatory transcription factors and a promising agent for the treatment of the inflammatory cascade of cardio-vascular diseases.<sup>[20]</sup> Coumestan constituents of plant like wedelolactone, dimethylewedelolactone-7-glucoside and nor-wedelolactone contribute for anti-inflammatory and Bronchodilator activity. The previous studies shows that hepatoprotective activity of *Eclipta Alba* is by regulating the levels of hepatic microsomal drug metabolizing enzymes.<sup>[21]</sup> Wedelolactone is potent and selective 5-lipoxygenase inhibitor with IC<sub>50</sub> of 2.5 μM.<sup>[1]</sup>

Analgesic effect was studied on albino mice using ethanolic and alkaloidal extract of *Eclipta alba*. Standard experimental models such as the tail clip method, the tail flick method and the acetic acid induced writhing response were used which showed both the ethanol extract as well as the total alkaloids produced good analgesic activity in all the different models of analgesia used. The total alkaloidal fraction including ecliptine, nicotine, and verazine was the most efficacious in all models tested.<sup>[22]</sup>

**Toxicity studies of *Eclipta alba* (L.) Hassk.:** In studies 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 g/kg when given orally and intraperitoneally in mice.<sup>[23]</sup>

**Clinical studies and Traditional Uses:** *Eclipta alba* is used in various parts of tropical and sub-tropical regions like South America, Asia and Africa. It is an active ingredient of many herbal formulations prescribed for liver ailments and shows effect on liver cell generation. It is used as a tonic and diuretic in hepatic and spleen enlargement. It is also used as haemostatic<sup>[24]</sup> and for skin diseases.<sup>[25]</sup> The alcoholic extract of the plant has shown antiviral activity against Ranikhet disease virus.<sup>[26]</sup> The plant is commonly used in hair oil all over India for blackening, promoting hair growth and strengthening the hair.<sup>[27]</sup> The fresh juice of leaves is used for increasing appetite, improving digestion and as a mild bowel regulator.<sup>[28]</sup> The herbal drug combinations Tefroliv-forte, Stimuliv syrup containing *Eclipta alba* in combination with other herbs are used as hepatoprotective in drug induced, alcoholic and viral hepatitis.<sup>[29]</sup> There has been clinical studies conducted that prove the effectiveness of *Eclipta alba* therapy in jaundice in children.<sup>[30]</sup> Bhringaraja in “Ghanasatwavati” is used in patients of kosta-shakhasrita kamala with special reference to hepatocellular jaundice.<sup>[31]</sup>

16 parts of *Eclipta prostrata* (bhringaraj), 1 part of Triphala formula {*Embolia officinalis* (amalaki), *Terminalia chebula*, (haritaki), *Terminalia bellerica* (bibhitaki)}, 1 part of *Crotalaria gigantea* (arka) and 1 part of *Smilax officinalis* (sariva) mixed with 80 parts of sesame oil and boiled to make a medicated oil which is reported to be used in skin diseases.<sup>[32]</sup>

*Eclipta alba* thus offers remarkable preventative and curative potential on going clinical investigation of *Eclipta alba* is health promoting qualities.

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