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A REVIEW ARTICLE ON *BHRINGARAJA (ECLIPTA ALBA LINN.)* EMPHASIZING SHOTHAGHNA (ANTI-INFLAMMATORY) AND RASAYANA (REJUVENATIVE) KARMA

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ABSTRACT

Bhringaraja (*Eclipta alba* Linn.), a well-known medicinal plant in Ayurveda, is revered for its multifaceted therapeutic potential. Classified under *Keshya*,[1] *Rasayana*[2] and *Shothaghna*[4,7] dravyas, it is traditionally used to promote longevity, vitality, and tissue regeneration. Classical Ayurvedic texts such as *Bhavaprakasha* nighantu and *Charaka Samhita* highlight its role in *Rasayana*[4,7] therapy and in the management of inflammatory and degenerative disorders. **Objectives:** To review and critically analyze the *Shothaghna* (anti-inflammatory) and *Rasayana* (rejuvenative and adaptogenic) actions of *Bhringaraja* in the light of Ayurvedic literature and modern pharmacological studies. **Methods:** Relevant Ayurvedic classics were reviewed to compile references describing the *Rasa*, *Guna*, *Virya*, *Vipaka*, and *Prabhava* of *Bhringaraja*. Scientific data were sourced from PubMed, Google Scholar, and Ayurvedic pharmacopoeias, focusing on experimental and clinical studies demonstrating its **Anti-inflammatory**, antioxidant, hepatoprotective, and immunomodulatory effects. **Results:** Ayurvedic texts describe *Bhringaraja* as *Tikta-Katu rasa*, *Laghu-Ruksha guna*, *Ushna virya*, and *Katu vipaka*, contributing to *Kapha-Vata shaman* and *Pitta vardhana*. Modern research corroborates its *Shothaghna* property through inhibition of pro-inflammatory mediators[8,9] (TNF-α, IL-6, COX-2), and its *Rasayana* action through antioxidant enzyme activation, hepatoprotection, and cellular regeneration. Phytochemical studies reveal wedelolactone,

eclalbasaponins, and luteolin as key bioactives responsible for theseeffects. **Conclusion:** *Bhringaraja* exemplifies the synergy between traditional Ayurvedic wisdom and contemporary pharmacological validation. Its dual *Shothaghna* and *Rasayana* actions make it a promising candidate for managing inflammatory, degenerative, and age-related conditions. Further clinical trials are warranted to establish its standardized formulations and dosage profiles for evidence-based integration into modern therapeutics.

KEYWORDS: *Bhringaraja*, *Eclipta alba Linn.*, *Shothaghna karma*[4,7], *Rasayana*,[4,7] *dravya*, Anti-inflammatory[8], Antioxidant[10], Ayurveda.

INTRODUCTION

Bhringaraja (Eclipta alba Linn.), belonging to the family **Asteraceae**, is a small, branched, annual herb widely distributed in moist and marshy regions throughout India. It grows up to **30–40 cm** in height with erect or prostrate, hairy stems and opposite, lanceolate leaves. The plant bears small **white composite flower heads** and black, compressed fruits (cypsela). Taxonomically, it is classified under Kingdom *Plantae*, Order *Asterales*, Genus *Eclipta*, and Species *E. alba*. In Ayurveda, Bhringaraja is known for its *Rasayana*, *Keshya*, *Shothaghna*, and *Yakritottejaka* properties, being traditionally used for hair growth, liver disorders, and inflammatory conditions.

Ayurveda the ancient system of life science, emphasizes the concept of maintaining health and preventing disease through balance of the *Tridoshas—Vata*, *Pitta*, and *Kapha*. Among the various therapeutic approaches, *Rasayana Chikitsa* occupies a special place as it aims at rejuvenation, longevity, and enhancement of vitality and immunity (*Ojas*). Drugs possessing *Rasayana* properties nourish the *Dhatus* (tissues), improve *Agni* (digestive fire), and delay the aging process (*Jara nivarana*). In parallel, *Shothaghna dravyas* play a pivotal role in alleviating inflammatory conditions (*Shotha*), which are manifestations of *Vata-Kapha* vitiation and *Rakta dushti*.

