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Effect of Climatic factors on phytochemical components of *Sesbania grandiflora* L. Pers Leaf extract.

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ABSTRACT: *The leaves of Sesbania grandiflora* L. Pers *were analyzed for the presence of the phytochemicals by cold and hot extraction method, which exhibited the results indicating the presence of phlobotanins, terpenoids, flavonoids, alkaloids, tannins, saponins, steroids, carbohydrates, proteins, emodins, anthocyanins and Leucoanthocaynins. The total yeild of the crude extract were calculated. The crude extract was dissolved in solvent to obtain the working stock solution. This stock solution was utilized for phytochemical analysis which revealed the presence of terpenoids, tannins, glycosides, carbohydrates and emodins in addition to the above contents.*

Suitable results were obtained indicating the presence and absence of the compounds (secondary metabolites) in the samples from cold/Rotar and hot extraction method which indicated that the chemical nature and growth of the plants varied with increase or decrease in the temperature, light and pressure (climatic conditions).

KEY WORDS: *Decoction, Cold extraction/Rotar method, Hot decoction method, Crude extract, Secondary Metabolites, Sesbania grandiflora L. Pers*

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I. INTRODUCTION

Sesbania grandiflora. L. Pers is a small woody tree species which belongs to the family: Fabaceae. It grows in dry, semi-dry land, a short lived, quick growing, soft-wooded tree, 6-9 m high and 0.6m in girth; leaves 15-30 cm long, abruptly pinnate; leaflets 41-61, linear-oblong, deciduous; flowers 6-10 cm long with showy, fleshy white, pink or red petals; pods 30 cm or more long, rather flat and somewhat 4-cornered, non-torulose, septate with swollen margins and 15-50 pale colored seeds (Narayan Das Prajapati *et al*., 2003) , The Indian Pharmacopoeia; (1966).

It can be cultivated in gardens and betel-vine plantations distributed throughout India. Western Ghats, dry deciduous forests and scrub jungle in Maharashtra (Mahabaleshwar hills, Kolhapur) and Karnataka (Tumkur, Hassan, Udupi, Chikkaballapura and Mysore).

It can be propagated by using seeds. The roots, bark, leaves, flowers and fruits of *Sesbania grandiflora* L. Pers are of medicinal importance.

The chemical constituents of *Sesbania grandiflora* L. Pers are arginine, cystine, histidine, isoleucine, phenylalanine, tryptophan, valine, threonine, alanine, asparagine, aspartic acid and a saponin yielding oleanolic acid, galactose, rhamnose and glucuronic acid. The root-bark of the red-flowered variety is useful in vitiated conditions of vata and arthralgia. The bark is astringent, cooling, bitter, tonic, anti-helminthic and febrifuge. The pounded bark is externally applied to cure scabies. The juice of the bark is good for dyspepsia, diarrhoea and gastralgia. The leaves are acrid, bitter, sweet, cooling, aperient, tonic and diuretic, and contain a non-poisonous saponin-like substance. The leaf juice is used in nasal catarrh, nyctalopia and cephalagia. Leaves are chewed to disinfect mouth and throat and are useful in stomachalgia. The flowers are cooling, bitter, astringent, acrid and antipyretic. The juice of the flowers is applied to the eyes for nyctalopia and is used for intermittent fevers. The fruits are sweet, bitter, laxative and alexiteric and are useful inflatulant-colic, anemia and emaciation and vitiated conditions of tridosa(Narayan Das Prajapati *et al*., 2003).

II. MATERIALS AND METHODS

The leaves and stem of *Sesbania grandiflora* L. Pers were collected from the Gunjur, Makalidurga and Siddara betta locations. The plants collected were dried and analyzed in the Plant Anatomy Research Laboratory, Department of Botany, Bangalore University, Bangalore.

III. PREPARATION OF PLANT EXTRACT

1. COLD EXTRACTION METHOD/ ROTAR METHOD (Ingle K. P. *et al* 2017):

The leaves of *Sesbania grandiflora*. L. Pers were removed and then washed under running tap water to remove dust. The plant samples were then air dried for few days and the leaves were crushed into powder and stored in polythene bags for use. 10 gms of the plant powder was taken in a conical flask and 50ml of solvent (Petroleum ether) was added so that the plant powder will soak in it and the mixture is stirred and shaken well in a Auto-rotator or Serial stirrer for 12 hours with 20 rpm (rotations per minute) at a gap of 4 hours in one set of rotation. After 3 series of rotations in a Rotar, the plant extract which is a semi-solid was extracted.

In case of physical shaker method, the extract was stirred by hand for 4 hours with a gap of ten minutes after half an hour to obtain the extract and then filtered with the Whatman's Filter paper and filtered, liquified 1 ml of the extract was used for further phytochemical analysis diluting it with distilled water. From this extraction serial dilutions were made and used suitably for the analysis of phytochemicals.

2. HOT DECOCTION METHOD/ HOT EXTRACTION METHOD (Yadav *et al* 2014):

The leaves of *Sesbania grandiflora*. L. Pers were removed and then washed under running tap water to remove dust. The plant samples were then air dried for few days and the leaves were crushed into powder and stored in polythene bags for use. 10 gms of the plant powder was taken in a conical flask, to this 50 ml of methanol was added and filtered into a beaker. The filterate was then heated on a hot water bath with 50°C for 4 hours to prepare a semi-solid extract and reduce to 1 gm of the extract.

