

How to Cite:

Jha, U., Singh, K., & Singh, A. (2022). Phytochemical and pharmacology activity of Bhringraj: A review. *International Journal of Health Sciences*, 6(S3), 11113–11125. <https://doi.org/10.53730/ijhs.v6nS3.8560>

Phytochemical and pharmacology activity of Bhringraj: A review

Umang Jha

Research Scholar, Dev Bhoomi Institute of Pharmacy and Research, Dehradun

Miss Kanchan Singh

Assistant Professor, Dev Bhoomi Institute of Pharmacy and Research, Dehradun

*Corresponding author email: sopr.kanchan@dbuu.ac.in

Dr. Amandeep Singh

Associate Dean, Dev Bhoomi Institute of Pharmacy and Research, Dehradun

Abstract--Plants are referred as the primary source of food, shelter and various remedial approaches. Plants are thoroughly used in treatment of various human illness across the globe traditionally. Among those therapeutic herbs Eclipta Alba/ Eclipta Prostrata is renowned for high therapeutic significance in medicinal world. Eclipta Alba or Eclipta Prostrata, commonly referred to as Bhringeria, belonging to the family of Sunflower (Asteraceae). It's found in all over the map specially in subtropical and tropical region. Standardization of the herbs was performed based on different physiochemical parameters and revealed the values were within the prescribed limits. The entire plant together with flowers, leaves, stems, seeds are large used for the treatment of assorted diseases. Eclipta alba is widely used as antioxidant, analgesic, anticancer, anti hyperglycaemic, anti-myotoxic and immuno modulatory. It also emphasizes the compounds or chemicals extracted from the plant parts and their properties with a short pharmacological profile. Though some of the properties of Bhringraj have been explored for pharmacological benefits, there is still a long way to go for its full potential to be exploited for human welfare. A wide range of chemical components are extracted. They are:- Alkaloid, Flavonoids, Polyacetylenes, Thiopenes, Triterpines, Cumentans, β -terthienylmethanol, Wedelolactone, Sterols, Ecliptalbine, Amyrin, Luteolin-7-o-glucoside.

Keywords--bhringraj, antimyotoxic, antimyotoxic, antihyperglycemic.

Introduction

Treatment of diseases with the utilization of medicinal plant has been followed by the traditional times. Since earlier times, people looked for the rescue of diseases they searched for drugs in nature and their surrounding. Use of medicinal plants began from the utilization in animals. This plant has been used traditionally in prehistoric medicine together with Siddha, Ayurvedic and also in allopathic now a days. Herbal medicines play a significant role in increasing the global healthcare where it helps in expanding the market by providing health foods and preventive medicines. Berengaria is renowned as one of the most supportive medicinal herbs for hair growth, shine and luster in Ayurvedic Pharmacopoeia. It brings its cooling, rejuvenating benefits to the mind and nervous system when it also supports the liver, circulation and even healthy skin. Eclipta Alba is widely used as antioxidant, analgesic, anticancer, antihyperglycemic, antimyotoxic and immuno modulatory properties. A wide range of chemicals components like Alkaloids, Flavonoids, Polyacetylenes, Triepenes, Cumentans, Thiophenes, Eclipta, Hentriacintanol, Eclabatin, Stigmasterol, β -terthienylmethanol, Wedelolactone, Sterols, Ecliptalbina, Amyrin, Luteolin-7-o-glucoside.