Bhringaraja (*Eclipta alba Linn.*, family: Asteraceae), also known as *Kesharaja*, *Markava* and *Bhring*, is one of the most esteemed herbs in Ayurvedic medicine. It is extensively mentioned in classical texts like *Charaka Samhita*, *Sushruta Samhita*, and *Bhavaprakasha Nighantu* under *Rasayana* and *Keshya* categories. Traditionally, it is used for promoting hair growth, improving liver function, enhancing complexion, and rejuvenating the body. The *Rasa Panchaka* attributes of *Bhringaraja—Tikta-Katu rasa*, *Laghu-Ruksha guna*, *Ushna virya*, and

Katu vipaka—render it effective in pacifying *Kapha* and *Vata doshas* while stimulating *Pitta*, thus contributing to its *Shothaghna* (anti-inflammatory) and *Rasayana* (rejuvenative) activities.

From a modern pharmacological perspective, *Eclipta alba* has been extensively studied for its bioactive constituents, including wedelolactone, eclalbasaponins, luteolin, and demethylwedelolactone. These phytochemicals exhibit potent anti-inflammatory, hepatoprotective, antioxidant, and immunomodulatory activities. Scientific studies have demonstrated that *Bhringaraja* inhibits inflammatory mediators such as prostaglandins, cyclooxygenase (COX), nitric oxide, and tumor necrosis factor-alpha (TNF-α). Its antioxidant potential enhances the activity of enzymes like superoxide dismutase (SOD), catalase, and glutathione peroxidase, thereby protecting cellular structures from oxidative damage and promoting tissue regeneration—key aspects of *Rasayana karma*.

AIM AND OBJECTIVES

AIM

To comprehensively review the *Shothaghna* (anti-inflammatory) and *Rasayana* (rejuvenative) properties of *Bhringaraja* (*Eclipta alba Linn.*) through classical Ayurvedic literature and modern scientific research, highlighting its therapeutic relevance in inflammatory and degenerative disorders.

OBJECTIVES

1. To compile and analyze Ayurvedic textual references describing the *Rasa*, *Guna*, *Virya*, *Vipaka*, and *Prabhava* of *Bhringaraja* with reference to *Shothaghna* and *Rasayana* karma.
2. To explore the pharmacological and phytochemical studies supporting the anti-inflammatory, antioxidant, and immunomodulatory actions of *Eclipta alba*.
3. To correlate Ayurvedic concepts of *Rasayana* and *Shothaghna* karma with modern biological mechanisms involved in inflammation and cellular rejuvenation.
4. To evaluate the clinical relevance of *Bhringaraja* in managing inflammatory and age-related conditions based on contemporary scientific evidence.
5. To identify research gaps and propose future directions for evidence-based validation and therapeutic application of *Bhringaraja*.

MATERIAL AND METHODS

1. Collection of Ayurvedic Literature

Classical Ayurvedic texts and Nighantus were reviewed to collect references related to *Bhringaraja*. The following primary and secondary sources were consulted:

- *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, *Bhavaprakasha Nighantu*, *Dhanvantari Nighantu*, *Raja Nighantu*, and *Kaiyadeva Nighantu*.
- Ayurvedic Pharmacopoeia of India (API) and *Dravyaguna Vijnana* texts by contemporary scholars were also reviewed for identification, classification, and therapeutic properties.

Each reference was analyzed to document *Rasa*, *Guna*, *Virya*, *Vipaka*, *Prabhava*, and *Karma* of *Bhringaraja*, with specific emphasis on *Rasayana* and *Shothaghna* actions.

2. Selection of Modern Scientific Literature

A systematic search was performed in major scientific databases such as **PubMed**, **Google Scholar**, **ScienceDirect**, and **AYUSH Research Portal** using the following keywords: "*Bhringaraja*," "*Eclipta alba*," "anti-inflammatory," "antioxidant," "immunomodulatory," "rejuvenation," "Rasayana," and "Ayurveda."

