ISSN: 2279 - 0594

Available Online at www.jbpr.in

Journal of Biomedical and Pharmaceutical Research 2 (5) 2013, 27-30

RESEARCH ARTICLE

BIOCHEMICAL ANALYSIS OF LEAVES OF SOME MEDICINAL PLANTS OF MARATHWADA REGION IN MAHARASHTRA

***V.B. Kadam[1], S.S.Tambe[2], Sumia Fatima[3], U.B.Kadam[4], M.S.Wadikar[5]**

[1]P.G.Department of Botany & Research Centre, K.T.H.M. College, Nasik, India

[2]Department of Botany, Pushpatai Hire Mahila College, Malegaon, India

[3]Department of Botany, Dr.Rafiq Zakaria College for Women, Aurangabad, India

[4]P.G.Department of Botany and Research Centre, M.S.G.College, Malegaon, India

[5]Department of Botany, Vinayakrao Patil Science College, Vaijapur, Aurangabad, India

Received 20 August 2013; Revised 30 August 2013; Accepted 4 September 2013

ABSTRACT

The seasonal variation of chlorophyll a, chlorophyll b and carotenoid have been investigated in leaves of *Butea monosperma, Madhuca indica, Syzygium cumini and Mimusops elengi* 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 and comparative lower 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. Th pigments are the coloured organic compounds that have capacity to absorb certain wavelength of light and reflect to others. Chlorophyll (also chlorophyl) is a green pigment found in cyanobacteria and the chloroplasts of algae and plants. Chlorophyll is an extremely important biomolecule, critical in photosynthesis, which allows plants to absorb energy from light. Chlorophyll absorbs light most strongly in the blue portion of the electromagnetic spectrum, followed by the red portion. However, it is a poor absorber of green and near-green portions of the spectrum, hence the green color of chlorophyll-containing tissues . Chlorophyll was first isolated by Joseph Bienaimé Caventou and Pierre Joseph Pelletier in 1817. 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). Traditionally plants have been well exploited by man for the treatment of human diseases. Indian sub-continent is a rich source of plant and animal wealth, which is due to its varied geographical and agro-climatic regions. Besides its varied biodiversity, it has a diverse cultural heritage too. Though at present Indian health care delivery consists of both traditional and modem systems of medicines. These two systems of medicine use plants, minerals, metals and animals as source of drugs, plants being the major source.

Butea monosperma (Lam.) is an indispensable tree. The plant is used in Ayurvedic, Unani and Siddha medicine for various ailments. Almost all the parts of the plant namely root, leaves, fruit, stem bark, flowers, gum young branches are used as medicine, food, fibre and for other miscellaneous purposes such as fish poison, dye, fodder, utensils, etc. (Burli and Khade, 2007) . Leaves are good for the disease of the eye. Leaf is an appetizer, astringent, carminative, anthelmintic, aphrodisiac, tonic, lessens inflammation and lumbago, cures boils and piles. The bark is reported to possess antitumor and antiulcer antimicrobial properties. (Kasture, *et.al.,* 2000). Bark is acrid, bitter, appetiser, aphrodisiac, and laxative, anthelmintic, useful in fractures of the bones, diseases of the anus, dysentery, piles, hydrocele, cures ulcers and tumours (Patil et.al., 2006).

Madhuca is useful in arresting secretions or bleeding because of its tannin content. The bark of the tree is an astringent and tonic. Madhuca indica flowers are known as energy rich material and used as animal as well as human feed. Flowers are used for making local wine. The oil extracted from seeds is used in cooking, soap making and manufacture of margarine. Extract of flowers used

*Corresponding author: V.B. Kadam | Email: drvbkadam@yahoo.com

against heart diseases, leucorrhoea, menorrhagia and act as antiduretic in polyuria and antitoxin. Several therapeutic uses as cardiotonic, alexipharmic, stomachic, anthelmintic and astringent have been ascribed to the bark . The fruits are used in chronic dysentery, constipations . Barks are used to increase fertility in women and known to have antiulcer activity (Shah *et al.,* 2003).

Syzygium cumini is a medicinal plant, whose parts were pharmacologically proved to possess hypoglycemic, antibacterial, anti-HIV activity and anti-diarrhea effects. (Bhuiyan *et al.,* 1996 ; Ravi *et al.,* 2004). The leaves, stems, flowerbuds, opened blossoms, and bark has some antibiotic activity. A decoction of the bark is taken internally for dyspepsia, dysentery, and diarrhea and also serves as an enema. The leaves, steeped in alcohol, are prescribed in diabetes. The leaf juice is effective in the treatment of dysentery, either alone or in combination with the juice of mango or emblic leaves. Jambolan leaves may be helpful as poultices on skin diseases.

