

Phytochemical profile of *Baliospermum montanum* (Wild.) Muell. Arg.

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ABSTRACT: The present study reveals the qualitative and quantitative analysis of the major bioactive constituents of different parts such as root, stem, leaf, flower and latex of medicinally important plant *Baliospermum montanum* using seven different solvents. Qualitative study of Alkaloids, Carbohydrates, Glycosides, Steroids, Flavonoids, Coumarins, Saponins, Fatty acids, Tannins, Protein and Amino Acids, Gum and Mucilage, Terpenoids, anthroquinones and Phenols showed variable of results in different solvents. Quantitative estimation revealed that phytochemicals are in between the following range alkaloids (6.2 - 9.5%), flavonoids (35.63-43.33%), Saponins (9.9 to 13.2%), phenolics (38.43 to 43.44%), tannins (13.26 to 18.3%), terpenoids (25.36 to 33.4%).

KEYWORDS: *Baliospermum montanum*, Euphorbiaceae, Phytochemicals screening.

1 INTRODUCTION

Baliospermum montanum (Wild.) Muell. Arg., (Hindi: danti, Kannada: kaadu haralu, Malayalam: katalavanakku, Marathi: buktumbo Sanskrit: kakubha, Tamil: appaiccevakam, Telugu: ettadundiga) belongs to Euphorbiaceae family. *Baliospermum montanum* is a stout undershrub with numerous branches. Plant is 10 cm to 8 m in height with herbaceous branches from the roots. Leaves are simple, toothed with undulations. Upper leaves are small, lower ones large, sometimes, 3-30 cm long, 1.5-15 cm broad. Male and female flowers are separated, seen in the same flowering branch, about 3 mm across, greenish yellow, arranged in axillary and terminal racemes, spikes or fascicles. Capsules are distinctly 3-lobed, obovoid, stony, 8-13 mm diameter, minutely densely pubescent. Seeds are egg-shaped.

B. montanum is distributed throughout the sub-Himalayan region from Khasi Hills to Kashmir. It is common in Bihar, West Bengal, and Peninsular and Central India. In Ayurveda, roots are used to cure jaundice, leucoderma, skin diseases, wounds, and as an anthelmintic [1]. Leaves are found to be useful in asthma, bronchitis [2] and in treating abdominal tumor [3]. Seeds are used as purgative and in gastric complaints [4]. Decoction of stem is used to get relief from toothache [5].

Phytochemicals are, literally, "The plant chemicals". They provide protection, color, odor and taste to the plants. Many evidences have come up showing the effects of phytochemicals on chemical process in human body, when they are ingested. The majority of these bioactive compounds are alkaloids, carbohydrates, glycosides, steroids, flavonoids, coumarins, saponins, fatty acids, tannins, protein and amino acids, gum and mucilage, terpenoids, anthroquinones and phenols. For developing new drugs, the ethnobotanical research and phytochemical test are imperative.

2 MATERIALS AND METHODS

2.1 COLLECTION OF PLANT MATERIAL

Baliospermum montanum (Wild.) Muell-Arg was collected from Sirsi, Western Ghats of Karnataka and now the plant is being maintained in the Department of Molecular Biology, Bangalore University, Bangalore.

2.2 PREPARATION OF PLANT EXTRACT

Leaf, stem, root and flowers were collected from *B. montanum*. They were dried for one week at room temperature (in shade). Dried plant parts were grinded in a blender to fine particles. Crude plant extract was prepared by Soxhlet extraction method. Seven different solvents were used namely methanol, ethanol, water, chloroform, petroleum ether, hexane and acetone. 20 gm of dried fine grinded powder was uniformly packed into thimble and phytochemicals were extracted with 250 mL of seven mentioned solvents separately. The extraction was carried out for 24 hours. Later extract was concentrated by keeping it on hot plate at 30 to 40°C and stored at 4°C for further analysis.