Table 1
Taxonomical Classification

1.	Kingdom	Plantae
2.	Subkingdom	Viridaepiantae
3.	Division	Tracheophyta
4.	Sub division	Sermatophytina
5.	Class	Magnoliopsida
6.	Order	Asteranae
7.	Family	Asteraceae
8.	Genus	Eclipta
9.	Species	Alba
10.	Common name	Bhringraj

Table 2
Vernacular Names

1.	Latin name	Eclipta alba
2.	Common name	False daisy
3.	Hindi name	Bhangra, Bhangraiya
4.	Marathi name	Maka
5.	Gujrati name	Bhangaro
6.	Arabic name	Kadim-ul-bint, Radim-el-bint
7.	Punjabi	Bhangra, dodhak, Babri
8.	Bengali	Kesuriya, kesuti
9.	Tamil	Kaikehsi
10.	Telugu	Galagara, Gunta, Galijaeru
11.	Malyalam	Cajenneam, Kanni
12.	Asamese	Kehraj
13.	Konkani	Mako, Kajalamavu

Habitat

Eclipta Alba is found to grow wild in a very of soils viz. sandy to clay soil and vary common on damp wastelands, low waterlogged areas, roadsides, paddy and other crop fields, probably in warm climate. It is a shade loving plant prefers damp to wet soil. The crop is sufficiently hardy and comes up well in tropical, subtropical and temperature regions. Moreover requires quite hot temperature ranging 25° c to 35° c for better productivity. These herb generally grows in moist regions of India, China, Nepal ,Thailand and Brazil.

Characteristics



Figure 1. Bhringraj Plant

It belongs to the family of sunflower, an annual plant that grows about 3 metres in height. It grows forlorn, white flower, having well developed and differentiated stem, leaves, flower and root. It is generally found within the fringe of garden, field where there is a presence of moisture, warmth like wetland. It has long stalk and white coloured flowers with are solitary, winged and about 6 to 8 mm in diameter. The leaves are sessile, lance shaped and arranged in opposite orientation. It has distinct cylindrical and gray coloured roots.

Sanskrit Synonyms

- Markava, Kesharanjana – Helps to alleviate grey hairs.
- Bhangaraja – Helps to form the hair silky and gloosy like that of peacock.
- Bhanragaraha, Bhringa , Maheneela, Ravipriya, Angaraka, Suryavarta, Pitrupriya.

Table 3
Description as Per Ayurveda

1.	Rasa (taste)	Katu(pungent), Tikta (biter)
2.	Guna (qualities)	Rooksha (dryness), Laghu (light to digest)
3.	Veerya	Ushna (Hot potency)

4.	Vipaka	Katu –undergoes pungent taste conversion after digestion
----	--------	--

Parts Used

Whole plant together with the flowers.

Morphology

- It is an erect or prostrate, branched (occasionally rooting at nodes) annual herb up to 30-40 cm high.
- Stem is cylindrical or flat, rough because appressed white hairs, nodes distinct and greenish occasionally brownish.
- Leaves are opposite, sessile to sub-sessile 2.0 to 6.2 cm long, 1.5-1.9 cm wide, oblong, lanceolate, sub-entire, acute to sub-acute and strigose with appressed hairs on both surfaces.

Table 4
Phytochemical Constituents Found in Eclipta Alba

1.	Roots	Thiophenes, Eclipta, Hentriacintanol, Eclabatin, Stigmasterol
2.	Stems	Wedelactone
3.	Leaves	Stigmasterol, β -terthienylmethanol, Wedelolactone[1.6%]
4.	Twigs of the plant	Sterols, Ecliptalbine
5.	Seeds	Alkaloids
6.	Aerial part	Amyrin, Luteolin-7-o-glucoside
7.	Bhringraj being a potent hair vitalizer has a host of bioactive constituents including flavonoids.	

Root



Figure 2. Root of Bhringraj

The part of plant which attaches it to the ground or to a support, typically underground, conveying water and nourishment to the rest of the plant via numerous branches and fibres. The chemicals found in roots are mentioned below:-

Thiophenes

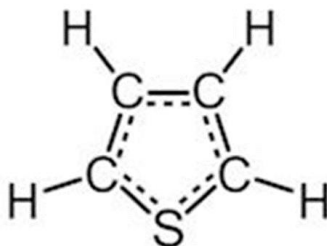


Figure 3. Structure of Thiophenes

Thiophene is a heterocyclic compound with the formula C_4H_4S . Consisting of a planar five-membered ring, it is aromatic as indicated by its extensive substitution reactions. Uses:- It is widely used as building blocks in many agrochemicals and pharmaceuticals. The benzene ring of a biologically active compound may often be replaced by a thiophene without loss of activity. This is seen in examples such as the NSAID lornoxicam, the thiophene analog of piroxicam.

