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"Effect of air pollution on chlorophyll content of *Terminalia procera* and *Magnifera indica*"

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Abstract

In the present investigation, comparative studies have been done, to find the effect of air pollutants generated from the exhaust of industries and automobiles on the chrorophyll content of leaves. The leaves samples of healthy and polluted leaf of *Terminalia procera* and *Mangifera indica* were collected and chlorophyll a, chlorophyll b and total chlorophyll were quantitified. A reduction in photosynthetic pigments of polluted leaves is compared with healthy leaves.

Key words : Chlorophyll a,b and total chlorophyll, Air Pollution, Quantification.

INTRODUCTION

Industrialization, urbanization, economic growth and associated increase in energy demands have resulted in a profound deterioration of air quality in developing countries like India. Oxides of nitrogen and sulphur and fly-ash constitute as the major proportions for the gaseous and particulate emissions from industries and automobile. The exposure of these pollutants to the leaves cause a reduction in the concentration of their photosynthetic pigments viz., chlorophyll and carotenoids, which affects the plant productivity, germination of seeds, length of pedicles, flowers. Chlorophyll is the principal photoreceptor in photosynthesis, the light-driven process by which carbon dioxide is fixed to yield carbohydrates and oxygen.

Aurangabad is an industrially developing city. It is densely populated and has heavy vehicular traffic. Air pollution increased tremendously that is affecting the proper growth of plants in its vicinity.

The rapid addition of toxic substance to environment is responsible for altering the ecosystem. Plants growing in heavy trafficular area are thus exposed to variety of pollutants.

Material and methods

Materials

- Dilute analytical grade acetone to 80%. Acetone
- Weight of 1 gm finally cut and well mixed representative sample of leaf into a clean mortar.
- Grind the tissue to a fine pulp with the addition of 20 ml of 80% acetone.
- Centrifuge (5000 R.P.M. for 5 min.) and transfer the supernatant to the same volumetric flask.

- Repeat this procedure until the residue is colourless. Wash the mortar and pestle thoroughly with 80% acetone and collect the clear washing in the volumetric flask.
- Make up the volume to 100 ml with 80% acetone
- Read the absorbance of the solution at 645, 663 against the solvent (80% acetone) blank.

Calculation

Calculate the amount of chlorophyll present in the extract mg chlorophyll per g tissue using the following equation:

mg chlorophyll a/g tissue = 12.7(A663) - 2.69(A645) × $\frac{Y}{1000 \times w}$

mg chlorophyll b/g tissue = 22.9(A645) -4.68(A663) × $\frac{Y}{1000 \times w}$

And

mg total chlorophyll tissue = 20.2(A645) +8.02(663) × $\frac{Y}{1000 \times w}$

Where A = absorbance at specific wavelength

Y = final volume of chlorophyll extract in 80% acetone

W = fresh weight of tissue extracted

Result: the results obtained with polluted and healthy *Terminalia procera*, *Magnifera indica* were compared. In general plant showed a decrease in photosynthetic pigment due to air pollution. Results are given in table 1 and 2.

Table 1: Concentration of different photosynthetic pigment(1 gm/mg)in the leaves of *Terminalia procera* colleted from polluted and control site.

Parameter	Healthy leaf	Polluted leaf
Chlorophyll-a	15.55mg	14.64mg
Chlorophyll-b	22.14mg	17.85mg
Total Chlorophyll	20.16mg	16.97mg

Table 2: Concentration of different photosynthetic pigment(1gm/mg)in the leaves of *Mangifera indica* colleted from polluted and control site.

Parameter	Healthy leaf	Polluted leaf
Chlorophyll-a	14.18mg	12.70mg
Chlorophyll-b	18.68mg	15.55mg
Total Chlorophyll	17.85mg	14.95mg

The photosynthetic pigment are the most likely to be damaged by air pollution.

Air pollution induced degradation in photosynthetic pigment was also observed by a number of workers. In both the plants chlorophyll a and chlorophyll b content were reduced significantly at polluted side.

Conclusion:- From the above experiment it concluded that reduction of chlorophyll a and chlorophyll b and total chlorophyll is found in polluted leaf as compared to healthy leaf.

It need to keep continuous monitoring on chlorophyll content to maintain and check the healthiness of plant.

The chlorophyll pigments are an indicator of a production and carbon requestration.

Thus it is concluded that there is need to develop green belt for the betterment of environment and human being.

Refrences:

- Joshi,O.P.,Wagela,D.K.,And Pawar.,K.Urbon air pollution effect on two species of Cassia.Poll res.16(1):1-3 (1997)
- Nikova.D and Dushkova,P.919780.Gorstopamska Nauka.3:3-8
- Saxena R.M.,Effect of motorway pollution of seed health of some vegetable crops.*Ind.J.Environ.Hlth.*33:385-387,(1991).

Swami,A.D.,Bhatt.,and Joshi,P.C.,Effect of automobiles pollution on sal (Shorea robusta)and rohini(Mallotus phillipinesis) at Asarori,Dehradun.Him.J.Environ.Zool.18:57-61(2004).