

**PART- I**

**VOLUME – II**



**GOVERNMENT OF INDIA**  
**MINISTRY OF HEALTH AND FAMILY WELFARE**  
**DEPARTMENT OF AYUSH**

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## 10. Bhringaraja (W.P.)

### BHR̥NGARĀJA (Whole Plant)

Bhr̥ngarāja consists of whole plant of *Eclipta alba* Hassk. (Fam. Asteraceae); a herbaceous annual, 30 - 50 cm high, erect or prostrate, much branched, strigosely hirsute, often rooting at nodes, a common weed of moist places found throughout India ascending upto 1700 m.

#### SYNONYMS

Sanskrit	:	Keśarāja, Tekarāja, Bhr̥nga, Mārkaṇḍa, Bhr̥ngaja
Assamese	:	Bhrngaraja
Bengali	:	Bheemraja, Kesuriya, Kesari
English	:	--
Gujrati	:	Bhangaro, Bhangro
Hindi	:	Bhangara, Bhangaraiya
Kannada	:	Garujalu, Gurugada, Soppu, Keshavardhana, Kodigaraju
Kashmiri	:	--
Malayalam	:	Kayyonni, Knnunni
Marathi	:	Bhangra, Bhringiraja, Maka
Oriya	:	--
Punjabi	:	Bhangra
Tamil	:	Karisalankanni, Karisalanganni, Karisalai
Telugu	:	Guntakalagara, Guntagalagara
Urdu	:	Bhangra

#### DESCRIPTION

##### a) Macroscopic

**Root** - Well developed, a number of secondary branches arise from main root, upto about 7 mm in dia., cylindrical, greyish.

**Stem** - Herbaceous, branched, occasionally rooting at nodes, cylindrical or flat, rough due to oppressed white hairs, node distinct, greenish, occasionally brownish.

**Leaf** - Opposite, sessile to subsessile, 2.2 - 8.5 cm long, 1.2 - 2.3 cm wide, usually oblong, lanceolate, sub-entire, sub-acute or acute, strigose with appressed hairs on both surfaces.

**Flower** - Solitary or 2, together on unequal axillary peduncles; involucral bracts about 8, ovate, obtuse or acute, herbaceous, strigose with oppressed hairs; ray flowers ligulate, ligule small, spreading, scarcely as long as bracts, not toothed, white; disc flowers

tubular, corolla often 4 toothed; pappus absent, except occasionally very minute teeth on the top of achene; stamen 5, filaments epipetalous, free, anthers united into a tube with base obtuse; pistil bicarpellary; ovary inferior, unilocular with one basal ovule.

**Fruit** - Achenial cypsella, one seeded, cuneate, with a narrow wing, covered with warty excrescences, brown.

**Seed** - 0.2 - 0.25 cm long, 0.1 cm wide, dark brown, hairy and non endospermic.

#### **b) Microscopic**

**Root** - Mature root shows poorly developed cork, consisting of 3-5 rows of thin-walled, tangentially elongated cells; secondary cortex consists of outer one or two rows of tangentially elongated or rounded cells with air cavities, inner secondary cortex of tangentially elongated to irregular shaped, parenchymatous cells with conspicuous air cavities; stone cells found scattered in secondary cortex and cork, in singles or in groups of various shape and size; pericyclic fibres in tangentially arranged bands of many cells or in singles; secondary phloem consists of sieve elements including phloem fibres traversed by multiseriate phloem rays; phloem rays broader towards periphery, consisting of rounded cells; xylem composed of vessels, fibre tracheids, fibres and xylem parenchyma, traversed by xylem rays; vessels numerous, found scattered throughout wood, in macerated preparation vessels small, drum-shaped, cylindrical elongated with pitted walls and perforations, simple, rarely slightly oblique; fibre tracheids, pitted, with very pointed tips, xylem fibres long with pointed tapering ends and short lumen, a few fibres show peg-like outgrowths towards the tapering ends; xylem parenchyma sparse usually squarish to rectangular having simple pits on their walls, xylem ray distinct, run straight in tangential section, generally 5-32 cells in height and 3-5 cells in width although very rarely uniseriate and biseriate rays also found, ray cells pitted.

#### **Leaf-**

*Petiole* - shows single layered upper and lower epidermis consisting of tubular cells, covered with striated cuticle; trichomes of two types, non-glandular, uniseriate, 1-5 celled, warty, and with pointed apical cell; epidermis followed by wide cortex, consisting of 2-5 layered collenchyma on both, upper and lower side with distinct angular thickening; parenchyma 4-6 layered on upper side and 5-8 layered on lower side consisting of isodiametric, thin-walled cells with intercellular spaces; five vascular bundles central one largest while four others small flanking to either side of central bundle, consists of xylem on dorsal side and phloem on ventral side; xylem vessels arranged in radial rows traversed by xylem rays.

