

## Preliminary phytochemical screening of *Byttneria herbacea* Roxb.

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### Abstract

Ethnomedicinal plants are an important source of phytochemicals that offer traditional medicinal treatment of various ailments therefore phytochemical analysis of ethnomedicinal plant gaining ground in the recent times for novel drug discovery process. The *Byttneria herbacea* is an ethnomedicinal plant using by various tribal communities in different pathological interventions. There are no data available for phytochemical analysis of *B. herbacea* in the scientific literature, hence we have undertaken this study to evaluate the same for the first time.

**Keywords:** Phytochemical Screening, *Byttneria herbacea*, Leaf, Stem, Root

### Introduction

Plants have formed the basis of herbal medicine system which has been used for thousands of years. Traditional medicine refers to health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercises, applied singly or in combination to treat or to diagnose and prevent illnesses or maintain well being [32]. It is generally known that the consumption of a variety of local herbs and vegetables by man contributes significantly to the improvement of human health, in terms of prevention and or cure of disease because the plants have long served as a useful and a natural source of therapeutic agents [4]. Plants are important for pharmacological research and drug development not only for using directly as therapeutic agents, but also as starting

materials for the synthesis of drugs or as models for pharmacologically active compounds, and also as pharmacological probes. The active principles of many drugs found in plants are secondary metabolites [8]. Secondary metabolites are considered products of primary metabolism and are generally not involved in metabolic activity viz. alkaloids, phenolics, essential oils and terpenes, sterols, flavonoids, lignins, tannins, etc. These secondary metabolites are the major source of pharmaceuticals, food additives, fragrances and pesticides [7, 21, 18, 22, 15, 16, 24]. Plant derived secondary metabolites mediates the physiological effect on different systems of the human body; thus they are known as the phytoactive compound.

Recent research finds interest in phytochemical screening of ethnomedicinal plant in search of alternative and sustainable

source of medicine. The selected plant species is procumbent spreading herb (sometimes erect up to 215 cm) with a perennial, 4 -10 cm long woody root-stocks. Wildlife Institute of India, Dehradun's Envis Bulletin [6] has recognized *B. herbacea* is an endemic to the Indian Peninsular region and categorized into the IUCN threatened category. Somkuwar S. R. *et. al.*, [27] has documented the extending distribution of this taxa in Maharashtra State, India. Previous studies have revealed that the *B. herbacea* crude drug is used in health care by indigenous cultures as a medicine in various ailments. In traditional herbal medicine, various parts of *B. herbacea* is used as an ethnoveterinary medicine to cure dysentery, impaction [23], to treat leprosy [11] to promote retention of placenta [17], for treatment of fracture of limbs [19] to get relief against asthma [3], in leucorrhoea and inflammation [2]. National Medicinal Plant Board [14] enlisted *B. herbacea* as medicinal plant of India. Day *et. al.*, [5] reported the use of *B. herbacea* root paste on the wound, Mallik *et. al.*, [12] has documented that the *B. herbacea* root paste is taken orally to get relief from body pain, Sreeramulu *et al.* [28] have found that *B. herbacea* leaf is used against dysentery and impaction while recently Suthari *et al.* [29] observed *B. herbacea* root used against swellings and Somkuwar S. R. *et. al.* [26] screened this plant for antioxidant activity. However, there is no data available on its phytochemical screening of *B. herbacea* hence, we have undertaken this study to for the first time.

## Materials and methods

### Collection and identification of plant materials

Fresh plant parts of *Byttneria herbacea* were collected in cleaned polyethylene bags from Shankarpur (Chandrapur) forest in the month of October. The various plant parts, i.e. leaves, stem and root was thoroughly

washed in cold water to remove the earthy material. Few plants were mounted on paper from the same locality. Efforts were made to collect the plant materials in flowering and fruiting conditions for the correct botanical identification. The plant was taxonomically identified and confirmed with the help of Flora [1, 25, 13]. The voucher specimen of the plant has been deposited and preserved in Dept. of Botany Dr. Ambedkar College, Deekshabhoomi, Nagpur for further collection and reference and an accession number was provided as DACN-1023.

### Extraction

The various plant part of *B. herbacea* were freed from any of the foreign materials. Then they were chopped and air-dried under shed temperature followed by air drying. The dried plant materials were then ground into powder with the help of a suitable grinder. Each plant powder (10g) was packed in a soxhlet apparatus separately and was subjected to successive extraction using increasing order of polarity solvents like petroleum ether, acetone, chloroform, ethanol, methanol and water. The temperature was maintained (depends upon the solvent) between 25-70<sup>0</sup>C and 24 hrs to 48 hrs time has been consumed to complete each extraction under ideal condition. After completion of extraction, the solvent was removed by distillation. The extract was concentrated under reduced pressure using a rotary vacuum flash evaporator at 50<sup>0</sup>C. The extract was kept in a desiccator till needed for experimentation.

### Phytochemical studies

The qualitative phytochemical screening for detection of important secondary metabolites from the leaves, stem and root of *Byttneria herbacea* was done according to the standard procedures adopted by the various workers such as Gibbs [9], Wagner *et. al.*, [31], Trease and Evans, [30] Harborne [30] and Raaman, [20].

**Results and Discussion**

The experiments conducted in *Byttneria herbacea* for phytochemical constituent

analysis showed the results summarized in the table 1, 2, 3 and 4 respectively.