2.3 COLLECTION OF LATEX

Latex sample was collected early in the morning from plant by twinging the leaves near the stem and branches of the plant and latex was allowed to drain in clean glass tube, and it was stored at 4°C, chilled latex was homogenized and filtered through muslin cloth for further phytochemical study.

2.4 PHYTOCHEMICAL PROFILING

QUALITATIVE AND QUANTITATIVE STUDY

The extracts were subjected to both qualitative and quantitative phytochemical tests of secondary metabolites viz. alkaloids, anthroquinone, cardiac glycosides, flavonoid, phenols, phylobatannins, saponin, steroids, tannins and terpenoids using standard procedures [6], [7], [8].

3 RESULTS

Table 1- Qualitative analysis of different parts like root, stem, leaf, flower and latex of *Baliospermum montanum* using different Solvents-

Plant name	W	Ac	Et	Mt	Ch	Hx	Eth	Tests	Phytochemicals
BM (leaf)	-	-	+	+	+	-	+	Dragendorff's	Alkaloids
BM (stem)	-	-	+	+	-	+	+		
BM(flower)	-	-	+	+	-	-	+		
BM (roots)	-	-	+	+	-	-	+		
BM (leaf)	-	-	+	+	-	-	+	Mayer's test	
BM (stem)	-	-	+	+	-	-	+		
BM(flower)	-	-	+	+	-	-	+		
BM (roots)	-	-	+	+	-	-	+		
BM (leaf)	-	-	+	+	-	+	+	Wagner's test	
BM (stem)	-	-	+	+	-	+	+		
BM(flower)	-	-	+	+	-	-	+		
BM (roots)	-	-	+	+	-	-	+		
BM (leaf)	-	-	-	-	-	-	-	Borntrager's test	
BM (stem)	-	+	-	-	-	-	-		
BM(flower)	-	+	-	-	-	-	-		
BM (roots)	-	+	-	-	-	-	-		
BM (leaf)	+	+	+	+	-	-	-	Molisch's test	
BM (stem)	+	+	+	+	-	-	-		
BM(flower)	+	+	+	-	-	-	-		
BM (roots)	-	-	+	+	-	-	-		

BM (leaf)	+	+	+	+	-	-	-	Barford's test	
BM (stem)	+	+	+	+	-	-	-		
BM(flower)	+	+	+	-	-	-	-		
BM (roots)	-	-	+	+	-	-	-		
BM (leaf)	+	+	+	+	-	-	-	Benedicts test	
BM (stem)	+	+	+	+	-	-	-		
BM(flower)	+	+	+	-	-	-	-		
BM (roots)	-	-	+	+	-	-	-		
BM (leaf)	+	+	+	+	-	-	-	Keller- Killiani test	Cardiac Glycosides
BM (stem)	+	+	+	+	-	-	-		
BM(flower)	-	-	-	+	-	-	+		
BM (roots)	-	-	-	+	-	-	-		
BM (leaf)	-	-	-	-	-	-	-	Using NaOH	Coumarins
BM (stem)	-	-	-	-	-	-	-		
BM(flower)	-	-	-	-	-	-	-		
BM (roots)	-	-	-	-	+	-	-		
BM (leaf)	-	-	-	-	-	-	-	Paper test	Fatty acids test
BM (stem)	-	-	-	-	-	-	-		
BM(flower)	-	-	-	-	-	-	-		
BM (roots)	-	-	-	-	-	-	-		
BM (leaf)	-	+	+	+	+	-	-	Shinoda test	
BM (stem)	-	+	+	+	+	-	-		
BM(flower)	-	+	+	+	+	-	-		
BM (roots)	-	+	+	+	+	-	-		
BM (leaf)	-	+	+	+	+	-	-	Alkaline reagent test	Flavonoids
BM (stem)	-	+	+	+	+	-	-		
BM(flower)	-	+	+	+	+	-	-		
BM (roots)	-	+	+	+	+	-	-		
BM (leaf)	-	+	+	+	+	-	-	Lead acetate test	
BM (stem)	-	+	+	+	+	-	-		
BM(flower)	-	+	+	+	+	-	-		
BM (roots)	-	+	+	+	+	-	-		
BM (leaf)	-	-	-	-	-	-	-		Gum and Mucilage
BM (stem)	-	-	-	-	-	-	-		
BM(flower)	-	-	-	-	-	-	-		
BM (roots)	-	-	-	-	-	-	-		
BM (leaf)	+	-	-	-	-	-	-	Ninhydrin test	Protein and Amino Acids
BM (stem)	+	-	-	+	-	-	-		
BM(flower)	+	-	-	-	-	-	-		
BM (roots)	+	-	+	-	-	-	-		
BM (leaf)	-	+	+	+	-	-	-	Ferric chloride test	Phenols
BM (stem)	-	+	+	+	-	-	-		
BM(flower)	-	+	+	+	-	-	-		
BM (roots)	-	+	+	+	-	-	-		
BM (leaf)	+	-	-	+	-	-	+	Frothing test	Saponins
BM (stem)	-	-	-	-	-	-	-		
BM(flower)	+	-	-	-	-	-	+		
BM (roots)	+	-	-	-	-	-	-		
BM (leaf)	-	-	-	+	-	-	-	Liebermann Burchard reaction	Steroids
BM (stem)	-	-	-	-	-	-	-		
BM(flower)	-	-	-	-	-	-	-		
BM (roots)	-	-	-	-	+	+	-		
BM (leaf)	-	-	+	-	-	-	-	Using FeCl ₃	Tannins test