Mimusops elengi belongs to the family *Sapotaceae*. It is an evergreen tree, 5-8 m tall and is cultivated throughout our country as an ornamental tree. Fruits are used as astringent, coolant and anthelmintic. The tender stems are used as tooth brushes, and in cystorrhea, diarrhea and dysentery. The seeds are used in constipation (Nair and Chanda, 2007). The Saponins present also demonstrated to be antifungal against some human pathogens. Sahu, *et.al.,* (2001). Different solvent extracts of bark, fruits (fleshy portion) and leaves of *Mimusops elengi* were screened for their antibacterial and antifungal activities against some pathogenic bacteria and fungi. (Abbas Ali 2008).

MATERIALS AND METHODS:

The plant material of *Butea monosperma, Madhuca indica, Syzygium cumini and Mimusops elengi* from different parts of Marathwada region during different season's viz. summer, monsoon and winter continuous for two years. .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:

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.

RESULT AND DISCUSSION:

***Butea monosperma*:**

The chlorophyll a content of leaves was raised in summer (2.08 mg/gm fresh wt.) over that of monsoon (1.77 mg/gm fresh wt.) and winter (1.825mg/gm fresh wt.). The Chlorophyll b content of leaves was higher in summer (1.64 mg/gm fresh wt.) over to monsoon (1.28 mg/gm fresh wt.) and winter (1.44 mg/gm fresh wt.). The carotenoids, contents of leaves were accumulated more in summer (1.36 mg/gm fresh wt.) over that of monsoon (1.085 mg/gm fresh wt.) and winter (1.265 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).

***Madhuca indica*:**

The summer leaves were rich with chlorophyll a (3.1 mg/gm fresh wt.) over that of winter (2.52 mg/gm fresh wt.) and monsoon (2.585 mg/gm fresh wt.). The Chlorophyll b content of leaves was higher in summer (1.775 mg/gm fresh wt.) over to monsoon (1.225 mg/gm

fresh wt) and winter (1.71 mg/gm fresh wt.). The carotenoids, contents of leaves were accumulated more in summer (1.47mg/gm fresh wt.) over that of monsoon (1.06 mg/gm fresh wt.) and winter (1.185mg/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).

***Syzygium cumini*:**

The summer leaves were rich with chlorophyll a (2.075 mg/gm fresh wt.) over that of winter (2.005 mg/gm fresh wt.) and monsoon (2.17mg/gm fresh wt.). The Chlorophyll b content of leaves was higher in summer (1.535mg/gm fresh wt.) over to monsoon (1.25 mg/gm fresh wt) and winter (1.33 mg/gm fresh wt.). The carotenoids, contents of leaves were accumulated more in summer (1.1mg/gm fresh wt.) over that of monsoon (1.06 mg/gm fresh wt.) and winter (1.07 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 1: Determination of Chlorophyll of leaves of *Butea monosperma, Madhuca indica, Syzygium cumini and Mimusops elengi*

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	*Butea monosperma*	Summer	2.09	2.07	2.08	1.69	1.59	1.64	1.38	1.34	1.36
		Monsoon	1.76	1.78	1.77	1.26	1.3	1.28	1.09	1.08	1.085
		Winter	1.87	1.78	1.825	1.43	1.45	1.44	1.28	1.25	1.265
2	*Madhuca indica*	Summer	3.05	3.15	3.1	1.86	1.69	1.775	1.49	1.45	1.47
		Monsoon	2.54	2.48	2.51	1.27	1.18	1.225	1.09	1.03	1.06
		Winter	2.62	2.55	2.585	1.78	1.64	1.71	1.12	1.25	1.185
3	*Syzygium cumini*	Summer	2.06	2.09	2.075	1.51	1.56	1.535	1.12	1.08	1.1
		Monsoon	2.01	2	2.005	1.24	1.26	1.25	1.08	1.04	1.06
		Winter	2.16	2	2.17	1.32	1.34	1.33	1.06	1.08	1.07
4	*Mimusops elengi*	Summer	2.56	2.42	2.49	2.1	2.14	2.12	1.42	1.15	1.285
		Monsoon	2.06	2.08	2.07	1.54	1.53	1.535	1.12	1.1	1.11
		Winter	2.19	2.16	2.175	1.78	1.69	1.735	1.35	1.45	1.4

