



## Seasonal Variation of Chlorophyll Content in the Leaves of Some Medicinal Plants in Nashik

## KEYWORDS

Chlorophyll pigments, medicinal plants

## Shinde H.P

Department of Botany, K.V.N. Naik College, Nashik.

## Goswami D.B.

Department of Zoology, K.V.N. Naik College, Nashik.

## Ahire P.P.

P. G. Department of Botany & Research Centre, K.T.H.M. College, Nashik.

**ABSTRACT** Chlorophyll pigments play an important role in photosynthesis. Chlorophylls are also used in medicine, colouring for waxes, candles, resins, soaps tooth pastes and oil preparations (Sivarjan and Indira Balchandran 1994; Kadam et al, 1996, Kadam, 2000). Attempts were made to investigate the occurrence and seasonal variations in chlorophyll content in leaves during various seasons in some medicinally important taxa of Nashik region. The amount of chlorophyll a, chlorophyll b, and total chlorophyll were calculated in terms of mg pigment/gm of fresh leaves (Duxbury and Yetsch, 1956, Macalachan and Zhalik, 1963).

## INTRODUCTION

The chlorophyll is essential component for photosynthesis and occur in all photosynthetic plant tissue. Chlorophyll is structural & functional unit of photosynthesis (Sivarjan and Indira Balchandran 1994; P.P.Ahire, 2006). Several kinds of pigments have been discovered in plants. Chlorophyll-a, chlorophyll-b are the green pigments. Carotenoids and xanthophylls are the orange and yellow pigments respectively.

The leaves of following plants have been investigated to study the seasonal variation of chlorophyll-a, chlorophyll-b, and total chlorophyll.

1. Eucalyptus globules (family Myrtaceae): It is indigenous to Australia and Tasmania. Eucalyptus oil is mainly used as antiseptic and expectorant. It is ingredient of several ointments and used to relieve cough, chronic bronchitis etc.
2. Santalum album Linn. (Family Santalaceae): It is an evergreen tree of 10-12 meters height and widely distributed in India, Malaysia. Sandalwood oil is commonly used in perfumery, cosmetics and is having therapeutic properties.
3. Rauwolfia serpentina Benth. (Family Apocynaceae): Rauwolfia roots contain several important alkaloids like Reserpine having great clinical importance. It is used to treat hypertension, blood pressure etc.
4. Adhatoda vasica Linn. (Family Acanthaceae): It is indigenous to India, commonly found in Maharashtra, Konkan and sub Himalayan region. The leaves, roots possess active principles having pharmacological properties and are used in cough, chronic bronchitis, asthma etc.
5. Withania somnifera Linn. (Family Solanaceae): The plant is restricted to sub tropical parts of India having great therapeutic properties. It is sedative and traditionally used in the treatment of rheumatism, gout, hypertension, skin diseases etc.
6. Centella asiatica Linn. (Family Umbelliferae): It is a creeping plant widely distributed in Asia. It shows spasmolytic, sedative and several other therapeutic properties.

## MATERIALS AND METHODS

The leaves of some medicinally important taxa under investigation were collected from Nashik region during summer (April), monsoon (August) and winter (December) seasons for one year (2012).

The pigments were extracted using 80% acetone from freshly plucked third leaf from the top. The absorbance of the chlorophyll extract was determined by using Spectrophotometric techniques. The standard spectrophotometer was used to record the absorbance for each chlorophyll pigment separately at 663nm and 645nm.

The amount of chlorophyll-a, chlorophyll-b and total chlorophyll were calculated in terms of mg pigment/gm of fresh leaves. (Duxbury and Yetsch; 1956, Macalachan and Zalik, 1963).

Chlorophyll-a =  $12.7 (\text{Absorbance at } 663 \text{ nm}) - 2.69 (\text{Absorbance at } 645 \text{ nm}) \times V/1000 \times W$

Chlorophyll-b =  $22.7 (\text{Absorbance at } 645 \text{ nm}) - 4.68 (\text{Absorbance at } 663 \text{ nm}) \times V/1000 \times W$

Total chlorophyll =  $20.2 (\text{Absorbance at } 645 \text{ nm}) + 8.02 (\text{Absorbance at } 663 \text{ nm}) \times V/1000 \times W$

Where,

V= Volume of the total chlorophyll extract.

W= gm weight of fresh leaves.

## RESULTS AND DISCUSSION

In the present study attempts have been made to investigate the occurrence and seasonal variation of chlorophyll content in the leaves of some medicinally important taxa from Nashik region.

The comparative account of chlorophyll content revealed the seasonal variations during summer, monsoon and winter seasons.

During summer, the highest amount of chlorophyll-a and chlorophyll-b were found in the leaves of Santalum album. (0.213 mg/gm weight of fresh leaves and 0.189 mg/gm

weight of fresh leaves respectively).

The lowest amount of chlorophyll-a and chlorophyll-b were found in the leaves of *Centella asiatica* (0.044 mg/gm weight of fresh leaves in monsoon) and *Rauwolfia serpentina* (0.002 mg/gm weight of fresh leaves in winter) respectively.

The lowest amount of total chlorophyll was found in the leaves of *Withania somnifera* (0.064 mg/gm weight of fresh leaves).

The total chlorophyll content of the leaves of *Santalum album* (0.405 mg/gm weight of fresh leaves) and *Rauwolfia serpentina* (0.219 mg/gm weight of fresh leaves) are found raised during summer than that of the monsoon and winter seasons.

**TABLE 1. Chlorophyll content in the leaves of some medicinal taxa of Nasik region.**

Plants	Season	Chlorophyll-a	Chlorophyll-b	Total chlorophyll
		(mg/gm of fresh weight)		
<i>Eucalyptus globulus</i>	Summer	0.203	0.154	0.36
	Monsoon	0.055	0.52	0.109
	Winter	0.062	0.060	0.123
<i>Rauwolfia serpentina</i>	Summer	0.189	0.029	0.36
	Monsoon	0.054	0.012	0.067
	Winter	0.076	0.002	0.076
<i>Santalum album</i>	Summer	0.213	0.189	0.405
	Monsoon	0.053	0.036	0.090
	Winter	0.123	0.027	0.151
<i>Withania somnifera</i>	Summer	0.185	0.103	0.291
	Monsoon	0.045	0.018	0.064
	Winter	0.052	0.025	0.077
<i>Adathoda vasica</i>	Summer	0.101	0.099	0.202
	Monsoon	0.047	0.037	0.085
	Winter	0.058	0.054	0.113
<i>Centella asiatica</i>	Summer	0.183	0.073	0.258
	Monsoon	0.044	0.026	0.071
	Winter	0.054	0.049	0.101

## REFERENCE

- Duxbury, A.C. and Yetsch, C.S.(1995) *Journal of marine Res.*15:190. | 2. Kadam, V.B., Krishnamoorthy, R and Parabia, M.H. (1996) *Journal of Environmental Biology* 5:122. | 3. Kadam, V.B. (2000) *Journal of advanced Science and Technology* 97:101. | 4. Kadam, V.B., Ahire P.P. (2006) *Bioinfolet* 3(4): 336-337. | 5. Maclachalam, S. and Zalik, S. (1963) *Can. J. Bot.*41:1053. | 6. Sivrajan, S., Indira Balchandran (1994) "Ayurvedic drugs and their plant sources" Oxford and IBH publishing Co. Pvt. Ltd., New Delhi. | 7. Kadam V.B et al, *International journal of current trends in pharmaceutical research (IJCTPR)* 2014, Vol.2 (5): 634-637. |