BM (stem)	+	-	+	+	-	-	-		
BM(flower)	+	-	+	+	-	-	-		
BM (roots)	+	-	+	+	-	-	-		
BM (leaf)	+	-	+	+	+	+	+	Salkowski test	Terpenoids
BM (stem)	+	-	+	+	+	+	+		
BM(flower)	+	-	+	-	+	+	+		
BM (roots)	+	-	+	+	+	+	+		

BM= *Baliospermum montanum*, W=water, Ac=Acetone, Et= Ethanol, Mt= Methanol, Ch= Chloroform, Hx=Hexane, Eth= ether, + = present, - = absent

Table 2- Qualitative analysis of latex of *Baliospermum montanum*

Test	Observations
Alkaloids	
i)Mayers test	+
ii)Wagners test	+
iii) Dragendorffs test	+
Cardiac glycosides	+
Phenolic compounds	-
Flavonoids	+
Terpenoids	+
Tannins	+
Saponins	+
Anthroquinone	-
Phlobatannins	-

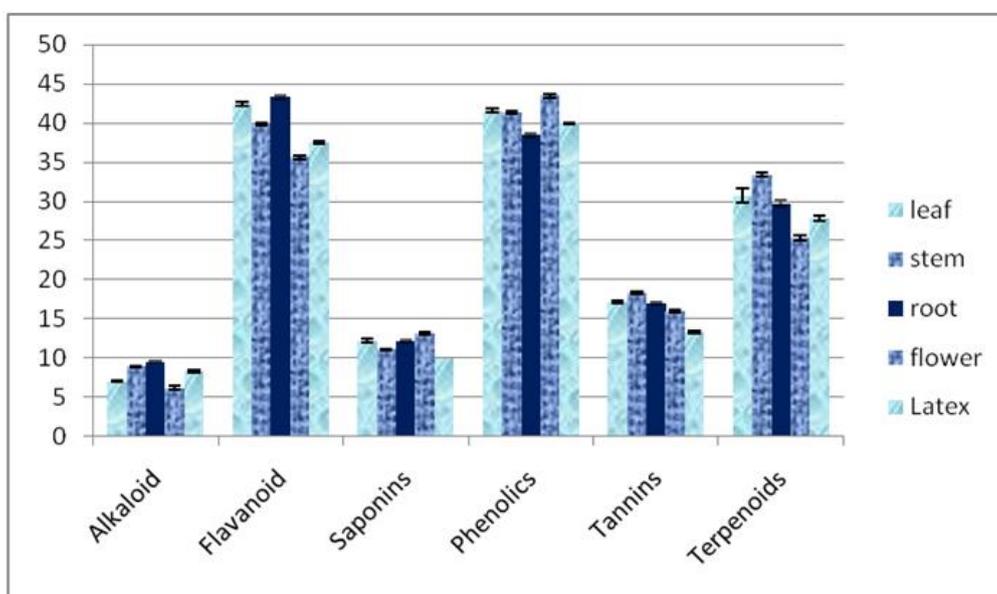


Fig:1- Quantitative estimation (%) Secondary metabolites of different parts of *Baliospermum montanum*, n=3, Data is presented as Mean± SD.

4 DISCUSSION

Medicinal plants are of great importance to the health of individuals and communities. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body [9]. These chemicals are called as phytochemicals. Secondary metabolites are non nutritive phytochemicals which are produced at different developmental stages, under stress conditions and plays important role in giving protection against pathogen attack. When

these phytochemicals are ingested by humans, it enhances their resistance power [10]. The medicinal properties of phytochemicals such as diterpenes, triterpenes, flavonoids, Saponins, tannins, alkaloids, phenol, ricin and esters are reviewed by Julius T. Mwine and Patrick Van Damme, 2011 [11]. They have cited medicinal properties such as anti-tumor, anti-fungal, anti-plasmodial, anti-inflammatory, anti-oxidant, anti-viral, anti-mutagenic, vaso-depressor and etc. Due to the versatile nature of phytochemicals, researchers and industries are looking forward the phytochemicals as a rich resource of succeeding drugs. Not only medicinal field but also nutraceuticals and food industry are getting engage in phytochemical research.

