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PHYTOCHEMICAL SCREENING OF *BIDARIA KHANDALENSE* (SANT.) *LORANTHUS CAPITELLATUS* WALL., *VISCUM ARTICULATUM* BURM.F. AND *VITEX NEGUNDO* LINN.

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ABSTRACT

The curative properties of medicinal plants are due to the presence of various complex chemical substances of different composition which occur as secondary metabolites. Nine principal bioactive compounds were investigated in dry leaf and stem of *Bidaria khandalense, Loranthus capitellatus*, *Viscum articulatum* and *Vitex negundo*. Powdered plant material was subjected to phytochemical screening using standard experimental procedure. Phytochemical study along with quantification of chemical constituents of studied taxa has been reported for the first time in the present investigation. The study scientifically validates the use of plants in traditional medicine and phytochemical data will be helpful for the standardization and quality control of precious indigenous drug and also Pharmaceutical industries.

Key words: Phytochemical, *Bidaria, Loranthus*, *Viscum, Vitex*

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INTRODUCTION

Nowadays, medicinal plants receive attention to research centers because of their special importance in safety of communities. The use of herbal medicine for the treatment of diseases and infections is as old as mankind. The curative properties of medicinal plants are due to the presence of various complex chemical substances of different composition which occur as secondary metabolites [8,10]. They are grouped as alkaloids , glycosides , flavonoids, saponins , tannins, carbohydrate and essential oils. Medicinal and aromatic plants form a large group of economically important plants that provide the basic raw materials for indigenous pharmaceuticals, perfumery, flavor and cosmetic industries [1]. *Bidaria khandalense* (Sant.) Jagtap and Singh belong to the family Asclepiadaceae is a gigantic climber reaching at the tops of tall tress in the dense forests of central and southern India. It is found to be growing in moderate rainfall localities. Stems are yellowish-green, densely pubescent and terete. Leaves are broadly ovate. Flowers are borne in pedunculate cymes. Fruits are follicle and seeds are measuring about 10-12 mm long and 3-4 mm broad. Coma is silky-with or reddish and 4 cm long. It is reported in the literature that *Bidaria khandalense* has same medicinal properties like that of *Gymnema sylvestre* in diabetes [16]. Therefore, it is useful in lowering blood sugar, balancing insulin levels and also for promoting weight loss. However, no literature is available on its chemical constituents of this plant. *Loranthus capitellatus* Wall. of the family Loranthaceae is a partial stem parasite. Stem is deciduous, pendant and woody. Leaves are opposite, fleshy, ovate and with entire margin. Greenish yellow flowers borne in axillary raceme. Fruits are drupaceous turns red after ripening. Leaves are used for checking abortion. Leaf poultice is used for sores and ulcers and for stone in the bladder and kidney. Bark contains astringent, narcotic that is used for wound, menstrual troubles and also as a remedy for consumption and asthma. Stem contains quercitrin (Antioxidant) [3]. No literature is available on its chemical constituents and antimicrobial activity this plant. But alkaloids were reported from other species i.e. *Loranthus micranthus,* other species and these chemical were responsible for antimicrobial activity [12]. *Viscum articulatum* Burm.f. belongs to the family Loranthaceae is a partial stem parasite. Stems is woody, sympodially branched and grooved. Leaves are scaly, borne at nodal region. Green flowers borne in axils of stems. The leaves contain a tannic acid and resins, soluble in ether and alcohol, striking a blood-red colour with strong sulphuric acid [18]. It is confirmed that antifungal activity is due to tannic acids and resins present in the plant. *Vitex negundo* Linn. of the family Verbenaceae is a woody aromatic shrub or small tree. In vernacular it is known as Nirgudi. Leaves are opposite, imparipinate, lanceolate, acute, villuous and with dentate margin. Purplish blue flowers borne in pendant branched tomentose cymes. The leaves contain an essential oil and a resin. The resin dissolves in alkaline solutions and turns reddish-brown colour. When heated gives aromatic vapors [18]. The leaves are applied locally in rheumatic swellings of the joints and in sprains. The juice of the leaves is used for the treatment of fetid discharges. It possesses anti-inflammatory, antibacterial, antifungal and analgesic activities. It is used in traditional medicine, for the treatment of superficial bruises, injuries, sores and skin infections.

