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Estimation of chlorophyll content in young and adult leaves of some selected plants in polluted areas

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ABSTRACT

*In the present study chlorophyll, a (Chl. a) and b (Chl. b) content of ten different plants have been recorded. The qualitative difference of chlorophyll a (Chl.a) and b (Chl.b) content between young and adult leaves were observed. A total of ten plant species were selected namely Mango (*Magnifera indica* L.), Hibiscus (*Hibiscus rosa-sinensis* L.), Neem (*Azadiracta indica* Juss), Ashoka (*Polyalthia longifolia* (sonner) Thw, Enum), Ficus (*Ficus benghalensis* L.) and *Nerium indicum* Mill. *Gard Datura stramonium* L, *Acacia nilotica* (L) Willd .ex *Del.ssp.indica* (Benth) Brenan. And *Bogainvillea spectabilis* Willd, *Ficus religiosa* L. were used for analysis of chlorophyll content. In all the cases the adult leaves showed higher chlorophyll content in comparison to young leaves. This has been proved that the age of leaves was an important factor for chlorophyll content.*

Keywords — Young and Adult leaves, Chlorophyll a and b

1. INTRODUCTION

Leaf chlorophyll concentration is an important parameter that is regularly measured as an indicator of chloroplast content, photosynthetic mechanism and of plant metabolism. Chlorophyll is an antioxidant compound which is present and stored in the chloroplast of green leaf plants and mainly it is present in the green area of leaves, stems, flowers and roots (Mirza et al., 2013; Srichaikul et al., 2011). However the chlorophyll production is mainly depended on the penetration of sunlight and it is the main source of energy for the plant (Srichaikul et al., 2011). In the laboratory, it is commonly determined by using pestle and mortar to extract the pigments using an organic solvent such as acetone or dimethylformamide (Arnon 1949; Porra et al., 1989; Ling et al., 2011). Chlorophyll a and Chlorophyll b are essential pigments of the plant photosystems (Richardson et al., 2002). Moreover, chlorophyll A is the primary photosynthetic pigment in plants which helps to produce energy in the plant (Srichaikul et al., 2011). However the chlorophyll A concentration is 2-3 times higher than that of secondary chlorophyll b in plants (Srichaikul et al., 2011). To obtain a ratio of chlorophyll a and b, the readings should be taken at the wavelength of 650 nm, which was in between the absorption maxima of both (Arnon 1949; Porra et al., 1989; Devmalkar et al., 2014). Green plants have different characters because of the presence of various pigments like chlorophyll, carotenoid, other pigments and water content which together constitute the spectral characters of a plant body (Philip and Shirly, 1978; Jan-Chang Chen and Chaur-Tzuhn Chen, 2006). However, the chlorophyll content has medicinal qualities. The chlorophyll is also played important role in plant physiology and it can act as nutrition in decline blood sugar conditions, detoxification, digestion, excretion and decreasing allergens (Srichaikul et al., 2011, Singh et al., 2011). However, in using a modern technique like satellite remote sensing technology being used for analysis of leaf chlorophyll concentration can also be measured. Variation in leaf chlorophyll content can provide information about the physiological condition of a leaf or plant. Destructive methods of leaf chlorophyll content quantification include a traditional method using extraction and spectrophotometric or HPLC measurement, but they are considered time-consuming and expensive. Biochemical components (green pigment and nutrient) of forest canopies are among the essential parameters that control physiological processes (Gamonand Quio, 1999; Chen et al., 2006). Present paper records the chlorophyll content of different plant leaves. Difference between chlorophyll content in young and adult leaves of the same plant species was studied. It is essential to do this kind of study to know the photosynthetic activity of physiological changes of young and adult leaves of plants. This work was an experimental study and objective of the study was to analyze chlorophyll a and b content in a young and adult leaf of selected plants. However, the chlorophyll is very important macromolecule which indicates the performance of photosynthesis and energy utilization rate. Also, it gives us energy in the form of food or plant material.

Chlorophyll bears antioxidant properties which can be used in medicinal drug discovery. In the article, it has explicitly been explained the chlorophyll content in young and adult leaves and its interaction with other macromolecules.

1.1 Principles

Chlorophyll is the principle photoreceptor in photosynthesis the light-driven process by which carbon dioxide is fixed to yield carbohydrates and oxygen. When plants are exposed to environmental pollution above the normal physiologically acceptable range, photosynthesis gets inactivated.

