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Estimation and Evaluation of Chlorophyll Content of Leaves of some Medicinal Plants of Marathwada

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Abstract

The seasonal variation of chlorophyll a, chlorophyll b and carotenoid have been investigated in leaves of *Sesbania grandiflora*, *Sesbania cannabina* and *Sesbania bispinosa* are important medicinal plants. Comparative account of chlorophyll a, chlorophyll b and carotenoid content of leaves of three medicinal plants revealed that, the highest amount of chlorophyll a, chlorophyll b and carotenoid content in the leaves of *Sesbania cannabina* (3.2 mg/g fresh wt.), (2.76 mg/g fresh wt.) and (1.44 mg/g fresh wt.) in summer seasons.

Key words—Medicinal plant, chlorophyll, carotenoid and genus *Sesbania*

Introduction

The pigments which are involved in the process of photosynthesis are called photosynthetic pigments. The pigments are the coloured organic compounds that have capacity to absorb certain wavelength of light and reflect to others. Several kinds of Chlorophyll have been discovered in plants. The formation of chlorophyll is physiological process that occurs only in living cells. The essential conditions for chlorophyll formation is the presence of genetic factors (Anonymous, 1986). The potential of higher plants as a source of new drugs is still largely unexplored. Hence, last decade witnessed an increase in the investigation on plants as a source of new biomolecules for human disease management.

(Grierson and Afolayan, 1999). Traditionally plants have been well exploited by man for the treatment of human diseases. *Sesbania grandiflora* (L.) Pers. is a soft wooded tree belonging to the family Papilionaceae. Flowers are rich in nutrients and are used as vegetables in rural area. Bark is used in treating small pox and other eruptive fevers. The juice from the flower is used to treat head ache, head congestion, or stuffy nose. The powdered bark is also recommended for ulcers of the mouth and alimentary canal and infantile disorders of the stomach [Dhiman AK. 2003]. Leaves are considered to be excellent sources of vitamin C, and calcium. The leaves are used as aperients, diuretic, and tonic in form of poultice and they are applied to bruises. The barks of the plant are used as astringent, febrifuge and tonic and its infusion in small-pox. Besides the root juice along with honey is used as expectorant [Dhiman AK. 2003]. The flowers and young leaves of *Sesbania*

cannabina are edible and are often used as a vegetable to supplement meals. Tender pods may also be eaten as string beans. The dried leaves of *S. cannabina* are used in some countries as a tea which is considered to have antibiotic, anti-helminthic, anti-tumour and contraceptive properties. Bark exudates and seed endosperm gums are produced by many species of *Sesbania*, but are not seen as an alternative to gum arabic (Anderson 1989).

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)

Materials and Methods

The plant material of *Sesbania grandiflora*, *Sesbania bispinosa* and *Sesbania cannabina* from different parts of Marathwada region during different season's viz. summer, monsoon and winter. Chlorophyll a, Chlorophyll b, and carotenoids were extracted from the freshly plucked third leaf from the top using 80% acetone. Optical densities were recorded at 480, 510, 645 and 663nm. The amount of chl. a, chl. b and carotenoid were calculated in the terms of mg pigment/ gm of fresh leaves by using the following formula (Duxbury and yentsch, 1956 and Maclachalam and Zalik, 1963).

Formula for Calculation

$$\begin{aligned} 1) \quad \text{Chl.a (Mg/gm fresh weight)} &= \frac{12.3 D_{663} - 0.86 D_{645}}{d \times 1000 \times W} \times V \\ 2) \quad \text{Chl.b (Mg/gm fresh weight)} &= \frac{19.3 D_{645} - 3.6 D_{663}}{d \times 1000 \times W} \times V \\ 3) \quad \text{Carotenoids (Mg/gm fresh weight)} &= \frac{7.6 D_{480} - 1.49 D_{510}}{d \times 1000 \times W} \times V \end{aligned}$$

Where 'V' is the volume of the chlorophyll solution, 'd' is the length (cm) of light path, and 'W' is the fresh weight of leaves

Result and Discussion

Sesbania grandiflora

Sesbania grandiflora

The chlorophyll a content of leaves was raised in summer (2.925 mg/gm fresh wt.) over that of monsoon (2.63 mg/gm fresh wt) and winter (2.34mg/gm fresh wt). The Chlorophyll b content of leaves was higher in summer (2.55 mg/gm fresh wt.) over to monsoon (2.26 mg/gm fresh wt) and winter (2.37mg/gm fresh wt.). The carotenoids, contents of leaves were accumulated more in summer (1.46 mg/gm fresh wt.) Over that of

monsoon (1.18 mg/gm fresh wt.) And winter (1.25 mg/gm fresh wt.). The range of Chl.a, chl.b, and carotenoids were found to be increasing order of monsoon < winter < summer season (Table 1 graph 1)