**Table 1: Preliminary Phytochemical Analysis of Different Plant Parts of *Byttneria herbacea* for Alkaloids, Cardiac glycosids and Tannins**

Test for↓	Part	Solvent→	Ethanol	Methanol	Water	Pet. Et.	Chloroform	Acetone
		<b>Reagent↓</b>						
<b>Alkaloids</b>	Leaf	MR	-	-	-	-	+	-
		WR	-	-	-	-	+	-
		DR	-	-	-	-	+	-
	Stem	MR	-	+	+	-	+	+
		WR	-	+	+	-	+	+
		DR	-	+	+	-	+	+
	Root	MR	-	+	+	-	-	+
		WR	-	+	+	-	-	+
		DR	-	+	+	-	-	+
<b>Cardiac Glycosids</b>	Leaf	KKT	+	-	+	+	-	-
	Stem	KKT	-	-	+	+	+	-
	Root	KKT	+	+	-	+	+	+
<b>Tannins</b>	Leaf	Gelatin	+	+	+			
		FeCl <sub>3</sub>	+	+	+			
		KI	-	-	-			
	Stem	Gelatin	+	+	+			
		FeCl <sub>3</sub>	+	-	-			
		KI	-	-	-			
	Root	Gelatin	+	+	+			
		FeCl <sub>3</sub>	+	-	+			
		KI	-	-	-			

**MR:** Mayers Reagent, **DR:** Dragandroff's Reagent, **WR:** Wagners Reagent, **Pet. Et.:** Petroleum Ether, **KKT:** Keller-Killani Test.

**Table 2: Preliminary Phytochemical Analysis of Different Plant Parts of *Byttneria herbacea***

Test for	Solvent/Part	Leaf	Stem	Root
Fatty acid & lipid	Pet. et	+	-	+
Volatile oil	Pet. et	+	-	-
Carotenoid	Pet. et	+	-	-
Saponin	Water	+	-	+
Polyuronoids	Water	-	-	-
Gum & Mucilage	Water	+	-	-
Anthraquinones	Fresh part	+	-	-
Anthocynin	Fresh part in Methanol	-	-	-
Aucubins	Fresh part	-	-	-
Iridoids	Fresh part	+	-	-

Table 1. shows the preliminary phytochemical analysis of different plant

parts of *B. herbacea* for alkaloids, cardiac glycosides and tannins.

**Table 3: Preliminary Phytochemical Analysis of Different Plant Parts of *Byttneria herbacea* for Flavonoids, Steroids and Phenol**

Test for↓	Part	Solvent→	Pet. Et.	Chloroform	Acetone	Ethanol	Methanol	Water
		<b>Reagent↓</b>						
<b>Flavonoids</b>	Leaf	Shinoda	+	+	+	-	+	+
		NaOH	+	+	+	-	+	+
	Stem	Shinoda	+	+	+	-	+	+
		NaOH	+	+	+	-	+	+
	Root	Shinoda	+	+	-	+	+	+
		NaOH	+	+	-	+	+	+
<b>Steroids</b>	Leaf	Lb-BR	+	+	+	-	+	-
		SR	+	+	+	-	+	-
	Stem	Lb-BR	+	+	+	-	+	-
		SR	+	+	-	-	+	-
	Root	Lb-BR	+	+	-	-	-	-
		SR	+	+	-	-	-	-
<b>Phenol</b>	Leaf	FeCl <sub>3</sub>				+	+	+
		Lb				+	+	+
	Stem	FeCl <sub>3</sub>				+	+	-
		Lb				+	+	-
	Root	FeCl <sub>3</sub>				+	+	+
		Lb				+	+	+

**Pet. Et:** Petroleum Ether, **Lb:** Libermann-Burchard Reaction, **BR:** Burchard Reaction, **SR:** Salkowski Reaction.

**Table 4: Comparative Phytochemical Analysis of Different Plant Parts of *Byttneria herbacea* for Alkaloids, Cardiac glycosides, Tannins, flavonoids, Steroids and Phenol**

Test for↓	Solvent→	Ethanol	Methanol	Water	Pet. Et.	Chloroform	Acetone
<b>Alkaloids</b>	Stem (04)	-	+	+	-	+	+
	Root (03)	-	+	+	-	-	+
	Leaf (01)	-	-	-	-	+	-
<b>Cardiac Glycosids</b>	Stem (03)	-	-	+	+	+	-
	Root (05)	+	+	-	+	+	+
	Leaf (03)	+	+		+		
<b>Tannins</b>	Stem (03)	+	+	+			
	Root (03)	+	+	+			
	Leaf (03)	+	+	+			
<b>Flavonoids</b>	Stem (05)	+	+	+	-	+	+
	Root (05)	+	+	-	+	+	+
	Leaf (05)	+	+	+	-	+	+
<b>Steroids</b>	Stem (04)	+	+	+	-	+	-
	Root (02)	+	+	-	-	-	-
	Leaf (04)	+	+	+	-	+	-
<b>Phenol</b>	Stem (02)				+	+	-
	Root (03)				+	+	+
	Leaf (03)				+	+	+

Table 2. Shows preliminary phytochemical analysis of different plant parts of *B. herbacea* for some other secondary metabolites. Table 3. shows preliminary phytochemical analysis of different plant parts of *B. herbacea* for flavonoids, steroids,

and phenol. Table 4. shows comparative phytochemical analysis of different plant parts (table 5) of *B. herbacea* for alkaloids, cardiac glycosides, tannins, flavonoids, steroids and phenol.

**Table 5: Photographs of Different Plant Part of *Byttneria herbacea***



### Conclusion

The present study is based on the report of the preliminary phytochemical screening of *Byttneria herbacea* plant parts extract. The results are quite promising; support the use of the plant in traditional medicine and demands further investigation. The traditional medicinal formulation screened for phytochemical constituents seemed to have the potential to act as a medicine which can be used to improve the health status of consumers. This study will improve basic understanding of the crude drug identification scheme useful in traditional care practices and could lead to reverse pharmacology by which society would get herbal drugs at an affordable cost.

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