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PHYSIOLOGICAL STATUS OF MEDICINALY IMPORTANT EPIPHYTIC FERNS FROM MAHABALESHWAR AND PANCHGANI

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ABSTRACT: *The measurement of photosynthetic pigment can provide basic information on the physiological status of plants the quantification of chlorophyll provides important information about the effects of environments on plant growth. In the present study total chlorophyll and carotene content of Asplenium decurrence, Lepisorus nudus and Microsorum membranecium epiphytic ferns have been recorded. The quantitative analysis of chlorophyll, carotene content between vegetative and reproductive leaves shows significant differences between the two stages. In this three fern showed total chlorophyll content was higher in reproductive stage than vegetative stage except Microsorum membranecium. In all three species carotene content was higher in reproductive stage than vegetative stage .The changes in chlorophyll and carotene content in the different species may be due to different microclimatic conditions in study area and related to the medicinal values which play important role in plant physiology.*

Keywords: *Epiphytic Ferns, Photosynthetic pigments, Medicinal value*

INTRODUCTION:

Photosynthesis is one of the most important biochemical processes for plant which convert light energy into stored chemical energy in the form of ATP and NADPH.Chlorophyll is important pigment for physiological process in plants (Richardson et al., 2002, Giletelson 2003). The quantificationofchlorophyll provides important information about the effects of environments on plant growth (Schlemmer et al., 2005) Most pteridophytes live in moist and shady environments (Aldasoro et al., 2004 Karstetd 2005).The measurement of photosynthetic pigment can provide basic information on the physiological status of plants.Chlorophyll is an antioxidant compounds which are present and stored in the chloroplast of green leaf plants and mainly it is present in the green area of the leaves, stem, flowers, and roots (Mirza et al., 2013 Srichaikal et al., 2011). The chlorophyll content has medicinal values and also play important role in plant physiology and it can be as nutrition in decline blood sugar condition, digestion, excretion and decreasing allergens (Srichaikal et al., 2011 Singh et al., 2011). The next photosynthetic pigment is carotenoids which are 40 carbon molecules formed by joining 8-c5 isopropane units and can be classified as carotenes, hydrocarbons or xanthophyll. Carotenoides shows extensive conjugated double bonds, making them susceptible to oxidation and free radical reactions (Britton G. et al., 1993).The present study was aimed to reveal the estimation of photosynthetic pigmentprofile and chl.a/b ratio of *Aspleniumdecurrence, Lepisorusnudus, Microsorummembranecium.*

MATERIAL AND METHODS:

The healthy leaves of plant material were collected from different areas of Mahabaleshwar and Panchgani hill region.The chlorophyll were estimated by Arnon (1949) method. One gm of leaf was cut and mixed with clean mortle and pestle. The material were grined gently with addition of 20 ml of 80 %acetone and 0.5gm of MgCo3 powder .Then sample was centrifuged at 5000 rpm for 5 min. and supernatant was transfered to 100 ml volumetric flask.The final volume was made up to 100 ml with addition of 80 % acetone. Then read the absorbance of solution by spectrophotometer using 645 and 663 nm wavelength. Acetone (80%) was used as blank.chlorophyll were calculated by using the formula

Chlorophyll a= 12.7*A663-2.69*A645=X
Chlorophyll b = 22.9*A645-4.68*A663=Y
Total (a+b)= 8.02*A663+20.2*A645=Z
Total chlorophyll=X or Y or Z *Volume of extract /1000*Weight of plant material*100

Carotenoides were estimated by Kirk and Allen (1965) by using the same extract prepared for estimation of chlorophylls. The absorbance was read at 480 nm using spectrophotometer Total carotenoids were calculated by using the formula of Jenson and Jenson (1951).C=D*V*F*10/2500

Where C= total carotenoids in mg g -1 fresh material D=optical density V =total volume in ml
F= dilution factor and 2500= average extinction.