1.2 Aim and objective

Estimation of Chlorophyll Content in Young and Adult Leaves of Some Selected Plants in polluted areas.

2. MATERIALS AND METHOD

2.1 Study area

The present study was carried out at M.I. D. C. which is located in the Nagar Tahasil of Ahmednagar district, Maharashtra during the month of August 2018. A total of ten different plant species were selected at random from different parts of the study area. Sampling was done for once only. Both the young and adult leaves from the same sample plant were collected and subjected to standard chemical procedures for the determination of chlorophyll content.

2.2 Requirement

- **Chemicals:** 80% acetone
- **Equipment's and Glassware:** Mortar and pestle, spectrophotometer, measuring cylinder, conical flask.
- **Plant material:** Ten selected plants young and adult Fresh green leaves from the non-polluted area.

2.3 Chlorophyll analysis

- Weight 1 gm. of given plant materials leaves polluted and crush them in 80% acetone with the help of mortar and pestle.
- Centrifugal the mixture at 5000 rpm for 5 minutes
- Collect the supernatant in a separate volumetric flask and remaining residue are again crush in 20 ml 80% acetone
- Centrifugal the mixture at 5000 rpm for 5 minutes
- Collect supernatant in a separate volumetric flask and remaining residue are again crush until the supernatant become 50ml.
- If the supernatant is 25 ml add 25 ml of the 80% acetone to become sample 50ml.
- By using 80% acetone as a blank solution measure the absorbance at 645,652,663 nm.
- Calculate the total amount of chlorophyll and total chlorophyll.
- Repeat this above procedure for polluted leaves. Of selected ten plants young and adult leaf.

2.4 Formula

$$\text{Chl a} = 11.75 \times A_{662.6} - 2.35 \times A_{645.6}$$

$$\text{Chl b} = 18.61 \times A_{645.6} - 3.96 \times A_{662.6}$$

Where Ca and Cb are the chlorophyll a and chlorophyll b, A is absorbance.

3. RESULT AND DISCUSSION

Table 1: Result of college area young leaf and adult leaf

Plant Name	Common name	Chlorophyll a Young leaf	chlorophyll b Young leaf	Total chlorophyll = a+b Young leaf	Chlorophyll a Adult leaf	chlorophyll b Adult leaf	Total chlorophyll=a+b Adult leaf
<i>Azadirachta indica</i> Juss (<i>Averrhaceae</i>)	Neem	7.0876	10.9878	18.0754	7.1393	9.2848	16.4241
<i>Hibiscus rosa-sinensis</i> L.(<i>Malvaceae</i>)	Jaswand	3.0268	4.676	7.7028	4.7047	7.266	11.970
<i>Polyalthia longifolia</i> (sonner) Thw, Enum (<i>Annonaceae</i>)	Ashoka	1.4405	2.2323	3.6728	8.4083	12.9895	21.397
<i>Ficus benghalensis</i> L.(<i>Moraceae</i>)	Vad	2.789	2.789	7.092	3.2500	5.0209	8.2709
<i>Ficus religiosa</i> L. (<i>Moraceae</i>)	Pimple	3.1208	4.8185	7.9393	10.998	17.0488	28.046
<i>Datura stramonium</i> L (<i>Solanaceae</i>)	Dhotra	9.8136	15.1708	24.984	14.694	22.7829	37.476
<i>Nerium indicum</i> Mill.Gard.(<i>Apocynaceae</i>)	Kanher	3.2970	5.0609	8.3578	4.0373	6.2332	10.2696
<i>Mangifera indica</i> L.(<i>Anacardiacaceae</i>)	Mango	0.3196	0.5790	0.8986	2.1197	3.2708	5.3905
<i>Acacia nilotica</i> (L) Willd.ex <i>Del.ssp.indica</i> (Benth) Brenan(<i>Mimosaceae</i>)	Babhul	4.650	7.1728	11.822	14.72	22.8221	37.5721
<i>Bougainvillea spectabilis</i> Willd(<i>Nyctaginaceae</i>)	Bougainvillea	8.4741	13.2901	21.764	12.661	19.5990	32.26

