

# Determination of Lipid and Alkaloid Content in some Medicinal Plants of Genus *Sesbania*

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Article Info	Abstract
<b>Article History</b> Received : 05-03-2011 Revised : 20-04-2011 Accepted : 20-04-2011	The seasonal variation of alkaloids have been investigated in leaf, bark and wood of <i>Sesbania grandiflora</i> , <i>Sesbania bispinosa</i> and <i>Sesbania cannabina</i> which are medicinally important in Marathwada region. The leaves of <i>Sesbania grandiflora</i> showed high level of Lipid (range 29.75 to 33.75 mg/g dry wt.) than <i>Sesbania bispinosa</i> and <i>Sesbania cannabina</i> (22.95 to 27.85 and 21.85 to 23.60 mg/g dry wt.) respectively. The leaves of <i>Sesbania grandiflora</i> showed high level of (3.7 to 4.6 mg/g dry wt.) alkaloid than <i>Sesbania bispinosa</i> and <i>Sesbania cannabina</i> (3.4 to 3.75 and 2.15 to 2.75 mg/g dry wt.) respectively.
<b>*Corresponding Author</b> Tel : +91-9421365273 Fax : +91-2442229923  Email: momin_rais@yahoo.com ©ScholarJournals, SSR	<b>Key Words:</b> Lipid, Alkaloid, Medicinal plant and genus <i>Sesbania</i>

## Introduction

All human beings require a number of complex organic/inorganic compounds in diet to meet the need for their activities. The important constituents of diet are carbohydrates, fats, proteins, vitamins, minerals and water (Indrayan et al., 2005). Every constituent plays an important role and deficiency of any one constituent may lead to abnormal developments in the body. Plants are the rich source of all the elements essential for human beings. There is a relationship between the element content of the plant and its nutritional status. Some elements are essential for growth, for structure formation, reproduction or as components of biologically active molecules while others have some other beneficial affects (New Wall et al., 1996).

Medicinal plants have been used as traditional treatments for numerous human diseases for thousands of years. Medicinal plants continue to be an important therapeutic aid for alleviating the ailments of humankind. The search for eternal health and longevity and for remedies to relieve pain and discomfort drove early man to explore his immediate natural surroundings and led to the use of many plants, animal product and minerals, etc. and the development of variety of therapeutic agents. Today, is a renewed interest in traditional medicine and an increasing demand for more drugs from plant sources. This revival interest in plant derived drugs is mainly due to the current widespread belief the green medicine is safe and more dependable than the costly synthetic drugs, many of which have adverse side effects. Nature has bestowed upon us a very rich botanical wealth and a large number of diverse type of plants grow wild in different parts of our country. In India, the use of different parts of several medicinal plants to cure specific ailments has been vogue from ancient times.

Lipids are organic compounds that include fats, waxes, phospholipids, glyco lipids and sterols. All of them are present in almost every living cell. Lipids are insoluble in water but soluble in organic solvents like alcohol and chloroform.

Alkaloids represent group of secondary metabolites produced in plants. About 2500 alkaloids contain nitrogen in heterocyclic ring and these are basic in nature. They are usually found in plants as salts of organic acid and exhibit important pharmacological properties.

All parts of *Sesbania grandiflora* are utilized for medicine. The bark of *Sesbania grandiflora* is used for Diarrhea, antibacterial investigation (Payorm, 1978; Runrawee, 1999) The bark is considered astringent and is utilized for the treatment of smallpox, for the treatment of ulcers in the mouth and alimentary canal (Kasture, V. S., et al., 2002). The juice of the leaves is considered anthelmintic and tonic and is used to treat worms, biliousness, fever, gout, and itchiness, and leprosy (Duke, et al., 1983.) The juice from the flower is used to treat headache. The root juice along with honey is used as expectorant (Dhiman AK., 2003).

The leaves and flowers of *Sesbania bispinosa* are prepared as poultices for external application or taken as a decoction for internal ailments. In traditional medicine, seed mixed with flour is used to treat ringworm and other skin diseases and worms. (Orwa et al., 2009; Duke, 1981a). Ayurvedics regard the root as alexiteric, anthelmintic, collyrium, diuretic, and lactagogue. (Kirtikar and Basu, 1975) The leaves of *Sesbania cannabina* as an aperient, diuretic, emetic, emmenagogue, febrifuge, laxative, and tonic, dysentery, eyes, fevers, headaches, small pox, sores, sore throat, and stomatitis (Duke and Wain, 1981). The astringent bark was used in treating small pox and other eruptive fevers. The juice from the flowers is used to treat headache, head congestion, or stuffy nose. Leaves are chewed to disinfect the mouth and throat. (Singh et al., 1980).