Considering the importance and applications of phytochemical study, qualitative and quantitative study of phytochemicals is being carried out worldwide. Jeruto Pascaline [12] evident the presence of phytochemicals in leaf and root of *Clutia abyssinica* using chloroform, methanol and water. Pandith [13] witnessed their presence in *Achyranthus aspera*, *Acalypha indica* (whole plant) in ethanol and acetone. R.R. Venkat raju [14] estimated leaf, shoot and root of 15 species belonging to genus *Phyllanthus* in petroleum ether, methanol and water. S.D. Shruthi [15] conducted preliminary phytochemical test on leaf of *Kirganelia reticulata* in aqueous, ethanol, methanol, chloroform, acetone and hexane solvent

The present study revealed the presence of medicinal active constituents of *Baliospermum montanum*. The phytochemical compounds of *Baliospermum montanum* are qualitatively analyzed for root, stem, leaf, flower and latex separately using seven different solvents and results are presented in Table 1. Qualitative study of alkaloids, carbohydrates, glycosides, steroids, flavonoids, Coumarins, Saponins, Fatty acids, Tannins, Protein and Amino Acids, Gum and Mucilage, Terpenoids, anthroquinones and Phenols variation in the content in different organic solvents as depicted in Table 2.

Quantitative estimation unveil that phytochemicals of different plant parts are in between the following range alkaloid ranges (6.2 -9.5%), flavonoids (35.63-43.33%), Saponins (9.9 to 13.2%), phenolics (38.43 to 43.44%), tannins (13.26 to 18.3%), Terpenoids (25.36 to 33.4%). The estimated quantitative data is presented in Fig 1. Coumarins, fatty acids, gum and mucilage was found to be absent.

5 CONCLUSION

The *Baliospermum montanum* sieved for phytochemical constituents seemed to be good source of medicinally active constituents and turn out to be potential source of modern drugs. This work justifies the need to isolate and characterize the medicinally active compounds.

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