Research Article

Comparative Phytochemical Analysis of Leaf and Stem in Seismonastic Plants

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ABSTRACT

The present investigation was carried out, to evaluate the chemicals present in seismonastic plants. Specially *Biophytum sensitivum* of oxalidaceae family. *Mimosa pudica*, Neptunia *triquetra* of Mimosae family. All these three plants are traditionally used in medicine for different kinds of ailments. After critical study it was found that these plants show variation in presence of some kinds of chemicals while most of them show similarities like alkaloids, cardiac glycoside, terpenoids, saponins, steroids.

Keywords: Phytochemical, seismonastic plants.

INTRODUCTION

Phytochemical studies of the plant preparation are necessary for standardization which helps in the understanding of the significance of the phytoconstituents in terms of their observed activities. Phytochemistry also helps in standardizing the herbal preparations; So as to get the optimal concentration of known active constituent and in preserving their activities. In a narrower sense the terms are often used to describe the large number of secondary metabolic compounds found in a plant. Many of these are known to provide protection against insect's attacks and plant diseases. They also exhibited a number of protective functions for human consumers.

Phytochemical techniques mainly applied to the quality control of Chinese medicine or herbal medicine of various chemical components, such as Saponins, alkaloids, flavonoids, phenolics, terpenoids and tannins. Primarily these chemicals constituents can be assessed by using some chemical tests just to identify whether these are present or not. In the development of rapid and reproducible analytical techniques, the combination of HPLC with different detectors such as Diode Array Detector (DAD), Refractive Index Detector (RID), Evaporative Light Scattering Detector (ELSD), Mass Spectrometric Detector (MSD). Constituents can be assessed by using some chemical tests just to identify whether these are present or not. In the development of rapid and reproducible analytical techniques, the combination of HPLC with different detectors, such as Diode Array Detector (DAD), Refractive Index Detector (RID), Evaporative Light Scattering Detector (ELSD), and Mass Spectrometric Detector (MSD) has been widely developed. And now these can be analyzed with the help of HPLC, IR, NMR and GCMS spectroscopy.

"The movement is caused due to touch means it requires a stimulus called as seismonastic movement," ex. *Mimosa pudica*."

The plant used for study *Biphytum sensitivum*, *Mimosa pudica* and *Neptunia triquetra*, after investigation about the previous work carried by workers is denoted that

Ambikabothya *et al*., (2011) studied efficacy evolution of *Mimosa pudica* tannin isolate (MPT) for it anti-ophidian properties. Gandhiraja et al., (2009) reported on phytochemical screening and antimicrobial activity of the plant extract of *Mimosa pudica* L. against selected microbe's ethnobotanical leaflet. Kumar et al., (2011) reported that evaluation of anticancer activity of *Mimosa pudica* leaves against carbon tetrachloride induced toxicity. Muthkumaran et al., (2011) worked on invitro antmicrobial activity of leaf powder. Pal M. Roychoudhary et al., (1190) reported a lnovel tubulin from *Mimosa pudica* purification and characterization. Pal M. Roychoudhary *et al*., (1990) reported a novel tubulin from *Mimosa pudica* purification and characterization. Rajendra, R. *et al*., (2010) worked on hypolipidemic activity of chloroform extract in leaves of Mimosa pudica. Robin et al., they worked out the Effect of Ethephon, 1-

Aminocyclopropane-1-carboxylic Acid and inhibitors of ethylene synthesis on the gravi-tropically induced movement of *Mimosa pudica* pulvinus. Robin et al., they worked out the Effect of Ethephon, 1-Aminocyclopropane-1-carboxylic Acid and inhibitors of ethylene synthesis on the gravitropically induced movement of *Mimosa pudica pulvinus*. Sai *et al*., (2011) worked efficacy of tannins form *Mimosa pudica* and tannic acid in neutralizing cobra (Naja Kaouthia) venom. Lin Y. L. et al. (2003) reported on chemical constituents of *Biophytum sensitivum.* Toriyama et al., (1972) studied migration of calcium and its role in the regulation of seisnonasty in the motor cell of *Mimosa pudica* Linn and Tridax procumbens for in vitro Antimicrobial Activity. Yao et al., (2008) worked on actin dynamics mediates the changes of calcium level during the pulvinus movement of *Mimosa pudica*.

Traditional uses

1)Biophytum sensitivum (L.) DC

The biophytum sensitivum is used as traditional folk medicine to treat numerous diseases. Biophytum is used as a tonic and stimulant. It is use for chest complaints, convulsions, cramps and inflammatory tumors. Its ash is mixed with lime juice and given for stomach ache. Its leaves are styptic; decoction of leaves is given for diabetes, asthma and phthisis. Brushed leaves applied to contusions. Plant decoction used for diabetes. Infusion of leaves use as expectorant. It is used as antiasthma tic also used for scorpion bites. It is used for tuberculosis. It is used asthma and phthisis. Folk medicine used as diabetes.