Hentriacintanol

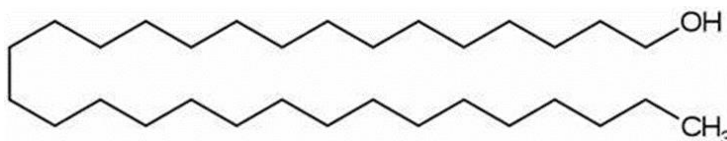


Figure 4. Structure of Hentriacintanol

Hentriacontane, also called untriacontane, is a solid, long-chain alkane hydrocarbon with the structural formula $CH_3(CH_2)_{29}CH_3$. It is found in a variety of plants, including peas (*Pisum sativum*), *Acacia senegal*, *Gymnema sylvestre* and others, and also comprises about 8–9% of beeswax. Uses:- It is used for treatment of various diseases such as skin diseases, ulcers, diabetes, piles, dysentery, asthma, gonorrhoea, gleet, leucorrhoea and urinary diseases.

Stigmasterol

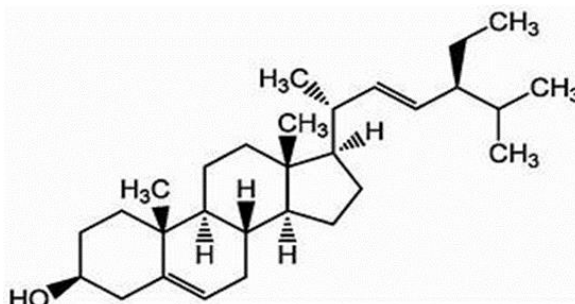


Figure 5. Structure of Stigmasterol

Stigmasterol is an important plant sterol that can inhibit the development of various cancerous cells by inhibiting the promotion and growth of apoptosis of cancer cells. This inhibition could be due to the activation of caspase enzymes (enzymes involved in cell regulatory networks that control cell death). Uses:- used in reducing inflammation and cholesterol lowering ability.

- **Stem:** A stem is one of the two main structural axes of a vascular plant, the other being the root. It supports leaves, flowers and fruits, transports water and dissolved substances between the roots and the shoots in the xylem and phloem, stores nutrients and produces new living tissue.
- **Wedelolactone:** Wedelolactone a phenolic derivative of Coumestan is a natural furocoumarin having potent antioxidant properties Compound could efficiently protect Mesenchymal stem cells (MSCs) from hydroxyl radical-mediated oxidative damage.

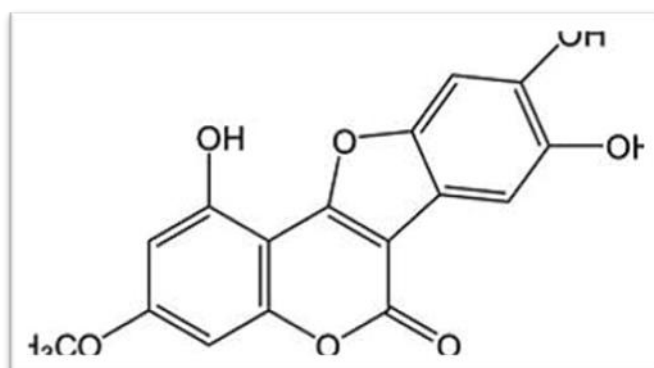


Figure 6. Structure of Wedelolactone

Uses: Wedelolactone, a phenolic coumestan, extracted from *Ecliptae herba*, has been reported to possess anti-inflammatory, antioxidant, anticancer and recently for bone disease

Leaves



Figure 7. Leaf of Bhringraj

A flattened structure of a higher plant, typically green and blade like, that is attached to a stem directly or via stalk and also a main organ of photosynthesis and transpiration