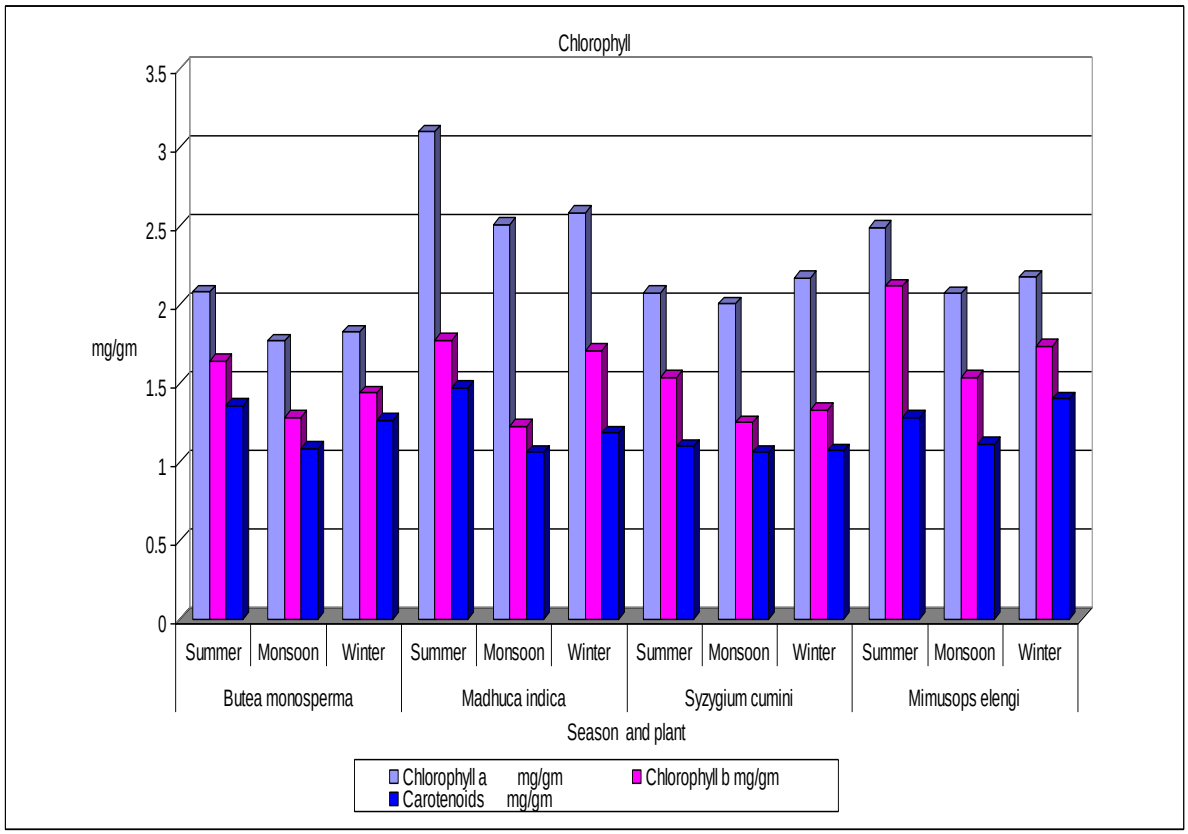

Figure 1:

1. Abbas Ali, Abdul Mozid, Mst. Sarmina Yeasmin, Astaq Mohal Khan and Abu Sayeed (2008): An Evaluation of Antimicrobial Activities of *Mimusops elengi* Linn. *Research Journal of Agriculture and Biological Sciences*, 4(6): 871-874 .
2. Anonymous, 1986: The Useful Plants of India. CSIR, New Delhi, India. Anonymous. (1985): Pharmacopoeia of India. Government of India, New Delhi, Ministry of Health and family welfare
3. Bhuiyan, M.A., M.Y. Mia and M.A. Rashid, 1996. Antibacterial principles of the seed of Eugenia jambolana, Banga J. Botany, 25: 239-241.
4. Duxbury, A.C. and Yentach, C.S.1956: Plankton pigment monograph.J.Marine Res., 15: 190-191
5. Kasture,V.S., Deshmukh,V.K. and Chopade,C.T.(2002): Anticonvulsive activity of *Butea monosperma* flowers in laboratory animals. *Pharmacol.Behav*., 72: 965 -72.
6. Maclachalam, S and Zalik, S. 1963: plastid structure, chlorophyll concentration and free amino acid composition of a chlorophyll mutant of barely. Can J.Bot. 41: 1053-1062.
7. Nair, R. and S.V. Chanda (2007) : Antibacterial activities of some medicinal plants of the western region of India. *Turkish Journal of Biology*, 31: 231-236.
8. Patil, M.V., S. Pawar and D.A. Patil. Ethnobotany of *Butea monosperma* (Lam.) Kuntze 2006: in North Maharashtra, India. Nat. Prod. Rad. 5(4): 323-25.
9. Sahu, N.P., N.B. Mandal, S. Banerjee and K.A.I Siddiqui, 2001: Chemistry and biology of the triterpenes and saponins from seeds of *Mimusops elengi*. Journal of Herbs, Spices and Medicinal Plants, 8: 29-38.
10. Shah, P.J., Gandhi, M.S., Shah, M.B., Goswami, S.S. and Santani, D. 2003, Study of Mimusops elengi bark in experimental gastric ulcers. Journal of Ethnopharmacol 89:305-311.

