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Phytochemical Studies on Leaves and Petiole extracts of *Marsilea minuta,*L.

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Abstract: ***To evaluate the phytochemical properties of leaves and petiole of Marsilea minuta,L. the dried and powdered leaves and petiole materials were extracted successively with 250 ml of petroleum ether, ethanol, chloroform, acetone and DMSO in using Soxhlet extractor for 8hrs at a temperature not exceeding the boiling point of the solvent. Phytochemical screening of extracts was carried out according to the standard methods. The phytochemical screening of extracts of leaves and petiole answered for the major derivatives of the phenol, flavonoids, saponins, quinones, tannins, terpenoids, coumarins, total sugar and anthroquinones.***

Keywords: phytochemicals, *Marsilea minuta*, leaves, petiole, solvents.

1. Introduction

Medicinal plants being an effective source of both traditional and modern medicines are generally useful for primary health care. World Health Organization has advocated traditional medicine as safe remedies for ailments of microbial and non-microbial origin. For past few decades compounds from natural sources have been gaining importance because of the vast clinical diversity that they offer. This had led to phenomenal increase in the demand for herbal medicines in the last two decades and or need has been felt for ensuring the quality, safety, and efficacy of herbal drugs. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body. The most important compounds of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic components. Plants have an ability to synthesize aromatic substances, mainly secondary metabolites such as alkaloids, tannins, saponins, flavonoids and phenolics when play defensive role in plants and therefore they protect the plants from this invaders like fungi, bacteria, viruses, nematodesetc. Among them 1200 have been isolated which are estimated to be less than 10% of the total. In India many plants are widely used by all section of people either directly as folk remedies or indirectly in pharmaceutical preparations of modern medicine. India is one of the richest countries in the world providing medicinal plants. The limitations associated with synthetic pharmaceutical products have opened awareness for “Green Medicine” that is considered to be safe more accessible and affordable too. To determine the potential and promote the use of herbal medicine, it is essentially required to intensify the research studies on traditional and folklore medicines (1). Hence today there is a need to do research to produce new antimicrobial agents from plants as an alternative to available antibiotics because they are effective against resistant pathogen of plants and animals to avoid the threat of post antibiotic era. Recently there has been growing interest in exploiting the biological activities of flora and fauna owing to their natural origin, cost effectiveness and lesser side effects (2, 3). Many pharmaceutical innovations are developed from a starting point of knowledge derived from the biological activities of natural organisms. At the global level plants have been examined for their phytochemical properties, antimicrobial and pharmacological activity and they proved their fruitfulness (4,5). Very few studies were carried out on the phytochemical properties of pteridophytes. With this background an attempt was made to evaluate the phytochemical properties of leaf and petiole extracts of *Marsilea minuta,* L.

2. Materials and Methods

2.1 Plant Material Collection

Healthy and disease free entire plants of *Marsilea minuta*, L. were collected from the rice fields of Mannachanallur, Trichy district.

2.2 Preparation of Extract and Preliminary Phytochemical Screening

The fresh materials were washed in tap water for 5 min and leaves and petioles were separated out from the entire plant and dried at shade for two weeks. The leaves and petiole materials (50 g) were extracted successively with 250 ml of acetone, chloroform, ethanol, petroleum ether and DMSO by using soxhlet extracter for 8hrs at a temperature not exceeding the boiling point of the solvent. The extracts were filtered using Whatman No.1 filter paper and then concentrated in vaccum at 40°C using rotary evaporator. The residues obtained were stored in a freezer at 70°C for further tests (6). Phytochemical screening of the extracts was carried out according to the standard methods (7).

3. Results

The crude extracts of leaves of *Marsilea minuta*, L. showed diverse phytoprofiles with reference to solvents. The chloroform extracts of leaves showed medium occurrence of phyto- constituents, followed by DMSO, acetone, petroleum ether and ethanol. The phenol is present in all the tested extracts of leaf. Flavonoids are present in acetone, chloroform and petroleum ether extracts. Similarly saponins are present in chloroform and DMSO extracts. Quinones are present only in acetone and chloroform extracts. Acetone, chloroform, petroleum ether and DMSO extracts showed the presence of tannins. Similarly chloroform, ethanol and

DMSO extracts showed the presence of terpenoids. Coumarin showed its presence in acetone, chloroform, and petroleum ether extract. A total sugar exists in acetone and DMSO extracts only. Likewise anthroquinones and alkaloids showed their presence only in DMSO extract.

