



**PHARMACOGNOSTICAL AND ANALYTICAL STUDY OF
*BHRINGARAJA PATRA SWARASA***

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ABSTRACT

Since the COVID period, there has been increasing acceptance and public interest in herbal products and therapies in both developing and developed countries. *Bhringarajaa* is a plant of immense value from the Asteraceae family. Besides curing diseases, it also improves general health with its active components like Coumestans, Ecliptine and Wedelolactone. As quality standards of *Bhringarajaa* as whole plant are available in *Ayurvedic Pharmacopeia of India (API)*, to evaluate the quality assessment parameters of *Bhringaraja* for the *Patra Swarasa* dosage form, present study was carried out and also quantification of one of the chemical constituent – Wedelolactone was done. All these evaluated and documented standards can be further used to support the biological action of the herbal drug.

Keywords: *Bhringaraja*, *swarasa*, phytochemicals, wedelolactone

INTRODUCTION

Bhringaraja consist of whole plant of *Eclipta alba* Hassk of family Asteraceae [1]. It is a herbaceous annual common weed of moist places found throughout India. Its properties include *katu, tikta rasa, ruksha, ushna guna, ushna virya, katu vipaka, kapha* and *vata hara* with special actions like *balya, rasayan, keshya, varnya, amahara* [2]. There are three varieties of *Bhringaraja* i.e *Shweta Bhringaraja* (*Eclipta alba*) and *Pita Bhringaraja* (*Wedelia calendulacea*) and *Neel Bhringaraja*, amongst which the *Shweta Bhringaraja* is commonly used for medicinal purpose. The phytopharmacological action of *the same* includes anti-hepatotoxic, anti-inflammatory, anti-tumor, anti-phospholipase effects [3]. From ancient times *Bhringaraja* is being used in various forms such as *churna, swarasa, asava, lepa* etc. To maintain the quality of *Bhringaraja* in all these dosage forms and to provide best quality product, it is necessary for timely assessment of its quality control parameters and its validation based on the standard norms. API has mentioned standard parameters of the raw drug as a whole, a separate analysis of its leaf juice (swarasa) is not available presently. Here, in this study, the qualitative analysis for inorganic elements with physiochemical screening of *Bhringaraja* in the form of patra

swarasa was done in the Central Research facility of KAHER's Shri BMK Ayurveda Mahavidyalaya, Shahapur, Belagavi along with quantitative analysis of one of its most important active component Wedelolactone at Natural Remedies Private Limited Bangalore, Karnataka, India.

MATERIALS AND METHODS

Fresh Leaves of *Bhringaraja* (*Eclipta alba*) (measuring about 6-8cm in length and 1.5-2cm width) were collected from herbal garden of the Institution and then identified and authenticated from the Central Research Facility of KAHER's Shri BMK Ayurveda Mahavidyalaya, Shahapur, Belagavi. Fresh juice of *Bhringaraja* leaves was then extracted as per classical method by using mortar and pestle and then filtered with fresh cotton cloth. Thus obtained juice was analysed and then subjected for further analysis of its different analytical properties like organoleptic, physicochemical, phytochemical etc. which were found as per the API standards.

RESULTS FOR RAW DRUG

Macroscopic description: (Table 1)

The raw drug *Bhringaraja* was taken in the form of leaves which had green colour, oblong, lanceolate, sub-entire, sub-acute or acute, strigose with appressed hairs on both surfaces. These macroscopic characters of

leaves are as per the standards mentioned in API (Table 1).

RESULTS FOR SWARASA

Macroscopic description: (Table 3)

The finished product of *Bhringaraja* was in the form of *Patra Swarasa* which was greenish in colour and bitter in taste.

Table 1: Macroscopic description

Test	Results
Part	Leaves
Colour	Green
Taste	Bitter feebly pungent
Odour	Odourless

Table 2: API Standards for purity check [4]

Physiochemical Standards	
Foreing matter	<2%
Total ash value	<22%
Acid-insoluble ash	<11%
Alcohol-soluble extractive	>5%
Water-soluble extractive	>15%

Table 3

Test	Results
Form	<i>Swarasa</i> (fresh leaves juice)
Colour	Greenish
Taste	Bitter
Odour	Odourless

Table 4: Physiochemical standards

Tests	Results
Ash value	19.356%
Acid insoluble ash	9.589%
Water insoluble extract	18.456%
Alcohol insoluble extract	7.156%
pH	5.9
Total solids	96.123%
Specific gravity	1.0456

Table 5: Preliminary phytochemical screening

Tests	Results
Test for Carbohydrates	Positive
Test for Reducing Sugar	Positive
Test for Monosaccharides	Negative
Test for Pentose Sugars	Positive
Test for Hexose Sugars	Negative
Test for Protiens	Positive
Test for Amino Acids	Positive
Test for Steroids	Positive
Test for Glycosides, Saponin Glycosides	Negative
Test for Flavanoids	Positive
Test for Alkaloids	Positive
Test for Tannins	Positive

