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RESEARCH ARTICLE

ESTIMATION OF CHLOROPHYLL CONTENT IN LEAVES OF SOME MEDICINAL PLANTS OF GENUS *SESBANIA*

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ABSTRACT

The seasonal variation of chlorophyll a, chlorophyll b and carotenoid have been investigated in leaves of *Sesbania rostrata, Sesbania exaltata and Sesbania sesban* 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 (range from 2.98 to 3.36 mg/g fresh wt.), chlorophyll b (range from 2.61 to 3.08 mg/g fresh wt.) and carotenoid (range from 1.88 to 2.12 mg/g fresh wt.) content in the leaves of *Sesbania exaltata* than *Sesbania rostrata* and *Sesbania sesban* in different seasons. Comaratively lowest amount of chlorophyll a (range from 2.62 to 3.04 mg/g fresh wt.), chlorophyll b (range from 2.39 to 2.77 mg/g fresh wt.) and carotenoid (range from 1.43 to 1.82 mg/g fresh wt.) content in the leaves of *Sesbania sesban* than *Sesbania rostrata* and *Sesbania exaltata* in different 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. Th 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, 1966) 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. Traditionally plants have been well exploited by man for the treatment of human diseases.

Sesbania rostrata as an important dietary nutritive source in Southeast Asian country's. *Sesbania rostrata* are richest source of amino acid, minerals and antioxidants vitamins. This species is unique because it fixes nitrogen not only in its roots in the soil, but also in its aerial parts including stems and branches (Dutt et.al., 1983). Various parts of this plant are used in Indian traditional medicine for the treatment of diuretic, emetic, fevers, headaches, anemia, bronchitis, inflammation, leprosy, gout, rheumatism, anxiolytic, anticonvulsive and hepatoprotective (Pari and Uma, 2003). It also has anti-inflammatory, analgesic and antipyretic activity (Momin et.al. 2011). Primarily used as green manure between rice crops (Shahjalal and Topps, 2000).

Sesbania exaltata is a crop generally cultivated for its nutritive value to soil. It is cultivated in monsoon season almost throughout India and grows sandy, loamy and clay soils. It is an ideal green manure crop as it is quick-growing, succulent, and easily decomposable with low moisture requirements and produces maximum amount of organic matter and nitrogen in the soil. Seed flour is used in the treatment of ringworm, skin diseases and wounds. The mature seeds of this species are known to be cooked and eaten by the Indian tribal's (Brown, 1954).

Sesbania sesban seeds considered stimulants and astringent. Leaves considered purgative, anthelmintic and anti-inflammatory. Leaves showed a high crude protein content, 25 to 30% and are a useful source of protein for ruminant diets and a source of supplement fodder for livestock. Study of the effect of *Sesbania sesban seed* powder on female albino rats showed inhibition of ovarian function, change of uterine structure and prevention of implantation with 100 % control of fertility (Shiv Pal Singh , 1990). The aqueous extracts of leaves in STZ-induced diabetic rats showed significant increase in serum insulin and HDL level and decreases in blood

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glucose , total cholesterol and triglycerides when compared to glibenclamide (Pandhare et.al.,2011*). Sesbania sesban* was referred to as milk shrub. Farmers were encouraged to feed *Sesbania* fodder to lactating cows to enhance milk secretion (Brown, 1954).

MATERIALS AND METHODS:

The plant material of *Sesbania rostrata, Sesbania exaltata and Sesbania sesban* collected 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 663 nm. 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:

1) Chl.a (Mg/gm fresh weight) = $\frac{12.3\,D_{663} - 0.86\,D_{645}}{d \times 1000 \times W} \times V$

2) Chl.b (Mg/gm fresh weight) = $\frac{19.3\,D_{645} - 3.6\,D_{663}}{d \times 1000 \times W} \times V$

3) Carotenoids (Mg/gm fresh weight) = $\frac{7.6\,D_{480} - 1.49\,D_{510}}{d \times 1000 \times W} \times V$

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.