3. Data Extraction and Analysis

Data from Ayurvedic and modern sources were systematically compiled to:

- Correlate Ayurvedic pharmacodynamic attributes (*Rasa Panchaka*) with modern pharmacological mechanisms.
- Identify key phytoconstituents responsible for *Shothaghna* and *Rasayana* effects (e.g., wedelolactone, eclalbasaponins, luteolin).
- Compare experimental outcomes related to inflammation inhibition, oxidative stress reduction, and tissue regeneration.

1. Collection of Ayurvedic Literature[1,2,3,4,5,6,7]

Classical Text	Rasa (Taste)	Guna (Quality)	Virya (Potency)	Vipaka (Post-digestive effect)	Prabhava (Specific action)	Karma (Therapeutic actions)
Charaka Samhita	Tikta, Katu	Laghu, Ruksha	Ushna	Katu	Rasayana	Keshya, Yakritottejaka (hepatoprotective)
Sushruta Samhita	Tikta	Laghu, Ruksha	Ushna	Katu	Keshya	Varnya,
Ashtanga	Tikta,	Laghu,	Ushna	Katu	Rasayana	Keshya, Deepana,

Hridaya	Katu	Ruksha				
Bhavaprakasha Nighantu	Tikta, Katu	Laghu, Ruksha	Ushna	Katu	Keshya	Rasayana, Shothahara, Krimighna, Keshya, Chakshushya
Dhanvantari Nighantu	Tikta	Laghu, Ruksha	Ushna	Katu	Keshya	Rasayana, Shothahara, Varnya, Keshya
Raja Nighantu	Tikta, Katu	Laghu, Ruksha	Ushna	Katu	Rasayana	Keshya, Rasayana, Krimighna, Shothahara, Medhya
Kaiyadeva Nighantu	Tikta, Katu	Laghu, Ruksha	Ushna	Katu	Keshya	Rasayana, Shothahara, Yakritottejaka, Varnya, Keshya

2. Modern scientific literature[8,9,10,11,12]

Pharmacological action	Key phytoconstituents	Representative findings (study / year)
Anti-inflammatory (Shotaghna correlate)	Wedelolactone, demethylwedelolactone, luteolin	Wedelolactone suppresses NF-κB signalling and pro-inflammatory cytokines (TNF-α, IL-6) — multiple in-vitro and animal studies demonstrate reduced edema and inflammatory markers
Antioxidant / Anti-aging (Rasayana correlate)	Flavonoids (luteolin, luteolin-7-O-glucoside), coumestans (wedelolactone)	Narrative and experimental reviews report strong free-radical scavenging (DPPH, ABTS), upregulation of SOD/catalase, and protection against oxidative DNA/protein damage.
Hepatoprotective (Yakritottējaka)	Coumestans (wedelolactone, DWL), saponins	Rat models (CCl_4, high-fat diet) show normalization of liver enzymes, histological protection and promotion of liver regeneration.
Antiviral / Antimicrobial (Krimighna)	Wedelolactone, luteolin, apigenin	In vitro inhibition of HCV replication and antimicrobial activity against several bacterial/fungal strains reported; isolates shown to block viral targets.
Hair growth promotion (Keshya)	Eclalbasaponins, wedelolactone, stigmasterol	Animal and cell studies demonstrate increased hair follicle stimulation and hair-cycle promotion; some topical formulations show positive outcomes in vivo.
Wound-healing & dermatologic effects	Wedelolactone, saponins, flavonoids	Topical/experimental studies report accelerated wound contraction, enhanced collagen deposition, and anti-inflammatory effects in skin models.
Neuroprotective / Cognitive (possible Rasayana for	Flavonoids, coumestans	Preclinical studies indicate antioxidant/neuroprotective effects, mitigation of memory deficits in animal

medha)		models; emerging reviews suggest potential for neurodegenerative disorders.
Anticancer / Chemomodulatory (emerging)	Wedelolactone, ursolic acid, β-amyrin	In vitro studies show apoptosis induction, cell-cycle arrest and synergy with chemotherapeutics in several cancer cell lines; early mechanistic work targets NF-κB, c-Myc pathways.