Table 2: Result of comparison of college area young leaf and Adult leaf

Plant Name	Common name	Total chlorophyll = a+b Young leaf	Total chlorophyll=a+b Adult leaf
<i>Azadirachta indica</i> Juss	Neem	18.0754	16.4241
<i>Hibiscus rosa-sinensis</i> L.	Jaswand	7.7028	11.970
<i>Polyalthia longifolia</i> (sooner)Thw, Enum	Ashoka	3.6728	21.397
<i>Ficus benghalensis</i> L.	Vad	7.092	8.2709
<i>Ficus religiosa</i> L.	Pimple	7.9393	28.046

Dhatura stramonium L	Dhotra	24.984	37.476
Nerium indicum Mill.Gard.	Kanher	8.3578	10.2696
Mangifera indica L.	Mango	0.8986	5.3905
Acacia nilotica(L)Willd.ex Del.ssp.indica (Benth)Brenan	Babhul	11.822	37.5721
Bougainvillea spectabilis Willd	Bougainvillea	21.764	32.26

Table 3: Result MIDC- Aurangabad road area young leaf and adult leaf

Plant_Name	Common name	Chlorophyll a Young leaf	Chlorophyll b Young leaf	Total chlorophyll = a+b Young leaf	Chlorophyll a Adult leaf	Chlorophyll b Adult leaf	Total chlorophyll = a+b Adult leaf
<i>Azadiracta indica</i>	Neem	5.9431	9.1842	15.1273	13.674	19.486	33.145
<i>Hibiscus rosa sinensis</i>	Jaswand	4.3733	6.7405	11.138	6.5964	4.2448	10.8412
<i>Polyanthis longifolia</i>	Ashoka	5.6329	8.7067	14.3396	8.4952	13.1444	21.6394
<i>Ficus benghalensis</i>	Vad	7.6304	11.791	19.421	7.1017	10.980	18.081
<i>Ficus religiosa</i>	Pimple	2.6038	4.0342	6.638	6.0183	9.2907	15.309
<i>Datura stramonium</i>	Dhotra	11.1554	17.2523	28.4407	11.832	18.3071	30.1391
<i>Nerium oleander</i>	Kaner	2.6766	4.1236	6.8002	8.3425	12.8751	21.2176
<i>Mangifera indica</i>	Mango	1.9951	3.0835	5.0786	8.8571	13.7027	22.5495
<i>Accacia milotica</i>	Babhul	4.7070	7.2557	11.962	21.768	33.905	55.673
<i>Boganvelia spectabilis</i>	Boganvelia	10.285	15.8906	26.175	19.4634	14.6141	24.077

Table 4: Result comparison of MIDC- Aurangabad road area young leaf and Adult leaf

Plant Name	Common name	Total chlorophyll = a+b Young leaf	Total chlorophyll = a+b Adult leaf
Azadiracta indica	Neem	15.1273	33.145
Hibiscus rosa sinensis	Jaswand	11.138	10.8412
Polyanthis longifolia	Ashoka	14.3396	21.6394
Ficus benghalensis	Vad	19.421	18.081
Ficus religiosa	Pimple	6.638	15.309
Datura stramonium	Dhotra	28.4407	30.1391
Nerium oleander	Kaner	6.8002	21.2176
Mangifera indica	Mango	5.0786	22.5495
Accacia milotica	Babhul	11.962	55.673
Boganvelia spectabilis	Boganvelia	26.175	24.077