RESULTS AND DISCUSSION:

Sesbania rostrata:

The chlorophyll a content of leaves was raised in summer (3.20 mg/gm fresh wt.) over that of monsoon (2.72 mg/gm fresh wt) and winter (2.96 mg/gm fresh wt). The chlorophyll b content of leaves was higher in summer (2.87 mg/gm fresh wt.) over to monsoon (2.46 mg/gm fresh wt) and winter (2.62 mg/gm fresh wt.). The carotenoids, contents of leaves were accumulated more in summer (1.99 mg/gm fresh wt.) over that of monsoon (1.69 mg/gm fresh wt.) and winter (1.82 mg/gm fresh wt.). The range of Chl.a, chl.b, and carotenoids were found to be increasing order of monsoon < winter < summer seasons (Table 1).

Sesbania exaltata:

The summer leaves were rich with chlorophyll a (3.36 mg/gm fresh wt.) over that of winter (3.19 mg/gm fresh wt.) and monsoon (2.98 mg/gm fresh wt.). The chlorophyll b content of leaves was higher in summer (3.08 mg/gm fresh wt.) over to monsoon (2.61 mg/gm fresh wt.) and winter (2.84 mg/gm fresh wt.).The carotenoids, content of leaves were accumulated more in summer (2.12 mg/gm fresh wt.) over that of winter (2.01 mg/gm fresh wt.) and monsoon (1.88 mg/gm fresh wt.). The range of Chl.a, chl.b, and carotenoids were found to be increasing order of monsoon < winter < summer seasons (Table 1).

Sesbania sesban:

The summer leaves were rich with chlorophyll a (3.04 mg/gm fresh wt.) over that of monsoon (2.62 mg/gm fresh wt.)And winter (2.81 mg/gm fresh wt.). The chlorophyll b content of leaves was higher in summer (2.77 mg/gm fresh wt.) over to winter (2.56 mg/gm fresh wt) and monsoon (2.39 mg/gm fresh wt.). The carotenoids, contents of leaves were accumulated more in summer (1.82 mg/gm fresh wt.) over that of monsoon (1.43 mg/gm fresh wt.) and winter (1.67 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).

Comparative account of chlorophyll a, chlorophyll b and carotenoid content of leaves of three medicinal plants revealed that, the highest amount of chlorophyll a (range from 2.98 to 3.36 mg/g fresh wt.), chlorophyll b (range from 2.61 to 3.08 mg/g fresh wt.) and carotenoid (range from 1.88 to 2.12 mg/g fresh wt.) content in the leaves of *Sesbania exaltata in* different seasons. Comaratively lowest amount of chlorophyll a (range from 2.62 to 3.04 mg/g fresh wt.), chlorophyll b (range from 2.39 to 2.77 mg/g fresh wt.) and carotenoid (range from 1.43 to 1.82 mg/g fresh wt.) content were found in the leaves of

Sesbania sesban than *Sesbania rostrata of chlorophyll* a (range from 2.72 to 3.20 mg/g fresh wt.), chlorophyll b (range from 2.46 to 2.87 mg/g fresh wt.) and carotenoid (range from 1.69 to 1.99 mg/g fresh wt.) and *Sesbania exaltata* of chlorophyll a (range from 2.98 to 3.36 mg/g fresh wt.), chlorophyll b (range from 2.61 to 3.08 mg/g fresh wt.) and carotenoid (range from 1.88 to 2.12 mg/g fresh wt.) in different seasons

Table 1: Determination of Chlorophyll in the leaves of *Sesbania rostrata, Sesbania exaltata and Sesbania sesban*

Sr. No.	Name of the Plant	Season	Chlorophyll mg/g fresh wt.	Chlorophyll b mg/g fresh wt.	Carotenoid mg/g fresh wt.
1	*Sesbania rostrata*	Summer	3.20	2.87	1.99
		Monsoon	2.72	2.46	1.69
		Winter	2.96	2.62	1.82
2	*Sesbania exaltata*	Summer	3.36	3.08	2.12
		Monsoon	2.98	2.61	1.88
		Winter	3.19	2.84	2.01
3	*Sesbania sesban*	Summer	3.04	2.77	1.82
		Monsoon	2.62	2.39	1.43
		Winter	2.81	2.56	1.67

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