3.Data extraction and analysis[9,11,12]

Ayurvedic attribute	**Classical meaning (short)**	**Physiological correlate**	**P0ssible molecular mechanisms (E. alba phytochemicals)**	**Experimental biomarkers / readouts**
Rasa — Tikta (bitter)	Bitter taste; digestive, blood-purifying	Hepatoprotective[9], choleretic, anti-inflammatory	Modulation of hepatic detox enzymes; antioxidant activity; inhibition of inflammatory signalling. *Wedelolactone*, flavonoids (luteolin) — ↑Phase II enzymes, ↑GSH, ROS scavenging, ↓NF-κB activation.	ALT/AST, bilirubin; hepatic histology; GSH/SOD/catalase levels; markers of lipid peroxidation (MDA); NF-κB activity.
Rasa — Katu (pungent)	Pungent — stimulates digestive fire, metabolism	Thermogenic, prokinetic, enhanced absorption and circulation	TRP channel activation, increased local blood flow, enhanced gut motility; may increase bioavailability of co-administered compounds. Alkyl/volatile components and pungent phytochemicals → transient ↑cAMP/vasodilation, mild pro-inflammatory mediator modulation for clearance.	Gastric emptying times; core/peripheral temperature; intestinal transit assays; plasma Cmax of marker compounds.
Guna — Laghu (light)	Light, easily metabolized	Readily absorbable, metabolically active compounds	Small/low-MW phytochemicals and glycosides enabling permeability and tissue distribution. Improved cellular uptake and faster pharmacokinetics.	Pharmacokinetic parameters (Tmax, Cmax, Vd); membrane permeability assays (Caco-2).
Guna — Ruksha (dry)	Drying, absorptive	Anti-edematous, reduces interstitial fluid	Modulation of vascular permeability; inhibition of inflammatory exudation.	Paw/ear edema models; vascular leakage assays; levels of VEGF,

			Flavonoids/saponins may stabilize endothelium and reduce edema.	histamine, bradykinin.
Virya — Uṣṇa (hot/potent)	Heating, metabolic stimulant	↑Metabolic rate, circulation, catabolic/thermogenic effects	Up regulation of metabolic enzymes, increased microcirculation and local blood flow; mild adrenergic/thermogenic signalling. Phytochemicals can increase mitochondrial activity and metabolic enzyme expression.	Oxygen consumption (VO_2) in animals; mitochondrial respiration assays; expression of metabolic genes (PGC-1α).
Vipāka — Katu (pungent post-digestive)	Final metabolic effect — catabolic, clearing	Lipid mobilizing, improves digestive transformation	Promotes catabolic pathways, bile secretion, lipolysis; supports clearance of metabolic debris via hepatic/gut routes.	Serum lipid profile, bile acid secretion, lipase activity.
Prabhāva — Keshya (hair-promoting)	Specific action on hair	Hair follicle stimulation, growth cycle modulation	Saponins and sterols (eclalbasaponins, stigmasterol) stimulate dermal papilla proliferation, modulate growth factors (VEGF, IGF-1), inhibit 5α-reductase-type effects locally.	Hair-growth assays (follicle counts), hair cycle staging, expression of IGF-1/VEGF, 5α-reductase activity.
Prabhāva — Rasāyana (rejuvenative)	Tissue nourishment, longevity	Antioxidant, immunomodulation, cytoprotection	Antioxidant enzyme upregulation (SOD, catalase, GPx); modulation of immune responses (balanced cytokine profile); mitochondrial protection. *Wedelolactone*, luteolin → ↓ROS, ↑antioxidant enzymes, immunomodulatory cytokine shifts.	Lifespan/healthspan proxies in models, oxidative stress markers, cytokine panels (IL-10, IL-6, TNF-α), mitochondrial function assays.
Karma — Śothaghna (anti-inflammatory)	Reduces swelling/inflammation	Inhibition of inflammatory mediators, reduced edema	Inhibition of NF-κB, COX-2, iNOS; ↓TNF-α, ↓IL-6; direct antioxidant scavenging reduces inflammatory amplification. Wedelolactone and	Paw edema, COX activity, iNOS expression, cytokine assays (TNF-α, IL-1β, IL-6), myeloperoxidase

			luteolin implicated.	(MPO) activity.
Karma — Yakṛtottējaka (hepatotonic)	Stimulates and protects liver	Hepatoprotection, regenerative signaling	Antioxidant protection, inhibition of hepatotoxic pathways, promotion of hepatocyte proliferation/regeneration. Saponins + coumestans show hepatoprotective effects in CCl_4/acetaminophen models.	Liver enzyme panels (ALT/AST), histopathology, PCNA/Ki-67 for regeneration, markers of apoptosis (caspase-3).