Table no. 1: (Chl. a, chl. b, Total chlorophyll)

Sr. No	Plant name	Chl.a (Veg.stage)	Chl.b (Veg.stage)	Total chl.content (Veg.stage)	Chl.A (Rep.stage)	Chl b. (Rep.stage)	Total chl.content (Rep. stage)
1)	*Asplenium decurrence*	99.06±0.75	80.3±1.7	178.8±0.5	103±1.1	110.6 ± 2	213 ± 1
2)	*Lepisorus nudus*	79.2 ± 1.4	67.03 ± o.5	146 ± 2	79.2 ± 1.4	78.5 ± 2.6	173.3 ± 1.8
3)	*Microsorum membranecium*	93.9 ± 0.7	61.8 ± 0.9	155.3 ± 1.5	83.6 ± 0.7	59.8 ± 0.9	142.6 ± 1.5

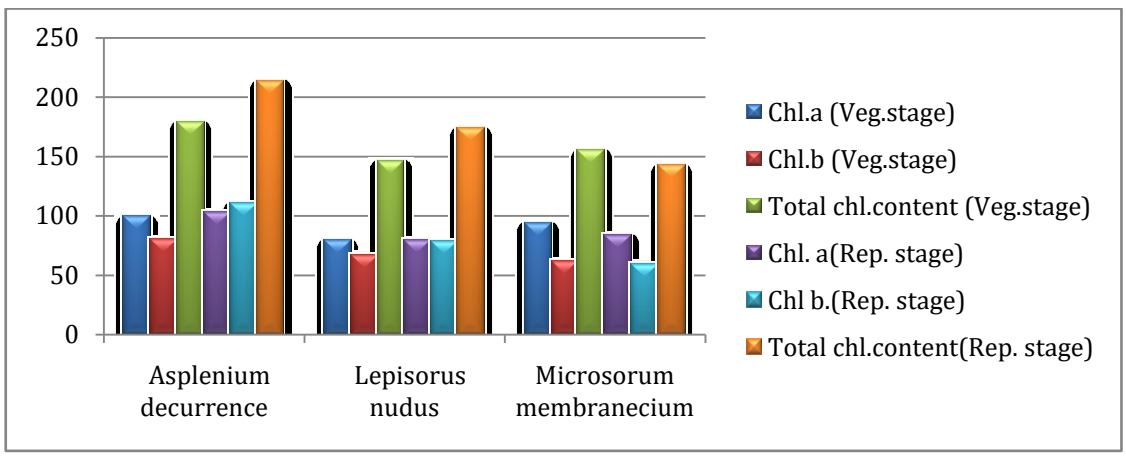
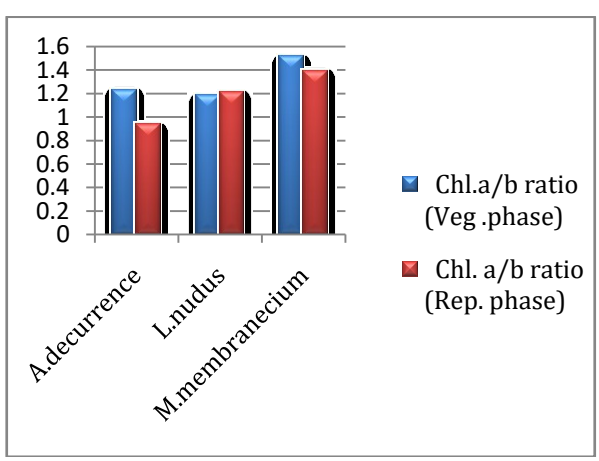
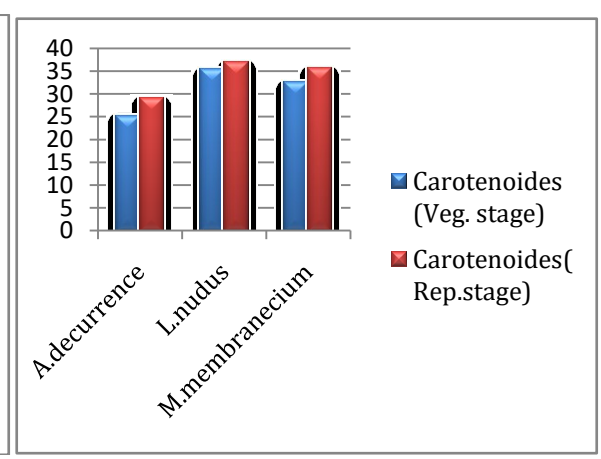


