



## PROSPECTIVE HEALING ATTRIBUTES OF BHRINGRAJ : THE “KING OF HAIR”

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**Review Paper**

Received: **23.08.2025**

Revised: **10.09.2025**

Accepted: **30.09.2025**

### ABSTRACT

Bhringaraj is a powerhouse herb in ayurveda, most famous for its role in promoting hair growth, preventing premature greying and improving the scalp health earning it the nick name Kesharaja. Bhringaraj is widely used for its extra-ordinary property in treating numerous human ailments especially hair growth. This herb has drawn much attention for owing the existence of significant organic compounds for the treatment of many infections and disease. Modern studies have begun confirming Bhringaraj's traditional uses for hair and liver health, suggesting its bioactive compounds have promising medicinal properties. It's generally safe when used appropriately, but individuals with allergies or specific medical conditions should seek professional advice before use. Although the world has so many medicines to treat each disease, they owe some side effects which is much alarming for health. But metabolites isolated from *Eclipta alba* used to treat different disease does not have any side effect. Clinical investigations have been done on different pharmacological activities. This small medicinal herb with multiple therapeutic applications can be a promising and reliable source of new drugs in future in modern medicine.

**No. of Pages: 5**

**References: 08**

**Keywords:**

### INTRODUCTION

*Eclipta alba* (L.) Hassk is a popular ayurvedic herb celebrated for its numerous health benefits especially for hair growth, liver health and overall rejuvenation. It can be erect or prostrate annual belongs to the Asteraceae family. The Sanskrit word “Bhringaraj” means that which bestows 'hair' the splendid black colour like that of a grand humming bee on the flower. *E. alba* has been traditionally used for thousands of years in Indian and Chinese medicine to treat various illnesses (Brown, 1995). The first recorded use of Bhringaraj was in the Chinese Tang Medica of 659 AD (Jadhav *et al.*, 2009). It is a well-known herb for its keshya property from vedic period. The medicinal value of Bhringaraj has been discussed in 'Raj Nighantu'- the ancient Indian ayurvedic classic text. It is one of the ten auspicious flowers (Dasapushpam) in Ayurveda and said to be the best herb for liver

cirrhosis and infectious hepatitis (The Indian Herbal Pharmacopeia, 1998). The plant is considered as revitalizer and anti-aging agent in Ayurveda (Thakur *et al.*, 2005). The herb is bitter, hot, sharp, and dry in taste and is used in Ayurveda and Siddha for the treatment of Kapha and Vata imbalances (Mukhopadhyay *et al.*, 2018)

### TAXONOMIC CLASSIFICATION

Kingdom : Plantae  
Sub Kingdom : Tracheobionta  
Super Division : Spermatophyta  
Division : Magnoliophyta  
Class : Magnoliopsida  
Sub Class : Asteridae  
Order : Asterales  
Family : Asteraceae  
Genus : *Eclipta*

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

### DISTRIBUTION AND ECOLOGY

It is native to India and it is also found in China, Thailand, Brazil and Iraq.

*E. alba* is cosmopolitan in distribution. It is a hardy crop, inhabits a wide range of habitat in the poorly drained wet areas, in the wastelands, along streams, ditches and canals, and tolerates saline conditions, higher altitudes and drier sites. It prefers clayey soils with high moisture content and warm climate with a temperature range of 25 °C to 35 °C. There are three types of *Eclipta* viz., white flowering, yellow flowering and black fruiting and all these are found in wild. *E. alba* is commonly known as safed bhangra (Hindi) in flowering stage and as Kala bhangra when its fruiting. Pila bhangra is the name given to closely related plant *Wedelia calendulacea* that bears yellow flowers and is considered as adulterant of this species.

### MORPHOLOGICAL CHARACTERISTICS Habit :

*E. alba* is an erect or prostrate, much branched, tufted, roughly hairy, annual herb commonly known as false daisy. The leaves are opposite, sessile and lanceolate and when cut with knife it turns the sap black. The flowering stalk arises from the axis of the leaf. The inflorescence is white on a hemispherical head of 1 cm in diameter. The commencement of flowering starts during August–September months and fruiting occurs up to November. The root system is well- developed.

### Stem

It is herbaceous, 30-40 cm tall, single from base but with many spreading branches from the base, nodes distinct, sub succulent, erect or ascending, cylindrical or flat, rough due to appressed white hairs, greenish,

occasionally brownish often rooting at lowest nodes.

### Leaves

Leaves are green, opposite, sessile to sub sessile, shallow serrate, 2.2- 8.5 cm long, 1.2- 2.3 cm wide, oblong, lanceolate, sub-acute or acute, strigose with appressed hair on both surface.

### Root

This herb possesses tap root system. A number of secondary branches arise from main root, upto about 7 mm in diameter cylindrical and greyish.