## Materials and Methods

The plant material of *Sesbania grandiflora*, *Sesbania bispinosa* and *Sesbania cannabina* from different

Marathwada region during different season viz. summer , monsoon, winter .The leaves, bark, and wood sample are collected and kept separately.Dried in sun light and make a powder with grinder.

#### **Determination of lipid (oil)**

Agrawal *et al.*, (1987) method was followed for the estimation of lipid. The material was dried for 12-17 hours at 60-70°C and ground to a coarse powder.5 gm of weighed sample was taken in a cellulose thimble (The quantity of material would depend on oil content). The thimble was fixed in the soxhlet funnel and about 150 -200ml of petroleum ether was taken in the flat bottom flask (FBF) .The funnel over the flask was fixed and attached to the water condenser. Refluxed for at least 4 hours and the heater were switched off to let the apparatus cool (maintaining the water flow as such). Condenser and funnel were detached, petroleum ether was evaporated in FBF over hot plat at 80°C .When a small quantity (about 10ml) of ether was left in the flask, transferred it in weighed beaker (W<sub>1</sub>) of 50 or 100 ml. Rinsed the FBF twice with small quantities of ether and transferred the washing in the beaker. The beaker was transferred in an oven at 70±1°C till ether evaporated (presence of ether can be detected by its smell). The beaker was cooled in a dessicator and weight (W<sub>2</sub>).Difference of (W<sub>1</sub>-W<sub>2</sub>) would give the oil content. The oil percentage was calculated on the basis of the weight of plant material.

#### **Total Alkaloids**

Quantitative estimations of alkaloids were carried out following the method of Sairam and khanna (1971).Each sample was ground to fine powder. To each one gram powder 0.75ml 25% ammonium hydroxide, 1ml 95% ethyl alcohol and 2 ml ethyl ether were added. The material was allowed to macerate for 12 hours and dried. The dried material was extracted with chloroform for 24 hours in a soxhlet apparatus, and the extract obtained was evaporated to dryness, and the residue was mixed with 2.5 ml 0.1 Methanol (90%) HCL. The extracted, thus obtained was centrifuged to take supernatant and discard pellet. The solution was evaporated and the total alkaloids were weight after drying at 100°C.

#### **Result and Discussion**

The estimation of lipid and alkaloid content was carried out in different parts like leaves, bark and wood of three taxa during summer, monsoon and winter for two consecutive years.

#### ***Sesbania grandiflora***

The lipid concentration of leaves was higher in summer (33.75mg/gm) over that of monsoon(29.75mg/gm) and winter (31.00mg/gm).The bark of lipid concentration was ranging from 8.75 to 9.7 mg/gm and significantly higher in summer (9.7mg/gm) (Table) The lipid content of wood was comparatively low (6.5 to 7.6 mg/gm)

The alkaloids content of leaves was ranging from 3.7 mg/gm to 4.6 mg/gm and attained its peak concentration (4.6 mg/gm) during summer season. Alkaloids range content was from 2.85 mg/gm to 3.6mg/gm in bark and from 2.4 to 3.25 mg/gm in wood during the three seasons tested. Highest concentration observed in summer season i.e. 3.6 mg/gm and 3.25 mg/gm in bark and wood respectively.

The lipid and alkaloids content were in increasing order from wood<bark<leaves (Table 1 and Graph 1).

#### ***Sesbania bispinosa***

The *Sesbania bispinosa* has stored more Lipid in summer (27.85mg/gm) in leaves over that of winter (25.65 mg/gm) and monsoon (22.95mg/gm). In bark highest concentration was observed in summer and winter (9.4 mg/gm) over than in monsoon respectively and in Wood show very low concentration range from 3.15 to 3.85 mg/gm.

The alkaloids content of leaves was higher in summer (3.75mg/gm) than winter (3.6 mg/gm) and monsoon (3.4mg/gm).Similarly, the alkaloids content of bark was higher (significantly different at 5 %from others based on 't' test) in summer and winter (2.4 mg/gm) over that of monsoon (2.25mg/gm).

The wood witnessed very low alkaloids contents if ranging from 1.6 to 1.85 mg/gm. The lipid and alkaloids content were in increasing order from wood<bark<leaves (Table 2 and Graph 2).