Table 6: Analysis for inorganic elements

Calcium	Absent
Chloride	Present
Magnesium	Absent
Nitrates	Present
Sodium	Present
Sulphates	Present
Potassium	Absent
Carbonates	Present
Iron	Present
Phosphates	Absent

Table 7: Chemical Constituent

Chemical constituent	Part used	Results
Wedelolactone (About 1.6%)	Leaf juice	0.5 By HPLC

DISCUSSION

Bhringaraja *Eclipta alba* Linn. (Asteraceae) is an important ingredient of several *Ayurvedic* formulations used for the management of various inflammatory conditions, pain and wounds etc. Though the drug *Bhringaraja* indicates whole plant, as per the literature different useful parts like fresh leaves can be made use separately to relive varieties of headaches like *Suryavarta*, *Ardhavabhedaka* etc. [5]

Before using any dosage forms of the medicinal drugs, quality standards are to be assessed to prove it's safety and efficacy. Till date standard parameters for the finished product of *Bhringaraja* leaf juice are not available. So here an attempt was made to analyse the organoleptic, physiochemical, phytochemical parameters and tried to quantify the active ingredient wedelolactone present in leaf juice, provided can serve as a substantiate value for further clinical study.

Bhringaraja is known for having *katu, tikta rasa, ruksha, tikshna guna, ushna virya* with *balya, kapha-vatahara, amahara, rasayan, kesya, twacya, chakshusya* and *vishara properties*. The physiochemical standards of the whole plant supports true also for the *swarasa* analysis. The ash value found was not more than 22%, the acid insoluble ash was also found to be within the parameters mentioned i.e, not more than 11% ensuring the quality and purity of the *swarasa*. The pH value found in the *swarasa* was 5.9 which indicates its acidic nature. The presence of carbohydrates in the *swarasa* suggests its anticancerous activity [6]. Proteins found exhibit antimicrobial, anti-oxidant, and neuromodulatory activities [7]. The flavonoids and tannins suggest the presence of anti-oxidants. Anti-oxidants protect the cells against oxidative damage and thereby prevent the occurrence of chronic diseases [8]. The biological activities of flavonoids have been

demonstrated as anti-oxidants, anticancer, antibacterial, anti-inflammatory, immune system promoting [9]. Available data suggests presence of Coumestans, Ecliptine etc. Coumestans represents important class of natural oxygenated aromatic products, including Wedelolactone as chemical constituent in *Bhringaraja* [10]. Wedelolactone exhibited various pharmacological activities such as anticancer, antihypertensive, antihepatotoxic, anti-inflammatory, antiphospholipase and antidote activity for snake poison [11]. Wedelolactone is known for its antioxidant property [12] which does direct radical scavenging via a single electron transfer and help reduce the free radical build up [13]. HPLC is a versatile widely used technique for the isolation of natural products, it is a chromatographic technique that can separate a mixture of compounds and is used in phytochemical and analytical chemistry to identify, quantify and purify the individual components of the mixture [14,15]. HPLC is used for characterization and quantification of secondary metabolites in plant extracts, mainly phenol compounds, steroids, flavonoids, alkaloids [16]. As wedelolactone is a polyphenol, HPLC technique was adopted for quantification. Presence of Wedelolactone traces proved by HPLC method supports the

biological properties of *Bhringaraja* such as antioxidant, hepatoprotective, antitumor, anti-inflammatory, antiviral, anti-fibrotic, and anti-osteoporotic activity [17]. The quantity of wedelolactone in *Bhringaraja* leaf juice was 0.5 % as the extract is only of leaf and lack the whole plant parts. To prove the more specific action of wedelolactone in targeted disease condition, the whole plant can be used in its suggested form. Example: due to anti-cancer activity of wedelolactone *Bhringaraja* is used in breast, colon cancer.^[17] Its neuro-protective activity used in alzheimers, epilepsy [18].

Bhringaraja, not only used orally also indicated for inrtanasal administration in the form of nasya in various types of shiro rogas. *Bhringaraja* is mentioned as one of the dietary component in cephalalgia (headaches) and gastro-intestinal problems. GI disorders like gastritis, anorexia, constipation etc are likely to cause headache like migraine [19]. By reviewing the phytochemicals of *Bhringaraja patra swarasa* in this study, it can be stated that phytopharmacological actions like anticancer, anti-oxidants, anti-inflammatory and hepatoprotective effects are possible therapeutically.

CONCLUSION

The quality control parameters along with presence of wedelolactone as an coumestans element of *Bhrigaraja patra swarasa*

documented here can be used as supportive data to prove its therapeutic effects in further clinical studies.

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