This was poured into the Epindoff tubes and again kept in hot water bath set at 50°C for 4 hours to solidfy the extract.

The residual extract was taken and analysed for phytochemicals by adding sterilized distilled water. i.e., 1 gm of the plant extract dissolved in 100ml of distilled water to dilute and utilize for series of estimation of the phytochemicals.

IV. PHYTOCHEMICAL ANALYSIS

The plant extract collected on filteration were subjected to the phytochemical analysis and 16 tests were conducted from cold and hot extraction method.

V. RESULTS

Tabulation: The following table shows the results obtained from the analysis of cold and hot extraction method:

Serial number	Phytoconstituents	*Sesbania grandiflora* (L.) Pers	*Sesbania grandiflora* (L.) Pers	*Sesbania grandiflora* (L.) Pers	*Sesbania grandiflora*(L.) Pers	*Sesbania grandiflora* (L.) Pers	*Sesbania grandiflora* (L.) Pers
	EXTRACTION METHODS	**Cold Ex.Md**	**Hot Ex.Md**	**Cold Ex.Md**	**Hot Ex.Md**	**Cold Ex.Md**	**Hot Ex.Md**
	REGIONS	A_1	A_1	A_2	A_2	A_3	A_3
	TESTS						
1.	Alkaloids ***(Hexane test)***	+	+	+	-	-	-
2.	Anthocyanins ***(Hydrochloric acid test)***	-	-	+	+	-	-
3.	Anthraquinones ***(Borntrager's Test)***	+	+	-	-	+	-
4.	Carbohydrates ***(Molisch's Test)***	+	+	+	-	+	+
5.	Coumarins ***(Sodium hydroxide test)***	-	-	+	-	+	+
6.	Emodins ***(Benzene test)***	+	-	-	-	+	+
7.	Flavonoids ***(Ammonia test)***	+	-	-	-	-	-
8.	Glycosides ***(Liebermann's Test)***	+	-	+	-	+	+
9.	Leucoanthocyanins	+	+	+	+	+	+

	(Isoamyl test)						
10.	Phlobotannins (***Precipitate Test)***	+	+	-	-	+	+
11.	Proteins ***(Xanthoproteic Test)***	+	+	+	+	+	+
12.	Reducing sugars ***(Fehling's test)***	+	-	+	-	+	+
13.	Saponins ***(Foam Test)***	+	-	+	+	+	-
14.	Steroids ***(Salkowski Test)***	-	-	-	-	+	+
15.	Tannins ***(Braymer's Test)***	-	-	+	+	+	+
16.	Terpenoids ***(Chloroform test)***	+	-	+	-	+	-

Note: **A_1 : Gunjuru., Chickkaballapura district.**
A_2 : Makalidurga., Chikkaballapura district.
A_3 : Siddara betta., Tumakuru district.

VI. DISCUSSION

From the present observations, it was evident that some of the phytoconstituents were detected in the plant extract of ***Sesbania grandiflora* L. Pers** by hot decoction method and the same remained absent when extracted through cold extraction or rotar method. A similar work had been carried out by Yadav ***et al*., 2014** in which they stated that a maximum number of phytoconstituents were detected in *Swertia chirata* and flavanoids were observed in fresh leaves of *F. Religiosa* L. *C. Limonia* Osbeck. , seeds of *P. dactylifera* L. , stem of *S. Chirata* L. , black seeds of *Sesamum indicum* L. and roots of *R. Sativus* L.

In the present study on the presence or absence of phytoconstituents, among the three accessions, Siddara betta of Tumakuru district had more number of phytoconstituents. Phlobotannins were detected by Precipitate method and the same was proved to be present in ***Raphanus sativus*** by Sangole ***et al***., **2017.**

The plant extracts were obtained by cold extraction method by Ingle ***et al***., **2017** were similar to the present work but was carried out on ***Sesbania grandiflora* L. Pers** plant for the phytochemical detection.

Rio ***et al* 1997** and Salah ***et al* 1995** stated that the screening of all the six selected medicinal plants of Genus ***Citrus*** were found to possess tannins. Tannins had amazing stringent properties and were known to hasten the healing of wounds along with inflamed mucous membranes. Flavonoids were also present in all six selected medicinal plants unlike tannins were also detected in ***Sesbania grandiflora* L. Pers**.

It is evident from the above findings that some of the aromatic phytochemicals tend to decrease its efficiency when there is a drastic increase in temperature. The presence of phytochemicals like Phlobotannins, Reducing sugars, Terpenoids, Flavonoids, Alkaloids, Tannins, Saponins, Steroids, Carbohydrates, Glycosides, Coumarins, Proteins, Emodins, Anthroquinones, Anthocyanins and Leucoanthocyanins were isolated from the leaves of ***Sesbania grandiflora***. L. Pers collected from three regions of Karnataka state viz., Gunjur and Makalidurga of Chickkaballapura, Siddara betta of Tumakuru districts respectively.

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