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MATERIAL AND METHODS

Fresh plant material was collected from Khandala, Mulshi, District Ratnagiri and District Raigad of Maharashtra State, India. Efforts were made to collect the plant in flowering and fruiting conditions for the correct botanical identification. The plant material was brought to the laboratory and identified with the help of flora of Maharashtra State [14] and Flora of British India [7]. Plant material were dried in shade so as to prevent the decomposition of chemical constituents and was powdered in blender for phytochemical screening which consists of qualitative tests for the presence of starch, proteins, tannins, saponins, reducing sugars, anthroquinones, alkaloids, glycosides and flavonoides. Besides these, quantitative estimations were carried out for starch, reducing sugars, non-reducing sugars, proteins and alkaloids using standard experimental procedure [6,15,17]. From the standard curve find out the concentration of phenols in the test sample and express as mg phenol/100g material [11].

RESULTS

Photochemical tests were carried out for starch, tannins, saponins, proteins, anthraquinones and reducing sugars on water extractive while for alkaloids, flavonoides and glycosides on alcoholic extractive. The results are depicted in table No. 1. Results of phytochemical screening indicated that the leaves and stems of all the plants mentioned above showed positive test for saponins and proteins. The leaves of *B. khandalense* and *V. negundo* and leaf and stem of *L capitellatus* and the stem of *V. articulatum* gave positive test for reducing sugars. The leaves of all the plants mentioned above showed positive test for starch while the stems of these plants showed negative tests for starch. The leaf of *B. khandalense* and the stem of *L. capitellatus* and *V. articulatum* gave negative tests for tannins, while the leaf of *L. capitellatus, V. negundo* and the stem of *B. khandalense* gave positive test for tannins. All the parts of the plants mentioned above gave positive for anthraquinones except the leaves of *L. capitellatus* and *V. negundo*. In the present investigation, leaves and stems of *B. khandalense* and stems of *L. capitellatus* and *V. articulatum* gave positive test for alkaloids. The leaf and stem of *L. capitellatu* gave positive for glycosides while the leaf and stem of *B. khandalense* and the stem of *V. articulatum* and the leaf of *V. negundo* gave negative tests for glycosides. In addition, all the parts of the plants mentioned above gave positive test for flavonoids except the leaf of *V. negundo* and leaf and stem of *L. capitellatus* (table No.1). In the present investigation, quantitative estimations were also carried out for proteins, starch, total sugars, reducing sugars, alkaloids and phenols. The results are given in tables' No. 2-5. Results of the quantitative estimation of proteins indicated that proteins were less in quantity in the stems while more in the leaves of all the plants mentioned above except the stem and leaf of *B. khandalense* (table No.2). Carbohydrates are present in all the studied plants (Table 3). Starch is present in all the plants mentioned above except the stem of V. articulatum but the percentage values are very less (Table 3). The quantitative estimation of phenols indicated that it is more quantity in all the parts of tested plants (table No. 4). Results of the quantitative estimation of alkaloids indicated that alkaloids were more in quantity in all the studied plants (Table5). Results of the quantitative estimation of alkaloids indicated that alkaloids were more in quantity in the stems of *L. capitellatus, V. articulatum* and leaf of *B. khandalense* (table No.2).

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TABLE NO. 1: PHYTOCHEMICAL TESTS OF PLANT

Name of the Test carried out	Reagents used	*Loranthus capitellatus*		*Viscum articulatum*	*Vitex negundo*	*Bidaria khandalense*	
		Leaf	Stem	Stem	Leaf	Leaf	Stem
A. Water Extract							
Starch	I2-KI	+ve	-ve	-ve	+ve	+ve	-ve
Tannins	Acidic $FeCl_3$	+ve	-ve	-ve	+ve	-ve	+ve
Saponins	H_2SO_4 + Acetic unhydride	+ve	+ve	+ve	+ve	+ve	+ve
Proteins	Millon's test	+ve	+ve	+ve	+ve	+ve	+ve
Anthraquinones	Benzene + 10%NH_4OH	-ve	+ve	+ve	-ve	+ve	+ve
Reducing sugars	Benedict's	+ve	+ve	+ve	+ve	+ve	-ve
B. Alcoholic*Extracts*							
Alkaloids	Mayer's	-ve	-ve	+ve	-ve	+ve	+ve
	Wagner's	-ve	-ve	+ve	-ve	+ve	+ve
	Dragendorff's	-ve	+ve	+ve	-ve	+ve	+ve
Flavonoids	HCl + Mg turnings	-ve	-ve	+ve	-ve	+ve	+ve
Glycosides	Benzene+hot ethanol	+ve	+ve	-ve	-ve	-ve	-ve