*Midrib* - cut at basal region shows both upper and lower single layered epidermis, externally covered with cuticle, a few epidermal cells elongate outwards to form uniseriate hairs; epidermis followed by cortex, consisting of 3-5 layered

collenchymatous cells on both sides; section cut at middle region shows 3-4 layered collenchymatous cells on dorsal and 1-3 layered on ventral side, while the section cut at apical region, shows 2 layered collenchymatous cells on both sides, similarly transverse section cut at a basal, middle and apical regions shows 4-6 layered parenchymatous cells on dorsal side and 6-9 layered parenchyma on ventral side, in section cut at basal region 4-6 layered parenchyma on both the sides in the middle region with thin-walled cells and intercellular spaces, 2-3 layered parenchymatous cells on both side in the apical region; in the basal region section shows vascular bundle similar to that of petiole while in the section cut at middle and apical region section shows 4 smaller bundles shifting towards lamina.

*Lamina* - shows a dorsi ventral structure, epidermis single layered, externally covered with cuticle, followed by single layered palisade parenchyma containing chlorophyll contents; spongy parenchyma irregularly arranged with distinct intercellular spaces and filled with chlorophyll contents; mesophyll traversed by number of veins; anisocytic and anomocytic stomata present on both surface, more abundant on lower surfaces; stomatal index 20.0-22.5 on upper and 23.5 -26.0 on lower surface; palisade ratio 3.8 -4.5; hairs stiff, pointed, wide at the base, about 3 celled, uniseriate, middle cells longest, uppermost generally not exceeding the basal cell in length, septa thick-walled.

*Stem* - Mature stem shows single layered epidermis, externally covered with cuticle, a few epidermal cells elongate to form characteristic non-glandular trichomes, the cork where formed, poorly developed consisting of rectangular cells; secondary cortex composed of large, rounded or irregular shaped parenchymatous cells having wide air spaces; endodermis single layered consists of tangentially elongated cells; pericyclic fibres distinct, arranged in tangential strands; vascular bundles in a ring, collateral, endarch, of varying sizes traversed by medullary rays; phloem a narrow strip composed of sieve elements and phloem parenchyma; xylem consists of large number of vessels, xylem fibres and xylem parenchyma; xylem vessels appear evenly distributed throughout the xylem; in macerated preparation vessels barrel-shaped, some elongated with simple perforations, pitted with spiral thickening; xylem fibres with wide lumen, pointed tips and pitted walls, a few often bifurcate and a few other large, peg-like outgrowth; xylem parenchyma rectangular with pitted thickening; xylem rays triseriate to pentaseriate, normally biseriate and uniseriate, 8-15 cells in height and 3-5 cells in width; centre occupied by a wide pith consisting of isodiametric cells of parenchyma.

**Powder** - Dark green; shows vessels in large groups or single broken pieces with pitted walls, numerous fibres entire or in pieces, trichomes entire or in pieces, warty, a few attached with epidermal and subsidiary cells, anomocytic and anisocytic stomata.

## IDENTITY, PURITY AND STRENGTH

Foreign matter	Not more than 2	per cent, Appendix	2.2.2.
Total Ash	Not more than 22	per cent, Appendix	2.2.3.
Acid-insoluble ash	Not more than 11	per cent, Appendix	2.2.4.
Alcohol-soluble extractive	Not less than 5	per cent, Appendix	2.2.6.
Water-soluble extractive	Not less than 15	per cent, Appendix	2.2.7.

**CONSTITUENTS** - Alkaloids, Ecliptine and Nicotine.

## PROPERTIES AND ACTION

<b>Rasa</b>	:	Kaṭu, Tikta
<b>Guna</b>	:	Rukṣa, Ṭikṣṇa
<b>Virya</b>	:	Uṣṇa
<b>Vipaka</b>	:	Kaṭu
<b>Karma</b>	:	Balya, Kaphahara, Vātahara, Āmahara, Rasāyana, Keśya, Tvacya, Dantya, Cakṣusya, Viṣahara.

**IMPORTANT FORMULATIONS** - Bhṛṅgāmalakādi Taila, Bhṛṅgarāja Taila, Nīlī Bhṛṅgādi Taila, Bhṛṅgarājāsava, Tekarāja marica.

**THERAPEUTIC USES** - Śoṭha, Śvāsa, Kāsa, Pāṇḍu, Yakṛdroga, Kṛmiroga, Śirah Śūla, Hṛdroga.

**DOSE** - 3 - 6 ml of the drug in juice form.

12 - 36 g. of the drug in powder form for decoction.