β -trithienylmethanol

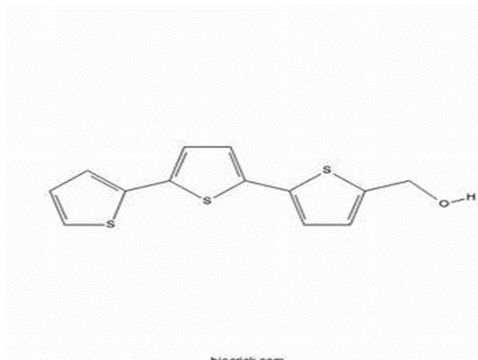


Figure 8. Structure of β -trithienylmethanol

Stigmasterol

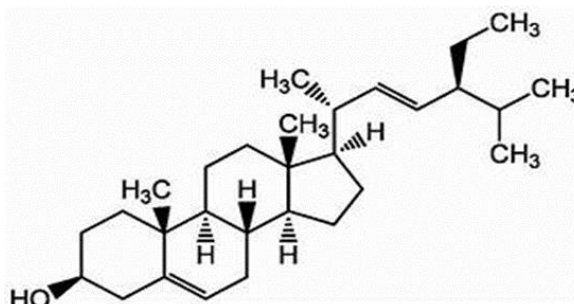


Figure 9. Structure of Stigmasterol

Stigmasterol is an important plant sterol that can inhibit the development of various cancerous cells by inhibiting the promotion and growth of apoptosis of cancer cells. This inhibition could be due to the activation of caspase enzymes (enzymes involved in cell regulatory networks that control cell death)

Uses: - used in reducing inflammation and cholesterol lowering ability.

Wedelolactone

Wedelolactone a phenolic derivative of Coumestan is a natural furocoumarin having potent antioxidant properties Compound could efficiently protect Mesenchymal stem cells (MSCs) from hydroxyl radical-mediated oxidative damage.

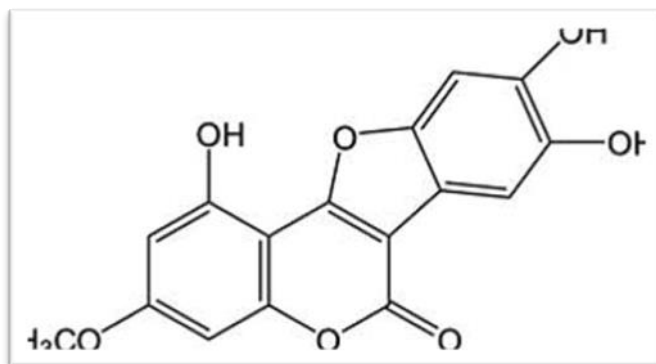


Figure 10. Structure of Wedelolactone

Uses: Wedelolactone, a phenolic coumestan, extracted from *Ecliptae herba*, has been reported to possess anti-inflammatory, antioxidant, anticancer and recently for bone disease.

Seed



Figure 11. flower showing seed in flower

Alkaloid

Alkaloids are a class of basic, naturally occurring organic compounds that contain at least one nitrogen atom. This group also includes some related compounds with neutral and even weakly acidic properties. Some synthetic compounds of similar structure may also be termed alkaloids. In addition to carbon, hydrogen and nitrogen, alkaloids may also contain oxygen, sulfur and, more rarely, other elements such as chlorine, bromine, and phosphorus.

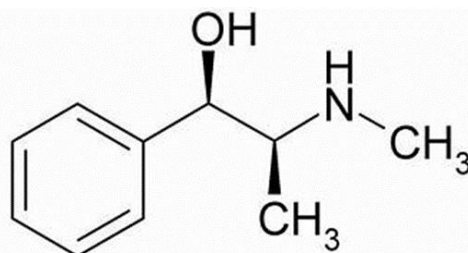


Figure 12. Structure of Alkaloid

Uses: Alkaloids are used in cancer treatment, cough remedy, migraine relief.