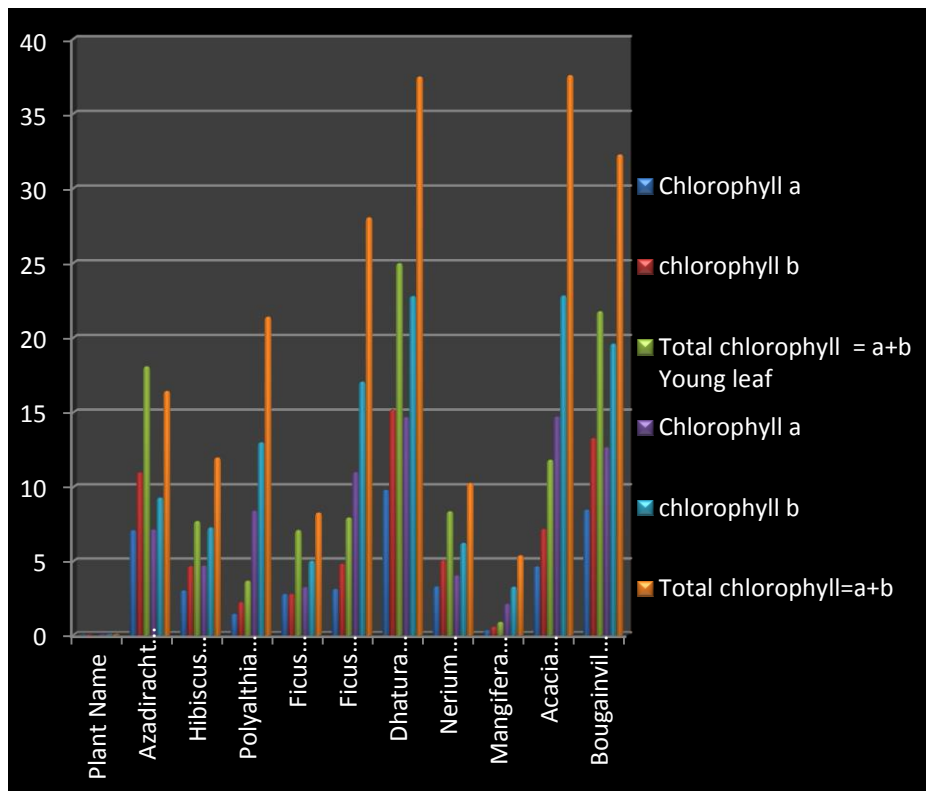


Fig. 1: Result of college area young leaf and adult leaf

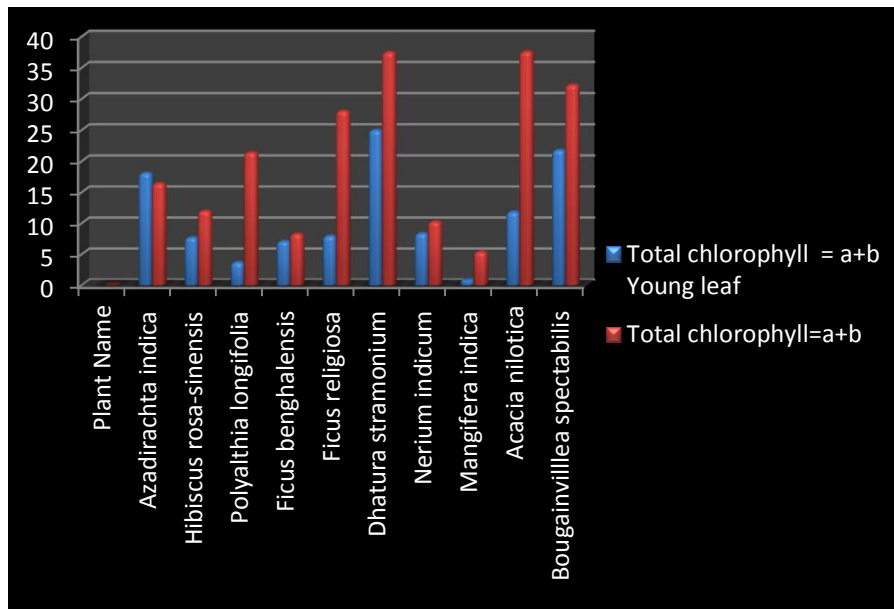


Fig. 2: Result of comparison of college area young leaf and adult leaf

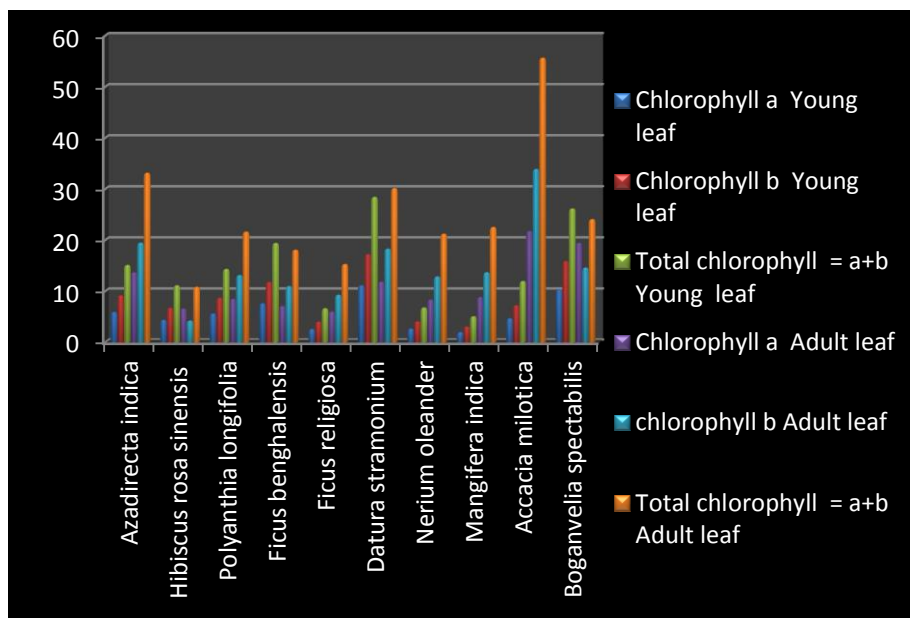


Fig. 3: Result MIDC- Aurangabad area young leaf and adult leaf

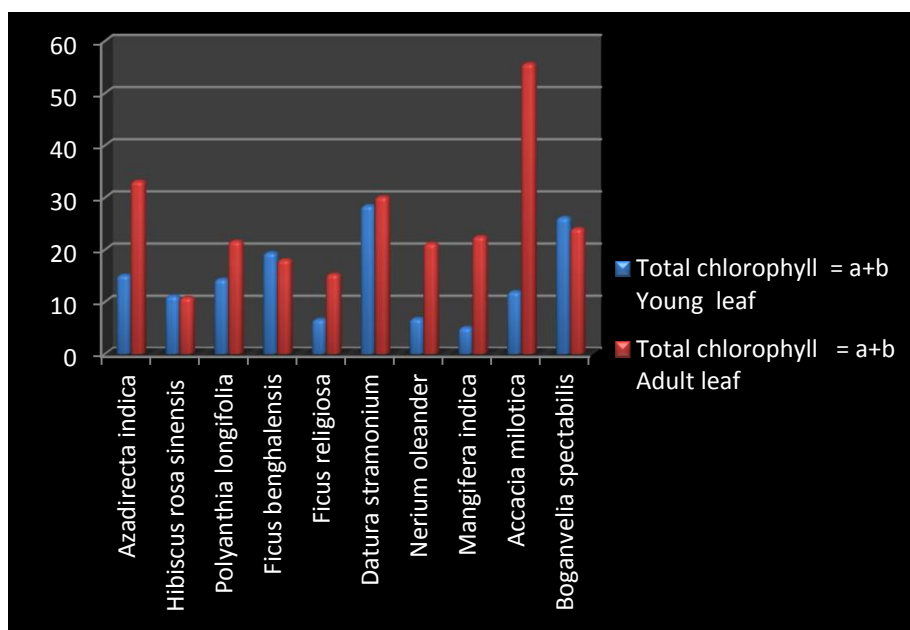


Fig. 4: Result comparison of MIDC- Aurangabad area young leaf and adult leaf

3.1 College area Young leaf and Adult leaf (figure 1)

3.1.1 Young Leaf Chlorophyll-a

The highest chlorophyll -a content in young leaves of *Dhatura stramonium L* (*Solanaceae*) is 9.8136, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 8.4741, *Azadirachta indica Juss* (*Meliaceae*) is 7.0876, *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 4.650, *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 3.2970, *Ficus religiosa L.* (*Moraceae*) is 3.1208, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 3.0268, *Ficus benghalensis L.*(*Moraceae*) is 2.789, *Polyalthia longifolia (sonner) Thw, Enun*(*Annonaceae*) is 1.4405, *LMangifera indica L.*(*Anacardicaceae*) is 0.3196.

3.1.2 College area Young Leaf Chlorophyll -b

The highest chlorophyll -b content in young leaves of *Dhatura stramonium L* (*Solanaceae*) is 15.1708, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 13.2901, *Azadirachta indica Juss* (*Meliaceae*) is 10.9878, *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 7.1728, *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 5.0609, *Ficus religiosa L.* (*Moraceae*) is 4.8185, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 4.676, *Ficus benghalensis L.*(*Moraceae*) is 2.789, *Polyalthia longifolia sonner) Thw, Enun*(*Annonaceae*) is 2.2323, *LMangifera indica L.*(*Anacardicaceae*) is 0.5790.