+ve: Present -ve: Absent

TABLE NO. 2: PROTEINS FROM DIFFERENT PARTS OF PLANTS

NAME OF THE PLANT	PLANT PART USED	TOTAL PROTEINS g/100g dry wt.
Loranthus capitellatus Wall.	Stem Leaf	0.320 1.740
Viscum articulatum Burm.	Stem	0.560
Vitex negundo Linn.	Leaf	1.980
Bidaria khandalense (Sant.) Jagtap and Singh	Stem Leaf	1.78 0.55

The results are mean of three determinants. Results are in g / 100g dry tissue.

TABLE NO. 3: CARBOHYDRATES FROM DIFFERENT PARTS OF PLANTS

NAME OF THE PLANT	PLANT PART USED	Reducing Sugar	Non-Reducing Sugar	Total Sugar	Total Starch
Loranthus capitellatus Wall.	Stem Leaf	0.0030 0.0420	0.0030 0.0030	0.0060 0.0450	0.000 1.200
Viscum articulatum Burm.	Stem	0.0225	0.0000	0.0255	0.000
Vitex negundo Linn.	Leaf	0.0375	0.0075	0.0450	0.615
Bidaria khandalense (Sant.) Jagtap and Singh	Stem Leaf	0.028	00.00	0.028	0.062

The results are mean of three determinants. Results are in g / 100g dry tissue.

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TABLE NO. 4: PHENOLS FROM DIFFERENT PARTS OF PLANTS

NAME OF THE PLANT	PLANT PART USED	PHENOLS g/100g dry wt.
Loranthus capitellatus Wall.	Stem Leaf	0.675 0.643
Viscum articulatum Burm.	Stem	0.598
Vitex negundo Linn.	Leaf	0.507
Bidaria khandalense (Sant.) Jagtap and Singh	Stem Leaf	0.502 0.440

The results are mean of three determinants. Results are in g / 100g dry tissue.

TABLE NO. 5: ALKALOIDS FROM DIFFERENT PARTS OF PLANTS

NAME OF THE PLANT	PLANT PART USED	ALKALOIDS g/100g dry wt.
Loranthus capitellatus Wall.	Stem	6.18 %
Viscum articulatum Burm.	Stem	5.8 %
Bidaria khandalense (Sant.) Jagtap and Singh	Stem Leaf	1.25% 2.61%

The results are mean of three determinants. Results are in g / 100g dry tissue.

DISCUSSION

To promote the proper use of herbal medicine and to determine their potential as sources for new drugs, it is essential to study medicinal plants. The curative properties of medicinal plants are mainly due to the presence of various complex chemical substances of different composition which occur as secondary metabolites [8,10]. Photochemical tests were carried out for starch, tannins, saponins, proteins, anthraquinones and reducing sugars on water extractive while for alkaloids, flavonoides and glycosides on alcoholic extractive. The results are depicted in table No. 1. Phytochemical screening portrays that most of the natural products tested for were present in all the studied plants. It was also found that alkaloids were present in the ethanolic extracts. On this premise it will be advisable to extract the leaf and stem of *B. khandalense* and the stem of *Viscum articulatum* with ethanol in an attempt to exploit its detoxifying and antihypertensive properties since alkaloids is known to be effective for this purposes [17,19]. Saponins are a special class of glycosides which have soapy characteristics [5]. It has also been shown that saponins are active antifungal agents [13]. Phenols the aromatic compounds with hydroxyl group are widespread in plant kingdom. They occur in all parts of the plants phenols are said to offer resistance to diseases and pests in plants. Tannins are also known antimicrobial agents. Tannins are water – soluble polyphenols that are present in many plant foods and precipitate proteins. Tannins have been reported to prevent the development of microorganisms by precipitating microbial protein and making nutritional proteins unavailable for them [13]. The growth

of many fungi ,yeasts ,bacteria and viruses was inhibited by tannins [4]. Tannins are reported to have various physiological effects like anti–irritant, antisecretolytic, antiphlogistic, antimicrobial and antiparasitic effects. Presence of tannins suggests the ability of these plants to play a major role for the treatment of some disease [2]. Flavonoides are also shown to inhibit microbes which are resistant to antibiotics [9]. The study scientifically validates the use of these plants in traditional medicine plant and phytochemical data will be helpful for the standardization and quality control of precious indigenous drug and also Pharmaceutical industries.

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