Pharmacological Activity

- **Anti-oxidant activity:-**

Methanolic extract from *E.alba* (leaves) showed antioxidant activity in hydrogen peroxide uptake tests, total antioxidant capacity and reduced test capacity. This was demonstrated by DPPH atom capture and therefore the 2,2'-azinobis- (3-ethylbenzthiazoline-6-sulfonic acid) (ABTS) assay.

- **Anti- diabetic activity:-**

The antidiabetic effect of *E. abla* ethanol extract was investigated for possible beneficial effects against hyperglycemia and diabetic nephropathy in diabetic STZ mice. Treatment with a single dose of the extract was found to cut back blood sugar levels by 17.6% after 5 hours of oral administration at a dose of 250 mg / kg.

- **Anti- venom potential of *E.prostrata*:-**

The butanol and pure butanol extracts (PBE) of *Eclipta Prostrata* were evaluated in terms of their potential against poisoning. Inhibition of lethal, hemorrhagic, proteolytic and phospholipase A2 activities in *Calloselasma rhodosoma* venom (Malayan pit viper (MPV)) resolve by these extracts. Butanol extract at a dose of 2.5 mg per mouse completely neutralized the lethal activity of 2LD50 in MVP venom, but increasing the dose reduced the effect. PBE at a dose of 1.5-4.5 mg per mouse can neutralize toxin mortality by approximately 50-58%.

- **Antibacterial and antifungal activity**

The antibacterial activity of both the methanolic extract and also the isolated compound was found well (7-18 mm). antifungal activity is moderate (11-14 mm).

- **Skin disease:-**

E.alba leaves are used to remove ectoparasites in dogs in Trinidad and Tobago. The Ayurvedic formulation containing *E.alba* powder was shown to provide complete remission in 22.6% and diagnosis of disease recurrence in 89.5% of patients with eczema.

- **Cardio vascular effects:-**

Ethanol extract from *E. alba* leaves and leaf capsules was tested for heart inhibitory activity in isolated frog hearts. The extracts showed negative inotropic and negative chronotropic effects as well as reduced cardiac output. Callus extract showed a higher inhibitory effect on the heart than leaf extract at doses of 20 mg.

- **Anti-malarial activity:-**

The animal activity of *E. alba* leaf extract was tested against the plasmodium berghei ANKA strain in mice. Methanol leaf extract (250-750 mg / kg) induced dose-dependent chemosuppression as a schizontocidal effect during early and proven infection and long-term survival (m.s.t.), especially in the 750 ng / kg / day extract group.

- **Neuropharmacological activities:-**

Aqueous and hydroalcoholic extracts of *E.alba* were evaluated for sedative, muscle relaxation, anxiolytic, nootropic and antistress activity. activities at doses of 150 and 300 mg / kg, p.o.

- **Immunomodulator activities:-**

It is stated that the protection of the neural network can be enhanced by the action of the *Eclipta Alba* immunomodulator. Thus, *Eclipta Alba* can act as a potential memory modulator . The aqueous extract of *Eclipta alba* leaves was applied to fish (*tilapia, oreochromis mossambicus*) in various concentrations as food for 3 weeks. Non-specific humoral (lysozyme, antiprotease and complement) and cellular (myeloperoxidase content, production of reactive oxygen species and nitrogenous substances) and disease resistance against *aeromonas hydrophila* were recorded after each week, resulting in increased air activity. specific immune parameters. The results showed that food intake *E. The aqueous extract of album leaves increases the non-specific immune response and resistance of O.mossambicus to A. hydrophila.*

- **Anti-ulcer and anti-colon cancer activity:-**

Ethanol extract showed strong anti-ulcer activity in a dose-dependent manner and significantly reduced ulcerative lesions and alleviated lipid peroxidation in a single model. in rats. In another study, methanol extract from *Eclipta chinensis* showed a significant reduction in gastric ulcers and inflammation in mice with aspirin-induced ulcers . In the MTT assay, crude methanol extract *Eclipta chinensis* showed target anti-cancer activity against the colon cancer cell line HCT-116. *Eclipta chinensis* methanol extract contains compounds against colon cancer and deserves to be explored for possible future advances in treatment.