3.1.3 College area Total chlorophyll young Leaves (chlorophyll a+b)

Dhatura stramonium L (*Solanaceae*) is 24.987, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 21.764, *Azadirachta indica Juss* (*Meliaceae*) is 18.0754, *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 11.822,5), *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 8.3578, *Ficus religiosa L.* (*Moraceae*) is 7.9393, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 7.7028, *Ficus benghalensis L.*(*Moraceae*) is 7.092, *Polyalthia longifolia (sonner) Thw, Enun*(*Annonaceae*) is 3.6728, *LMangifera indica L.*(*Anacardicaceae*) is 0.8986.

3.1.4 College area Adult Leaf Chlorophyll a

The highest chlorophyll -an in adult leaves of *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 14.72, *Dhatura stramonium L* (*Solanaceae*) is 14.694, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 12.661, *Ficus religiosa L.* (*Moraceae*) is 10.998, *Polyalthia longifolia (sonner) Thw, Enun*(*Annonaceae*) is 8.4083, *Azadirachta indica Juss* (*Meliaceae*) is 7.1393, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 4.7047, *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 4.0373, *LMangifera indica L.*(*Anacardicaceae*) is 2.1197, *Ficus benghalensis L.*(*Moraceae*) is 3.2500

3.1.5 College area Adult Leaves Chlorophyll-b

The highest chlorophyll -b in adult leaves of *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 22.8221, *Dhatura stramonium L* (*Solanaceae*) is 22.7829, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 12.661, *Ficus religiosa L.* (*Moraceae*) is 17.0488, *Polyalthia longifolia (sonner) Thw, Enun*(*Annonaceae*) is 12.9895, *Azadirachta indica Juss* (*Meliaceae*) is 9.2848, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 7.266, *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 6.2332, *Ficus benghalensis L.*(*Moraceae*) is 5.0209, *LMangifera indica L.*(*Anacardicaceae*) is 3.2708.

3.1.6 College area Adult leaves of (chlorophyll a+b) Total chlorophyll

The highest (chlorophyll a+b)Total chlorophyll in adult leaves of *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 37.5721, *Dhatura stramonium L* (*Solanaceae*) is 37.476, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 32.26, *Ficus religiosa L.* (*Moraceae*) is 28.046, *Polyalthia longifolia (sonner) Thw, Enun*(*Annonaceae*) is 21.397, *Azadirachta indica Juss* (*Meliaceae*) is 16.4241, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 11.970, *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 10.2696, *Ficus benghalensis L.*(*Moraceae*) is 8.2709, *LMangifera indica L.*(*Anacardicaceae*) is 5.3905.

3.2 College area Total chlorophyll young Leaves (chlorophyll a+b) (figure 2)

Dhatura stramonium L (*Solanaceae*) is 24.987, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 21.764, *Azadirachta indica Juss* (*Meliaceae*) is 18.0754, *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 11.822,5), *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 8.3578, *Ficus religiosa L.* (*Moraceae*) is 7.9393, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 7.7028, *Ficus benghalensis L.*(*Moraceae*) is 7.092, *Polyalthia longifolia (sonner) Thw, Enun*(*Annonaceae*) is 3.6728, *LMangifera indica L.*(*Anacardicaceae*) is 0.8986.

3.2.1 College area -Adult Leaves of (chlorophyll a+b) Total chlorophyll

The highest (chlorophyll a+b)Total chlorophyll in adult leaves of *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 37.5721, *Dhatura stramonium L* (*Solanaceae*) is 37.476, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 32.26, *Ficus religos L.* (*Moraceae*) is 28.046, *Polyalthia longifolia (sonner) Thw, Enun*(*Annonaceae*) is 21.397, *Azadirachta indica Juss* (*Meliaceae*) is 16.4241, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 11.970, *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 10.2696, *Ficus benghalensis L.*(*Moraceae*) is 8.2709, *LMangifera indica L.*(*Anacardicaceae*) is 5.3905.