The crude extracts of petiole *Marsilea minuta,*L. illustrated the presence various metabolites with reference to solvents of the extracts. The DMSO extracts of petiole showed maximum occurrence of phyto-constituents followed by acetone, chloroform, ethanol and petroleum ether. Phenol showed its presence in acetone and chloroform extracts. Flavonoids showed its presence in ethanol, petroleum ether and DMSO extracts. Tannins are present in chloroform and DMSO extracts. Terpenoids, Coumarins and total sugars are showed their presence only in acetone. Similarly anthroquinone is present only in DMSO extract (Table-1).

Table 1: Phytochemical analysis of leaves and petiole extracts of *Marsilea minuta,* L.

S. No	*Compounds*	*Acetone*		*Chloroform*		*Ethanol*		*Petroleum Ether*		*DMSO*	
		A	B	A	B	A	B	A	B	A	B
1	Alkaloid	-	-	-	-	-	-	-	-	-	+
2	Phenols	+	+	+	+	+	-	+	-	+	-
3	Flavonoids	+	-	+	-	-	+	+	+	-	+
4	Saponins	-	-	+	-	-	-	-	-	+	+
5	Quinones	+	-	+	-	-	-	-	-	-	-
6	Tannins	+	-	+	+	-	-	+	-	+	+
7	Terpenoids	-	+	+	-	+	-	-	-	+	-
8	Coumarin	+	+	+	-	-	-	+	-	-	-
9	Total sugars	+	+	-	+	-	+	-	-	+	-
10	Anthroquinones	-	-	-	-	-	+	-	-	+	+

4. Discussion

The present study has screened the phytochemical properties of leaves and petiole extracts of *Marsilea minuta,* L.The presence and absence of the phyto- constituents depends upon the solvent medium used for the extraction and the physiological property of individual taxa. The curative properties of medicinal plants are perhaps due to the presence of various secondary metabolites such as alkaloids, flavonoids, glycosides, phenols, saponins, sterols etc. Thus the preliminary screening tests may be useful and lead to the detection of bioactive principles and drug discovery. The present study revealed and supplemented the phytochemical properties *Marsilea minuta,* L. particularly the leaf and petiole extracts. Recently, a number of plants have been reported for antimicrobial properties across the world (8,9). In the present study various phytochemical compounds detected are known to have beneficial importance in medicinal sciences. Plant based natural constituents can be derived from any part of the plant like bark, leaves, flowers, roots, fruits, seeds etc(10). The medicinal actions of plants unique to particular plant species is consistent with the concept that the combination of secondary products in a particular plant is taxonomically distinct(11). Many naturally occurring compounds found in plants have been shown to possess antimicrobial functions (12). For example, flavonoids are known to inhibit bacterial growth(13). In the present study we observed the presence of the flavonoids. It suggests that the selected plant may be used to treat bacterial infection and diseases. Tannins are known to possess antimicrobial and antioxidant activities (14). Recent reports show that tannins may have potential value as cytotoxic and antineoplastic agents (15). Tannin is almost present in six extracts out of ten extracts. It revealed the antimicrobial properties of the selected parts of the plants and may be used as antioxidant and anticancer agents. Other compounds like saponins are used in medicine for the treatment of hypercholesterolemia, hyperglycemia, antioxidant, anticancer etc. It is also known to have antifungal properties (16). In the present study saponin showed its presence in different extracts. Phenolics have antimicrobial, antioxidative, anti-diabetic, anti- carcinogenic, anti-allergic, anti- mutagenic, and anti-inflammatory activities(17). In the present study seven different tested extracts showed the presence of phenolics in high concentrations. It is suggested that the selected parts of the plants can be used in all the above said activities in the near future. Therefore we recommend further research on these plants to quantify the concentration of the compounds. Further work will accentuate the isolation and characterization of active principles responsible for bio-efficacy and bio activity.

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