Health Benefits of *Eclipta Prostrata*

- **Bhringraj controls hypertension**

To standardize the pulse, give 2 teaspoon sap of *Bhringeria* leaves with 1 teaspoon of honey blended in it, double a day.

- **Bhringraj benefits for jaundice issue**

Grind new and clean leaves of *Bhringraj* with 7 dark peppers in 2ml glue of leaves and give it to the patient each day, in a vacant stomach. One can give it with sharp curd or buttermilk, Within 5-6 days, it fixes jaundice.

- **Bhringraj helpful for ulcers**

Apply juice of *bhringraj* on the irresistible ulcers. One can likewise tie the poultice on the ulcers. If there should arise an occurrence of ulcers and bubbles close by, thumb and fingers apply its thick glue on the ulcer. It recuperates the ulcer quick.

- **Bhringraj helpful during diabetes**

- Take powder of Bhringraj and powder of blossoms of babool in equivalent amounts. Add a sugar candy to it. Give this to the diabetes patient with 6 ml of goat's milk. This is extremely helpful to treat all types of diabetes.
- **Bhringraj helps for scorpion chomps**
Grind the leaves of Bhringraj and apply the glue on the enlarged region. The aggravation gathers on the chomped region. It likewise eases the sting and toxin as well.
- **Bhringraj accommodating in cholera**
2 teaspoon juice of Bhringraj plant assuming given with little measure of rock salt in it, to the patient threefold every day, alleviates Cholera.
- **Bhringraj oil for eye issue**
We can in like manner use bhringraj while making kajal, we apply the keelanelli juice on the metal plate and spot it over somewhat light that is filled rough sesame oil. At the point when the debris is assembled, we take it in a plate and mix it in with ghee and use as kajal. Kajal made with keelanelli affects the eyes. May progress loosening up and rest. Magnesium is known for its relaxant properties and may propel muscle loosening up, rest, and it can in like manner further foster demeanor. May assist with forestalling urinary lot contaminations (UTIs), The antimicrobial properties of bhringraj may assist with treating UTIs, which are generally regularly brought about by bacterial contaminations.
- **Liver detoxification**
The juice from the leaves of the bhringraj (bogus daisy) plant are utilized as a liver tonic in Ayurvedic medication. A few investigations show that the spice might assist with liver cell age.
- **Mitigates aggravated skin**
Bhringraj oil is hydrating and can assist with extinguishing dry skin. Bhringraj is a calming, so when applied topically to skin it might assist with dealing with skin aggravation like psoriasis, dermatitis, and a few types of skin inflammation.

Nutritional Value

Calcium, Iron, Vitamin-D, Vitamin-E, Magnesium.

Conclusion

The presence of the different chemical constituents that makes more useful and leads to the vast medical benefits. It rehabilitate god health among human and has neglible side effects.

References

1. Isha Hemlata Kaurav, Gitika Chaudhary, Eclipta Alba (Bhringraj): A promising Hepatoprctective and Hair Growth Stimulating Herb. Asain Journal of Pharmaceutical and Clinical Research, vol 14, Issue 7, 2021
2. Bebashish Mukharjee, Sakshi Lokwani, Cloris Gonsalvis, Bhringraj: A Pharmaceutical Treasure Trove, Indain Journal of Natural Science, Vol 12/ Issue 68/ October 2021, ISSN:0976-0997.