3.3 MIDC- Aurangabad road area (figure 3)

3.3.1 Young leaves of Chlorophyll -a

The highest chlorophyll -a in young leaves of *Dhatura stramonium L* (*Solanaceae*) is 11.1554, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 10.285, *Ficus benghalensis L.*(*Moraceae*) is 7.6304, *Azadirachta indica Juss* (*Meliaceae*) is 5.9431, *Polyalthia longifolia (sonner) Thw, Enun*(*Annonaceae*) is 5.6329, *Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan*(*Mimosaceae* is 4.7070, *Hibiscus rosa-sinensis L.*(*Malvaceae*) is 4.3733, *Nerium indicum Mill.Gard.*(*Apocynaceae*) is 2.6766, *Ficus religiosa L.* (*Moraceae*) is 2.6038, *LMangifera indica L.*(*Anacardicaceae*) is 1.9951.

3.3.2 MIDC- Aurangabad road area Young leaves of Chlorophyll -b

The highest chlorophyll -b in young leaves of *Dhatura stramonium L* (*Solanaceae*) is 17.2523, *Bougainvillea spectabilis Willd*(*Nyctaginaceae*) is 15.8906, *Ficus benghalensis L.*(*Moraceae*) is 11.791. *Azadirachta indica Juss* (*Meliaceae*) is 9.1842, *Polyalthia*

longifolia (sonner) Thw, Enun(Annonaceae) is 8.7067, Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan(Mimosaceae) is 7.2557, Hibiscus rosa-sinensis L.(Malvaceae) is 6.7405, Nerium indicum Mill.Gard.(Apocynaceae) is 4.1236, Ficus religiosa L. (Moraceae) is 4.0342, LMangifera indica L.(Anacardiacae) is 5.0786

3.3.3 MIDC- Aurangabad road area Total (chlorophyll a+b) Total chlorophyll of Young leaves

The highest (chlorophyll a+b) Total chlorophyll in young leaves of Dhatura stramonium L (Solanaceae) L (Solanaceae) is 28.4407, Bougainvillea spectabilis Willd(Nyctaginaceae) is 26.175, Ficus benghalensis L.(Moraceae) is 19.421, Azadirachta indica Juss (Meliaceae) is 15.1273, Polyalthia longifolia (sonner) Thw, Enun(Annonaceae) is 14.3396, Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan(Mimosaceae) 11.962, Hibiscus rosa-sinensis L.(Malvaceae) is 11.138, Nerium indicum Mill.Gard.(Apocynaceae) is 6.8002, Ficus religiosa L. (Moraceae) is 6.638, LMangifera indica L.(Anacardiacae) is 5.0786.

3.3.4 MIDC- Aurangabad road area Adult Leaves of Chlorophyll-a

The highest chlorophyll -a in adult leaves of Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan(Mimosaceae) is 21.768, Bougainvillea spectabilis Willd(Nyctaginaceae) is 19.4634, Azadirachta indica Juss (Meliaceae) is 13.674, Dhatura stramonium L (Solanaceae) L (Solanaceae) is 11.832, LMangifera indica L.(Anacardiacae) is 8.8571, Polyalthia longifolia (sonner) Thw, Enun(Annonaceae) is 8.4952, Nerium indicum Mill.Gard.(Apocynaceae) is 8.3425, Ficus benghalensis L.(Moraceae) is 7.1017, Hibiscus rosa -sinensis L.(Malvaceae) is 6.5964, Ficus religiosa L. (Moraceae) is 6.0183.

3.3.5 MIDC- Aurangabad road area Adult leaves of Chlorophyll-b

The highest chlorophyll -b in adult leaves of Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan(Mimosaceae) is 33.905, Azadirachta indica Juss (Meliaceae) is 19.486, Dhatura stramonium L (Solanaceae) L (Solanaceae) is 18.3071, Bougainvillea spectabilis Willd(Nyctaginaceae) is 14.6141, LMangifera indica L.(Anacardiacae) is 13.7027, Polyalthia longifolia (sonner) Thw, Enun(Annonaceae) is 13.1444, Nerium indicum Mill.Gard.(Apocynaceae) is 12.8751, Ficus benghalensis L.(Moraceae) is 10.980, Ficus religiosa L. (Moraceae) is 9.2907, Hibiscus rosa sinensis L. (Malvaceae) is 4.2448.