### Flower

Inflorescence is heterogamous head, 6-8 mm in diameter with companulate involucre of bracts. Flowers are white, solitary or 2, together on unequal axillary peduncles. Bracts are biseriate, and the outer broader is receptacle, flat, strigose with appressed hair. Ray flowers are ligulate, ligule small, spreading, scarcely as long as bracts, two toothed or entire and white in colour. The disc flowers are tubular, corolla 4 to 5 lobed. The ray florets are pistillate while disc florets are bisexual. Pappus is generally absent, if present occasionally it is very minute teeth on the top of achene. Stamen - five, filaments- epipetalous, and syngenesious. Pistil- bicarpellary, ovary is inferior, unilocular with one basal ovule.

### Fruit

The fruit of *E. alba* is achenial cypsela, one seeded, cuneate, with a narrow wing and brown in colour. Achenes of ray florets are triquetras, warted and those of disc are compressed.

### Seed

Seeds are dark brown, hairy, non-endospermic, 0.2- 0.25 cm long and 0.1 cm wide.

### Traditional uses of Bhringraj

Traditional Uses	Country/ Region	Used plant part(s)	Formulations
Acidity	India	Whole plant	Plant extraction is prescribed with cow milk 3 times daily for 15 days before each meal.
Alopecia	India	Leaf	Leaf extract with other plant extract is given orally twice a day for three months.
Allergy, athlete's foot and ringworm	Pakistan	Leaf	Leaf paste is used to the affected parts
Asthma	India, Thailand	Whole plant	Plant ash is given orally with honey thrice a day for 3 months.
Amoebiasis, Anaemia, Asthma	Thailand	Stem	Specific method is still to discover

Body pain	India	Leaf	Treated with fresh leaf extract orally twice a day for 5 days or till the patient recovers.
Bronchitis	and pneumonia	India	Whole plantDecoction of whole plant is given orally with honey twice a day for 7 days.
Burns	India	Whole plant	Leaf paste is used for the external uses and also plant extract is given orally twice a day for 15 days
Catarrhal problems		Nepal	Whole plantPlant juice with essential oil
Constipation	India	Root	Powder is given orally once a day for 3 days
Chicken pox	Bangladesh	Leaves and stem	Plant extract with mustard oil applied to the skin
Cold	Sidha	Leaf	Leaf juice with equal amount honey
Coronary heart disease		China	Whole plant15 g extract is equal to about 30g raw herb twice a day
Cuts and wounds	Nepal	Whole plant	Plant extract is applied in the affected parts.
Diarrhea and dysentery	India	Whole plant	Whole plant decoction is given orally thrice a day for 7 days or till complete cure is obtained.
Fever	India	Whole plant	Plant extract is given orally twice or thrice a day for 7 days or until the patients recover fully.
General weakness	India	Whole plant	Plant extract mixed with three gm of <i>Phyllanthus emblica</i> L. powder is given orally twice a day for 6 weeks or till the patient fully recovers.
Gingivitis	India	Leaf	Leaf extract is given orally twice a day for 3 weeks or till complete cure is achieved.
Hemorrhoids	India	Root	Root extracts 3 times in a day
Hair dying	Thailand	Leaves	The specific method of use is unclear
Hair fall	India	Leaf	Leaf extract 2 times daily with cow milk for 3 months.
Hair falling	Bangladesh	Leaf	Leaf extract with cow milk two times a day
High	blood pressure	India	Whole plantPlant decoction twice or thrice a day for three months.
Hemoptysis of pulmonary tuberculosis	Philippines	Whole plant	Dried plant or tincture used to treat
Jaundice	India	Whole plant	Plant extract with honey is given twice or thrice daily for 15 days.
Liver Enlargement	India	Whole plant	Plant extract 2 or 3 times daily
Loss of appetite	India	Leaf	Leaf extract before each meal for 15 days
Oedema	India	Whole plant	Herb extract 2 times a day
Palpitation	India	Leaf	Leaf extract with honey thrice a day