*Sesbania cannabina*: lipid content of leaves was higher test in summer (23.6 mg/gm)over than winter (22.55 mg/gm) and monsoon (21.85 mg/gm) (Table 2). The range of lipid content of bark was from 7.3 to 7.75 mg/gm. Highest level in bark was being observed during summer (7.75mg/gm). The wood was poor in having lipid content (from 4.4 to 4.75 mg/gm)

*Sesbania cannabina* accumulated highest level of alkaloids in its leaves over than bark and wood, and these trends of observation were similar to *Sesbania grandiflora* and *Sesbania bispinosa* throughout the course if investigation.

The lipid and alkaloids content were in increasing order from wood<bark<leaves. (Table 3 and Graph 3).

Table 1: Seasonal variation of Lipid and Alkaloid levels of different plants parts of *Sesbania grandiflora*

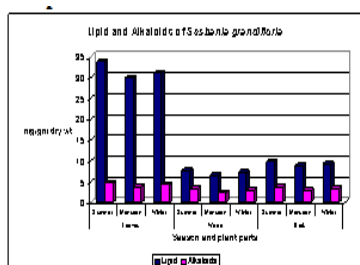
Plant parts	Season	Lipid (mg/g dry wt)			Alkaloid (mg/g dry wt)		
		1 year	2year	Mean	1 year	2year	Mean
Leaves	Summer	33.7	33.8	33.75	4.8	4.4	4.6
	Monsoon	29.6	29.9	29.75	3.6	3.8	3.7
	Winter	30.4	31.6	31	4.3	4.1	4.2
Wood	Summer	7.8	7.4	7.6	3.2	3.3	3.25
	Monsoon	6.6	6.4	6.5	2.6	2.2	2.4
	Winter	7.2	7.1	7.15	2.8	2.9	2.85
Bark	Summer	9.6	9.8	9.7	3.8	3.4	3.6
	Monsoon	8.7	8.8	8.75	2.9	2.8	2.85
	Winter	9.2	9.2	9.2	3.3	3.4	3.35

Table 2: Seasonal variation of Lipid and Alkaloid levels of different plants parts of *Sesbania bispinosa*

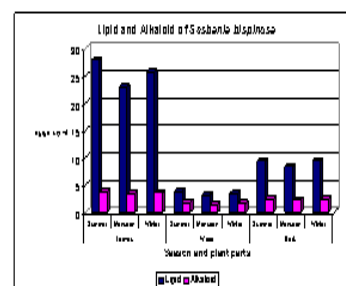
Plant parts	Season	Lipid (mg/g dry wt.)			Alkaloids (mg/g dry wt.)		
		1 year	2year	Mean	1 year	2year	Mean
Leaves	Summer	28.4	27.3	27.85	3.6	3.9	3.75
	Monsoon	22.4	23.5	22.95	3.5	3.3	3.4
	Winter	24.7	26.6	25.65	3.6	3.6	3.6
Wood	Summer	3.8	3.9	3.85	1.8	1.9	1.85
	Monsoon	3.1	3.2	3.15	1.4	1.5	1.45
	Winter	3.3	3.4	3.35	1.6	1.6	1.6
Bark	Summer	9.6	9.2	9.4	2.4	2.4	2.4
	Monsoon	8.3	8.4	8.35	2.2	2.3	2.25
	Winter	8.9	9.9	9.4	2.5	2.3	2.4

Table 3 constituent's levels of different plants parts of *Sesbania cannabina*

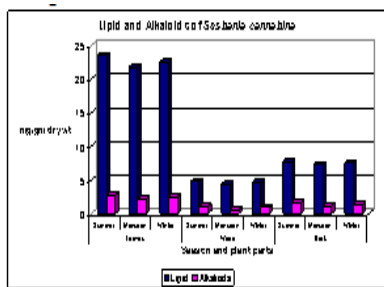
Plant parts	Season	Lipid (mg/g dry wt)			Alkaloids (mg/g dry wt)		
		1 year	2year	Mean	1 year	2year	Mean
Leaves	Summer	23.7	23.5	23.6	2.8	2.7	2.75
	Monsoon	22.5	21.2	21.85	2.2	2.1	2.15
	Winter	22.3	22.8	22.55	2.6	2.4	2.5
Wood	Summer	4.9	4.6	4.75	0.9	1.2	1.05
	Monsoon	4.5	4.3	4.4	0.6	0.65	0.625
	Winter	4.5	4.7	4.6	0.8	1.1	0.95
Bark	Summer	7.9	7.6	7.75	1.6	1.7	1.65
	Monsoon	7.3	7.3	7.3	1.2	1.15	1.175
	Winter	7.6	7.5	7.55	1.35	1.4	1.375



Graph No. 1



Graph No. 2



Graph No. 3

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