3.3.6 MIDC- Aurangabad road area Total (chlorophyll a+b) Total chlorophyll of Adult Leaves

Total (chlorophyll a+b) Total chlorophyll of Adult Leaves of Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan(Mimosaceae) is 55.673, Azadirachta indica Juss (Meliaceae) is 33.145, Dhatura stramonium is 30.1391, Bougainvillea spectabilis Willd(Nyctaginaceae) is 24.077, LMangifera indica L.(Anacardiacae) is 22.5495, Polyalthia longifolia (sonner) Thw, Enun(Annonaceae) is 21.6394, Nerium indicum Mill.Gard.(Apocynaceae) is 21.2176, Ficus benghalensis L.(Moraceae) is 18.081, Ficus religiosa L. (Moraceae) is 15.309, Hibiscus rosa sinensis L.(Malvaceae) is 10.8412.

3.4 Result- Comparison of Total chlorophyll of young leaf and Adult leaf MIDC- Aurangabad road area (figure 4)

3.4.1 Total (chlorophyll a+b) Total chlorophyll of Young leaves

The highest (chlorophyll a+b) Total chlorophyll in young leaves of Dhatura stramonium L (Solanaceae) is 28.4407, Bougainvillea spectabilis Willd(Nyctaginaceae) is 26.175, Ficus benghalensis L.(Moraceae) is 19.421, Azadirachta indica Juss (Meliaceae) is 15.1273, Polyalthia longifolia (sonner) Thw, Enun(Annonaceae) is 14.3396, Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan(Mimosaceae) 11.962, Hibiscus rosa-sinensis L.(Malvaceae) is 11.138, Nerium indicum Mill.Gard.(Apocynaceae) is 6.8002, Ficus religiosa L. (Moraceae) is 6.638, LMangifera indica L.(Anacardiacae) is 5.0786.

3.4.2 Total (chlorophyll a+b) Total chlorophyll of Adult Leaves

Total (chlorophyll a+b) Total chlorophyll of Adult Leaves of Acacia nilotica (L) Willd.ex Del.ssp.indica(Benth) Brenan(Mimosaceae) is 55.673, Azadirachta indica Juss (Meliaceae) is 33.145, Dhatura stramonium is 30.1391, Bougainvillea spectabilis Willd(Nyctaginaceae) is 24.077, LMangifera indica L.(Anacardiacae) is 22.5495, Polyalthia longifolia (sonner) Thw, Enun(Annonaceae) is 21.6394, Nerium indicum Mill.Gard.(Apocynaceae) is 21.2176, Ficus benghalensis L.(Moraceae) is 18.081, Ficus religiosa L. (Moraceae) is 15.309, Hibiscus rosa sinensis L.(Malvaceae) is 10.8412.

In almost all the selected plants, the chlorophyll content was high in adult leaves in comparison to young leaves. The possible explanation could be that the young leaves were not mature and on the other hand, adult leaves were fully mature (Siwach and Gill, 2014; James *et al.*, 1999). However, the structure of mesophyll plays a very important role in the photosynthetic process of leaves through the functioning of the internal light (Siwach and Gill, 2014; James *et al.*, 99). Moreover James *et al.*(1999) have studied and observed that the young leaves had maximum mesophyll content; Due to that they appear blue-gray in color while the adult leaves were shown to have a low concentration of mesophyll because of that they appear green in color (Johnson, 1926; Jacobs, 1955; Penfold and Willis, 1956; Pryor, 1976; FAO, 1979; James *et al.*, 1999; Siwach and Gill, 2014). In the context of both young and adult leaves, the chlorophyll a/b ratio was higher in adult leaves than that of young leaves (Smith and Nobel, 1978). However in the case of Hibiscus, Ashoka, the chlorophyll content was high in young leaves than that of adult leaves

However the almost in all cases the chlorophyll a concentration was higher than that of chlorophyll b. The possible justification could be that Chlorophyll a is the primary pigment while others pigments including Chlorophyll b are accessory Pigments (Srichaikulet *et al.*, 2011).

4. CONCLUSION

From the findings of the present study, we conclude that most of the plant showed higher chlorophyll content in adult leaves as compared to young leaves. Chlorophyll content can be used as a measurement of the healthiness of plants canopy and the rate of photosynthesis as well. This study will be helpful to do research in chlorophyll content analysis of various plants species and study the vegetation cover area. Also, the effect of pollution on chlorophyll content is an important point of the study. It needs to

keep continuous monitoring on chlorophyll content to maintain and to check the healthiness of plants. The chlorophyll pigments are an indicator of O₂ production and carbon sequestration.

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