Table 2 : a/b ratio of chlorophyll and Carotenoides

Sr. No	Plant Name	Chl.a/b ratio (Veg .phase)	a/b ratio (Rep. phase)	Carotenoides (Veg. stage)	Carotenoides (Rep.stage)
1.	*Asplenium decurrence*	1.23	0.93	25.24±0.70	28.92±0.84
2.	*Lepisorus nudus*	1.18	1.21	35.44±0.55	37±0.46
3.	*Microsorum membranecium*	1.51	1.39	32.49±0.96	35.61±0.41





RESULT AND DISCUSSION:

In present investigation the values of chl.a, chl.b, total chlorophyll andcarotene contents in the vegetative and reproductive fronds of ferns species are recorded. It is clear from fig 1 the amount of total chlorophyllare higher in the leaves of reproductive stages than vegetative stage. except *Microsorum membranecium.* The higher amount of chl. a and chl. b was found in the leaves of both vegetative and reproductive stages of *Asplenium decurrence.*Vyas and Sharma (1988) who showed that more amount of chl.a than chl. b in *Marsilea aegyptica, Cyclosorus dentatus, Pteris vittata,Tectariacoadunate, Adiantum*

incisum, A.capillusveneris, .Rathorand Sharma(1991) and Sharma et al.,(1995) found the higher contents of chl.a than chl. b in *Isoetes* species. Shakil and Dongare (2008) observed that variation in chlorophyll content may be due to differences in environmental factors like altitude, rainfall, temperature, light intensity and humidity.

In present study showed the highest amount of carotenoids are found in leaves of both vegetative and reproductive stages of *Lepisorus nudus*.Krinsky,(1966) evaluated that during stress conditionthe carotenoids shows sufficient degradation He further indicated that the carotenoids protect the plants from photosynthesized oxidation and chlorophyll degradation .Bohra et al.,(1979) demonstrated that the species of ferns possessing higher carotenoids show less chlorophyll degradation .Kale (2008) showed higher amount of carotenoide contents in the leaves of vegetative phase than reproductive phase. Shakil (2010) recorded higher level of carotenoids in reproductive stage of A. Philippines during winter and summer season. The lower concentrations of carotenoids may be assign to higher concentrations of total chlorophylls evidently low degradation of chlorophylls. In the present investigations, in reproductive stage contain higher amount of carotenoids than the vegetative stage of all the investigated species. Differentiation of carotenoids from specs to species found to be independent of ecological and morphological conditions of plants. The chlorophyll a/b ratio shows lowest values in the leaves of reproductive stage of *Asplenium decurrence* and highest in vegetative stage of *Microsorum membranecium.*The increase in chlorophyll a/b ratio can be assigned to more reduction of chlorophyll -a than chlorophyll –b.The lower values of chlorophyll a/b ratio in the leaves of reproductive stage of *Microsorum membranecium* can be assigned to more reduction of chlorophyll -b content.

CONCLUSION:

The present investigation that in two different species of fern shows chl.a chl.b and total chlorophyll are more in reproductive stage than vegetative stage The variation of content is due to difference in environmental factors. One species shows amount of photosynthetic pigment are higher in vegetative stage than reproductive stage. In this case decrease the level of photosynthetic pigment in reproductive stage due to sporangium formation which creates stress.

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