Sesbania bispinosa

The summer leaves were rich with chlorophyll a (3.14 mg/gm fresh wt.) Over that of winter (2.86 mg/gm fresh wt.) And monsoon (2.81 mg/gm fresh wt.). The Chlorophyll b content of leaves was higher in summer (2.56 mg/gm fresh wt.) over to monsoon (2.27 mg/gm fresh wt) and winter (2.45 mg/gm fresh wt.). The carotenoids, contents of leaves were accumulated more in summer (1.63 mg/gm fresh wt.) over that of winter (1.36 mg/gm fresh wt.) and monsoon (1.26 mg/gm fresh wt.). The range of Chl.a, chl.b, and carotenoids were found to be increasing order of monsoon < winter < summer season (Table 1 graph 1)

Sesbania cannabina

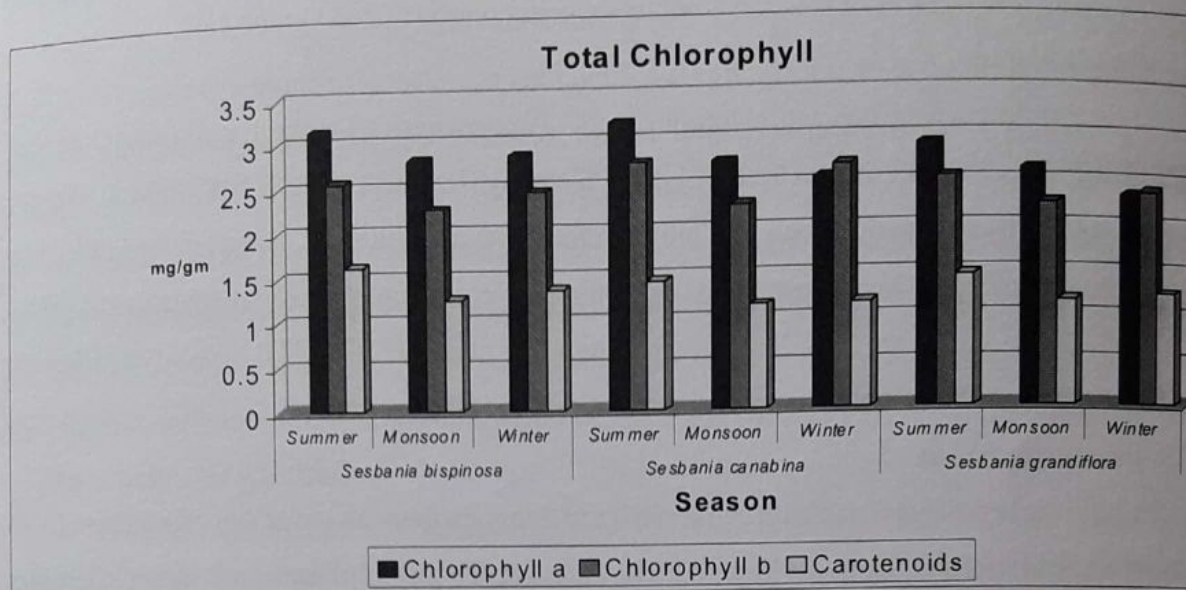
The summer leaves were rich with chlorophyll a (3.2 mg/gm fresh wt.) over that of monsoon (2.76 mg/gm fresh wt.) And winter (2.56 mg/gm fresh wt.). The Chlorophyll b content of leaves was higher in summer (2.76 mg/gm fresh wt.) over to winter (2.70 mg/gm fresh wt) and monsoon (2.28 mg/gm fresh wt.). The carotenoids, contents of leaves were accumulated more in summer (1.44 mg/gm fresh wt.) over that of monsoon and winter (1.17 mg/gm fresh wt.). The range of Chl.a, chl.b, and carotenoids were found to be increasing order of monsoon < winter < summer season (Table 1 and Graph 1)

Table No 1

Determination Chlorophyll of leaves of Sesbania grandiflora, Sesbania bispinosa and Sesbania cannabina

Sr. No.	Name of Plant	Season	Chlorophyll a mg/gm			Chlorophyll b mg/gm			Carotenoids mg/gm		
			1 year	2 year	mean	1 year	2 year	mean	1 year	2 year	mean
1	<i>Sesbania grandiflora</i>	Summer	2.86	2.99	2.925	2.55	2.56	2.555	1.45	1.42	1.435
		Monsoon	2.51	2.75	2.63	2.24	2.29	2.265	1.18	1.19	1.185
		Winter	2.26	2.42	2.34	2.36	2.39	2.375	1.22	1.28	1.25
2	<i>Sesbania bispinosa</i>	Summer	3.12	3.17	3.145	2.54	2.59	2.565	1.67	1.59	1.63
		Monsoon	2.93	2.69	2.81	2.24	2.31	2.275	1.25	1.28	1.265
		Winter	2.84	2.89	2.865	2.43	2.47	2.45	1.38	1.35	1.365
3	<i>Sesbania cannabina</i>	Summer	3.25	3.15	3.2	2.88	2.64	2.76	1.44	1.45	1.445
		Monsoon	2.74	2.78	2.76	2.29	2.28	2.285	1.18	1.16	1.17
		Winter	2.53	2.59	2.56	2.67	2.74	2.705	1.17	1.18	1.175

Graph No.1



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