3. Puri, HS Rasayana: Ayurvedic Herbs for Longevity and Rejuvenation. Taylor and Francis, London, pages 80–85, (2003)
4. Wagner H, Geyer B, Yoshinobu K, Govind SR - Coumestans as the Main Active Principles of the Liver Drugs *Eclipta alba* and *Wedelia calendulacea*. *Planta Medica*:5: 370-2, (1986).
5. www.planetayurveda.com
6. Trease G.E., and Evans, W.C. *Pharmacognosy*. 13th edn. Bailliere Tindall, London, 1989, pp 176- 180
7. <https://www.easyayurveda.com/2013/09/16/bhringraj-eclipta-alba-benefits-usage-dose-side-effects/>
8. Mohammad Shabeer, Gul Abad Khan, Standardization of *eclipta alba* (L), *Asain J.Research chem.* 4(12):Dec-2011, ISSN0974-4169, Jan 2012
9. Fazi-i-Sattar, Akhtar Ali, Standardization of *Eclipta alba* (L), *Asian J.Research chem.* 4(12):Dec 2011, ISSN 0974-4169 March 2013
10. Archana Pareek, Ashwani Kumar, Bhringraj (*Eclipta Prostrata* L.) for mental improving ability, *World Journal of Pharmaceutical Science*, ISSN (print): 2321-3310; ISSN (online):2321-3086
11. V.M. Jadhav, R..M.Thorat, V.J.Kadam and K.P.Salaskan, chemical composition, Pharmacological activities of *Eclipta Alba*, *Journal of Pharmacy Research*.
12. Gupta SC, Bajaj UK, Sharma VN. Cardiovascular effects of *Eclipta alba*. *J Res Ind Med Yoga and Homeop*; 11:3, 91-93, (1976).
13. McGuffin M, Hobbs C, Upton R, et al. (eds.) *American Herbal Products Association's Botanical Safety Handbook*. Boca Raton, FL: CRC Press, p. 44, (1997).
14. Chase C R and Pratt R.J, *J. Am. Pharm. Assoc. (Sci.Ed)*, 1949, 38, 324 - 331.
15. Anonymous, *Pharmacopoeia of India*, 2nd Ed., Manager of Publications, New Delhi, 1966, 947 – 948.
16. Sofowora A. *Medicinal plants and Traditional Medicine in Africa*. Spectrum Books, Ibadan. 1993; pp 150.
17. Trease G.E., and Evans, W.C. *Pharmacognosy*. 13th edn. Bailliere Tindall, London, 1989, pp 176- 180
18. T. Reghupati, K.Chitra and G.Lalitha, Antibacterial and Antifungal Activity of *Eclipta Alba* (L.) Hassk, *International Journal of Pharmaceutical and Phytopharmacological Research (eIJPPR)*, ISSN (Online) 2249-6084 (Print) 2250-1029.
19. <https://www.netmeds.com/health-library/post/bhringaraj-benefits-for-hair-uses-dosage-formulations-and-side-effects>
20. <https://avedaayur.com/benefits-of-bhringraj-medicinal-uses-dosage-side-effect>
21. Satish A Bhalerao, Deepa R Verma, Nikhil C Teli, Vaibahv R Mukurate, *Eclipta alba* (L): An Overview, *International Journal of Bioassay*, ISSN:2278-778X, September 2013.
22. <https://in.images.search.yahoo.com/search/images?p=image+of+root+of+bhringraj&fr=mcafee&type=E210IN662G0&imgurl=https%3A%2F%2Fwww.mirahbelle.com%2Fpub%2Fmedia%2Fwysiwyg%2FIngredients%2Fhair-care-ingredients%2FExtract%2Fbhringraj-large.jpg#id=32&iurl=https%3A%2F%2Fwww.mirahbelle.com%2Fpub%2Fmed>

- ia%2Fwysiwyg%2FIngredients%2Fhair-care-ingredients%2FExtract%2Fbhringraj-large.jpg&action=click
23. Arnawa, I.K., Sapanca, P.L.Y., Martini, L.K.B., Udayana, I.G.B., Suryasa, W. (2019). Food security program towards community food consumption. *Journal of Advanced Research in Dynamical and Control Systems*, 11(2), 1198-1210.
 24. Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2021). Get vaccinated when it is your turn and follow the local guidelines. *International Journal of Health Sciences*, 5(3), x-xv. <https://doi.org/10.53730/ijhs.v5n3.2938>