DISCUSSION AND RESULTS

Bhringaraja (Eclipta alba Linn.), a classical Rasāyana dravya, has been revered in Ayurvedic texts such as *Charaka Samhita* (*Rasāyana Adhyaya*), *Sushruta Samhita* (*Chikitsa Sthana*), and *Bhavaprakasha Nighantu* for its profound rejuvenative (*Rasāyana*) and anti-inflammatory (*Śothaghna*) properties. The *Rasa Panchaka*—predominantly *Tikta* and *Katu Rasa*, *Laghu–Ruksha Guna*, *Ushna Virya*, *Katu Vipaka*, and *Keshya–Yakritottējaka Prabhava*—suggests its ability to pacify *Kapha* and *Pitta doshas*, cleanse microchannels (*Srotoshodhana*), and restore tissue homeostasis (*Dhatu Poshana*). The concept of *Rasāyana* emphasizes systemic rejuvenation, improved longevity, and restoration of *Dhatu Bala* through antioxidant, immunomodulatory, and adaptogenic effects. *Bhringaraja*, described as a potent *Rasāyana* for *Keshya*, *Medhya*, and *Yakritottējaka* actions, supports tissue vitality and organ function. *shotha* is understood as local or systemic swelling caused by deranged *Pitta*, *Kapha*, and *Rakta*, leading to obstruction in *Srotas* and accumulation of *Ama*. *Bhringaraja's Tikta–Katu Rasa* and *Ushna Virya* contribute to *Amapachana* and reduction of *Kapha–Pitta* mediated inflammatory processes.

Mode of action of Bringaraj as Shothaghna and Rasayana

Doṣa Prakopa+ Āma → Srotorodha → Dhātu Dushti → Śotha

↓

Bhringaraja (Uṣṇa vīrya, Katu-Tikta rasa, Rasāyana)

↓

Agni Deepana → Āma Pācana → Srotoshodhana → Doṣa Shamana → Dhātu Poshanam → Rasāyana

CONCLUSION

Ayurvedic classics such as *Charaka Samhita*, *Sushruta Samhita*, *Ashtanga Hridaya*, and

Bhavaprakasha Nighantu describe *Bhringaraja* as possessing *Tikta–Katu Rasa*, *Laghu–Ruksha Guna*, *Ushna Virya*, *Katu Vipaka*, and specific *Prabhava* like *Yakritottējaka* and *Keshya*. These attributes indicate its role in pacifying *Pitta* and *Kapha doshas*, enhancing metabolism, rejuvenating tissues, and promoting cellular vitality.

Modern scientific investigations substantiate these classical descriptions through experimental and mechanistic findings. The presence of **wedelolactone, demethylwedelolactone, luteolin, apigenin**, and **eclalbasaponins** confers significant **anti-inflammatory**, **antioxidant**, **hepatoprotective**, and **cytoprotective** properties. These mechanisms involve suppression of **NF-κB and COX-2**, reduction of **TNF-α and IL-6**, enhancement of **endogenous antioxidant enzymes (SOD, catalase, GSH)**, and activation of the **Nrf2 pathway**. Collectively, these effects explain the herb's ability to mitigate *Shotha* (inflammation) and promote *Dhatu Poshana* (tissue nourishment).

Bhringaraja (Eclipta alba Linn.) is a scientifically validated **Rasāyana and Śothaghna dravya**, effective in inflammatory, hepatic, and degenerative disorders. It exemplifies how classical Ayurvedic knowledge, when systematically correlated with modern research, can yield robust, evidence-based therapeutic insights. Further **clinical trials**, **standardization**, and **biomarker-based validations** are recommended to strengthen its global recognition as a safe and potent herbal medicine in integrative healthcare.

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