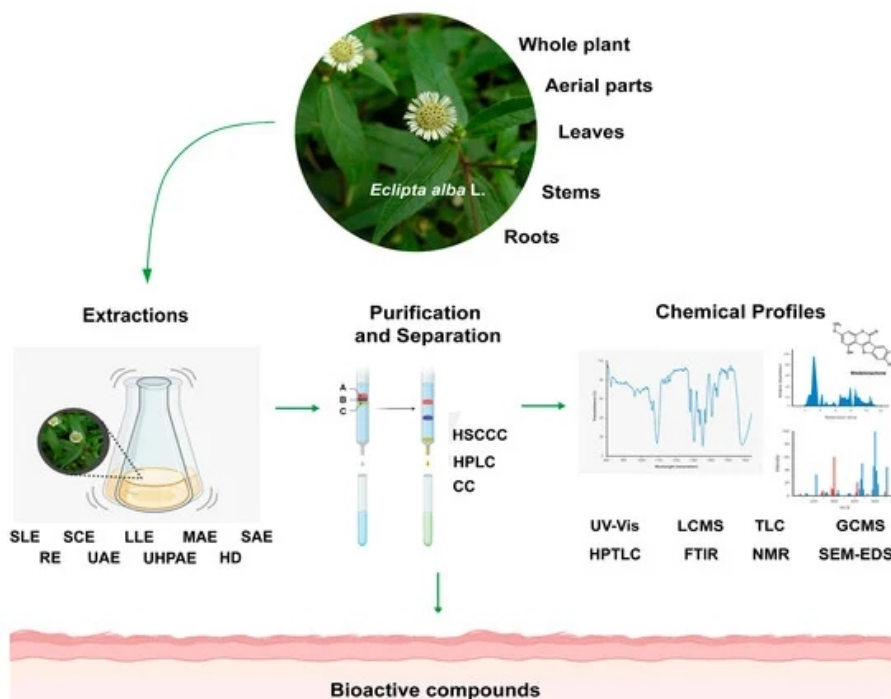
This diagram illustrates the process of extracting and analyzing bioactive compounds from *Eclipta alba* L. The plant's different parts (whole plant, leaves, stems, and roots) undergo various extraction methods such as solvent extraction, ultrasound-assisted extraction,

microwave-assisted extraction, reflux extraction (RE), ultrasonic-assisted extraction (UAE), liquid-liquid extraction (LLE), microwave-assisted extraction (MAE), ultra-high-pressure-assisted extraction (UHPAE), hydrodistillation (HD), and Soxhlet-assisted

**Phyto-chemical compounds present in *E. alba* and its Pharmacological activities.**

Types of phytoconstituents	Parts	Chemical constituents	Pharmacological activities
Coumestan	Leaves	Wedelolactone, demethylwedelolactone, demethylwedelolactone-7-glucoside	Anticancer, antihepatotoxic, trypsin inhibitor, antivenom, antihepatotoxic, antihemorrhagic, antivenom, dye (cosmetic), and antihepatotoxic
	Whole plant	Wedelolactone, demethylwedelolactone, isodemethylewedelolactone Coumestan and strycholactone	
Alkaloids	Leaves and seeds	Ecliptine, ecliptalbine, verazine, dehydroverazine.	Lipid lowering, Analgesic
Flavonoids	Aerial parts	Luteolin-7-o-glucoside, luteolin, apigenin, Quercetin, Buddleosid, Apigenin-7- O-glucoside, iosmetin, 7-methylorobol-4'-O-β-D-glucopyranoside, Pratensein, Pratensein-7-O-β-D-glucopyranoside.	Anticancer, antioxidant, antiallergic, and anti-inflammatory
Sterol	Roots	Stigmasterol, daucosterol, stigmasterol-3-O-glucoside	Anticancer
Sesquiterpene lactones	Stems	5-hydroxymethyl-(2,2':5',2'')-terthienyl tiglate, 5-hydroxymethyl-(2,2':5',2'')- terthienyl acetate	Anti-HIV activity, mosquito larvicidal and ovicidal
Fatty alcohols	Root	Hentriacontanol, heptacosanol	Skin diseases, ulcers, diabetes, heammaroides, asthma, gonorrhea, gleans, leucorrhea and urinary diseases
Saponins	Roots	Eclalbatin (triterpenesaponin), dasyscyphin C	Anticancer, antiviral and antioxidant activity

**PROCESS FOR EXTRACTION OF BIOACTIVE COMPOUNDS FROM *E. alba***



extraction (SAE), are employed to obtain plant extracts. The extracted compounds are then purified and separated using techniques like high-speed countercurrent chromatography (HSCCC), high-performance liquid chromatography (HPLC), and column chromatography (CC). Further chemical profiling is conducted using analytical techniques such as UV-Vis, LCMS, FTIR, NMR, and GCMS. The goal is to identify and characterize bioactive compounds present in the plant.

#### Harvesting and yield :

Harvesting is done 90 days after transplanting by cutting the above ground portion leaving behind 10-12 cm for ratoon crop. Above ground parts should be cleaned, shade dried, packed in gunny bags and kept in cool and dry place. Care needs to be taken so that there should not be any fungal infection during storage. On an average bhringaraj gives about 8 t/ha fresh herbage yield during 1st cropping (April-July) and 3 t/ha from the ratoon crop (August- September). The right time to collect seeds is when the seeds turn black in colour. The harvested seeds must be cleaned and stored after proper drying.

#### Economics :

On an average, *Eclipta alba* produces approximately 11-12 t/ha of fresh herbage in an year. Upon drying, the herb loses 60 per cent of moisture and gives an average of 6000 kg dried herbage/ha/year. The estimated cost of cultivation is about Rs. 20,000/- for one hectare area (NMPB). With the prevailing selling price of Rs 25 /kg for dry herb, gross return of Rs 1, 50,000/- per hectare can be obtained. Hence, a net return of Rs. 1, 30,000/- can be obtained by cultivating Bhringaraj on one hectare area.

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