2) Mimosa pudica Linn

The Mimosa pudica used in treatment of leprosy, dysentery, vaginal and uterine complaints, inflammation, burning sensation, asthma, leucoderma and fatigue and blood disease. It is mainly use in herbal preparation for gynecological disorders. Brushed leaves applied to contusions. Plant decoction used for diabetes. Infusion of leaves used as expectorant. As chhuimui leave used for increasing the sexual potency in men in Kurukshetra District (Haryana), India. As a Laajavanti, its leaves are used for gravel and other kidney diseases also for piles and pistula In the Sugar District Madhya Pradesh, India. As Punyo-sisa, leaves are used in Pillows to induce, sleep in children and the elderly in Ecuder.

The warm leaf paste is applied around furuncle, abscess and boils to burst and release of pus. The leaf paste is applied on the burst boils and itches for quick healing. The leaf paste is applied on forehead to get relief from headache and migraine. The leaf paste with honey is prescribed twice a day in empty stomach for 3-4 days for stomach and intestinal worms. Whole plant useful in treatment of diabetes, mixture of leaf powder with gymnema Sylvestre reduces blood glucose.

3)Neptunia triquetra Benth

Fresh leaf juice is taken as refrigerant. Culinary: - This plant is cultivated as a vegetable in Southeast Asia (leaves and shoot have cabbage-like flavor). They young leaves shoot tips and young pods usually eaten raw or in stir fries and curries such as Kaengsom. *Neptunia* stem is use as a stimulant young stem is cut and chewed. Astringent stem juice is poured into ear to get a relief from earache (Bhoomannarar et al., 2004). Young ends of stem are edible and usually eaten row as a vegetable in Thailand and Cambodia and cultivated much like rice. Juice of the stem is used for medicinal purposes. To cure earache and symphilis shoot used in stir fry also eated mimosa. The whole plant is very good tonic particularly for those who are suffering from Jaundice.

MATERIAL AND METHODS

The plants selected for study were as (1) *Biophytum sensitivum* (L.) DC (2) *Mimosa pudica* Linn and (3) *Neptunia triquetra* Benth. All the selected plants were collected in Akola district from Dr. PDKV, Akola and Katepurna Wild Life century. By using standard flora like flora of Maharashtra state vol I B.D. Sharma 2002. Flora of Marathwada vol. I by V.N. Naik 1998 and flora of Akola district 1988 S.Y. Kamble and S.G. Pradhan. The collected plant material of leaves was air dried and grounded well to obtain a homogenous fine grade powder. The treated powders were extracted with water, ethanol, petroleum ether and chloroform successively at room temperature for 3 days. Thirty gram of powdered material was soaked in 300ml of water and alcohol. The solvent were filtered and evaporated at 37^0C under reducing pressure the percentage yield of extract from different solvent ranged from 5-16%w/w.

Preliminary Phytochemical Screening

All the extracts such as water and alcohol of sensitive plant to routine qualitative chemical analysis to identify the nature of phytochemical constituents present in them.

OBSERVATION AND RESULTS

Phytochemical analysis of leaf powder

Table 1: Preliminary phytochemical analysis for *Biophytum sensitivum* leaves powder by using water and alcohol

S.No	Phytochemical	*Biophytum sensitivum* (leaves Powder)	
		Dist. Water	Alcohol
1	Alkaloids	+	+
2	Cardiac glycoside	+	+
3	Terpenoids	+	+
4	Reducing Sugar	_	_
5	Saponins	_	_
6	Tannin	+	_
7	Flavonoids	+	+
8	Phenol	+	_
9	Steroid	_	_
10	Coumarins	+	+
11	Quinones	_	+

Table 2: Some nutritive Biochemical in plant *Biophytum sensitivum*

S.No	Nutrients	*Biophytum sensitivum* (leaves extract)	
		Dist. Water	Alcohol
1	Protein	+	+
2	Carbohydrate	-	-

Table 3: Preliminary phytochemical analysis for *Mimosa pudica* leaves powder by using water and alcohol

S.No	Phytochemical	*Mimosa pudica* (leaves Powder)	
		Dist. Water	Alcohol
1	Alkaloids	+	+
2	Cardiac glycoside	+	+
3	Terpenoids	+	+
4	Reducing Sugar	+	_
5	Saponins	_	_
6	Tannin	+	+
7	Flavonoids	+	+
8	Phenol	+	_
9	Steroid	_	_
10	Coumarins	+	+
11	Quinones	+	+

Table 4: Some nutritive Biochemical in plant *Mimosa pudica*

S.No	Nutrients	*Mimosa pudica* (leaves extract)	
		Dist. Water	Alcohol
1	Protein	+	+
2	Carbohydrate	-	-

Table 5: Preliminary phytochemical analysis for *Neptunia triquetra* leaves powder by using water and alcohol

S.No	Phytochemical	*Neptunia triquetra* (leaves Powder)	
		Dist. Water	Alcohol
1	Alkaloids	+	+
2	Cardiac glycoside	+	+
3	Terpenoids	+	+
4	Reducing Sugar	+	+
5	Saponins	_	_
6	Tannin	+	+
7	Flavonoids	+	+
8	Phenol	_	_
9	Steroid	_	_
10	Coumarins	+	+
11	Quinones	+	+

Table 6: Some nutritive Biochemical in plant *Neptunia triquetra*

S.No	Nutrients	*Neptunia triquetra* (leaves extract)	
		Dist. Water	Alcohol
1	Protein	+	+
2	Carbohydrate	-	-

Phytochemical analysis of stem powder

Table 7: Preliminary phytochemical analysis for *Biophytum sensitivum* stem powder by using water and alcohol

S.No	Phytochemical	*Biophytum sensitivum* (Stem Powder)	
		Dist. Water	Alcohol
1	Alkaloids	+	+
2	Cardiac glycoside	+	+
3	Terpenoids	+	+
4	Reducing Sugar	_	_
5	Saponins	_	_
6	Tannin	+	_
7	Flavonoids	+	+
8	Phenol	+	_
9	Steroid	_	_
10	Coumarins	+	+
11	Quinones	+	+

Table 8: Some nutritive Biochemical in plant *Biophytum sensitivum*

S.No.	Nutrients	*Bioohytum sensitivum* (Stem extract)	
		Dist. Water	Alcohol
1	Protein	+	+
2	Carbohydrate	-	-

Table 9: Preliminary phytochemical analysis for *Mimosa pudica* stem powder by using water and alcohol

S.No	Phytochemical	*Mimosa pudica* (stem powder)	
		Dist. Water	Alcohol
1	Alkaloids	+	+
2	Cardiac glycoside	+	+
3	Terpenoids	+	+
4	Reducing Sugar	+	_
5	Saponins	_	_
6	Tannin	+	+
7	Flavonoids	+	+
8	Phenol	+	_
9	Steroid	_	_
10	Coumarins	+	+
11	Quinones	+	+

Table 10: Some nutritive Biochemical in plant *Mimosa pudica*

S. No.	Nutrients	*Mimosa pudica* (Stem extract)	
		Dist. Water	Alcohol
1	Protein	+	+
2	Carbohydrate	-	-

Table 11: Preliminary phytochemical analysis for *Neptunia triquetra* stem powder by using water and alcohol

S.No	Phytochemical	*Neptunia triquetra* (Stem Powder)	
		Dist. Water	Alcohol
1	Alkaloids	+	+
2	Cardiac glycoside	+	+
3	Terpenoids	+	+
4	Reducing Sugar	+	+
5	Saponins	_	_
6	Tannin	+	_
7	Flavonoids	+	+
8	Phenol	_	_
9	Steroid	_	_
10	Coumarins	+	+
11	Quinones	+	+

Table 12: Some nutritive Biochemical in plant *Neptunia triquetra*

S. No.	Nutrients	*Neptunia triquetra* (Stem extract)	
		Dist. Water	Alcohol
1	Protein	+	+
2	Carbohydrate	-	-

DISCUSSION

Leaves powder extract in aqueous form shows the presence of alkolids, cardiac glycoside, terpenoids, tannin, flavonoids, coumarins, antraquinones, and protein, reducing sugar, amino acid in *Biophytum sensitivum, Mimosa pudica* and *Neptunia triquetra.*

Leaves powder extract in alcohol shows presence of alkolids, cardiac glycosides, terpenoids, tannin, flavonoid, coumarin, antraquinons, and protein in *Biophytum sensitivum, Mimosa pudica* and *Neptunia triquetra.*

While extract form in water saponin, steroid and carbohydrate are not found. In alcohol extract steroid saponin, carbohydrate, reducing sugar is not found.

Both extract form in water and alcohol in *Mimosa pudica, Neptunia triquetra*, saponine, steroid, carbohydrate are not found. Tannins is found most significant in seismonastic plant.

Stem powder extract in aqueous form shows the presence of alkaloids, cardiac glycosides, terpenoids, tannin, flavonoid, coumarin, quinines, protein and reducing sugar, amino acids in *Mimosa pudica, Biophytum sensitivum* and *Neptunia triquetra.*

Stem powder extract in alcohol shows presence of alkaloids, cardiac glycosides, terpenoids, tannin, flavonoids, coumarins, quinines and protein in *Mimosa pidica, Biophytum sensitivum* and *Neptunia triquertra.*

While extract form in water saponins, steroids, carbohydrate are not found. In alcohol extract saponin, steroid, phenol carbohydrate is absent.

Both extract form in water and alcohol alkaloids, cardiac glycosides, terpenoids, tannin, flavonoids, coumarin, phenol, antraquinones, aminoacids, protein are present.

Both extract form in water and alcohol saponins, steroid, carbohydrates are absent.

The plant prominently features in the texts of Ayurveda i.e. the Traditional Indian System of Medicine, which prompted the authors to complete the published data and to critically analyze it, and is an honest, through rather the preliminary attempt for the preparation of the plant monograph. The review presented a brief profile of *Mimosa pudica*, a plant associated with fond memories of almost every Indian childhood (Chhuimui). The literature claims that there is vast potential in this herb in view of therapeutic and furthermore commercialization of this herb would be in line with the WHO guidelines (developing country needs to give more emphasis on explanation of their natural resources like medicinal plant) is highly describable for the benefits of humanity. It is suggestive of greater benefits as it is economically viable easily available and a reservoir of significant medicinal properties (Muthumani P. et al., 2010)

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