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# Impact of Air pollutants on leaves of Mango tree in Haridwar city with reference to light Absorption

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**ABSTRACT:**The present study was conducted from January 2022 to August 2022to find out the impact of Air pollutants on the light absorption of Mangiferaindica. Total Chlorophyll content was also assessed of leaves samples collected from the selected study sites.All the three selected study sites were quite different in terms of pollutant exposure due to the different activities round the clock. During the study period, adecrease in the amount of light absorption was observed in higher polluted site as compared to non or less polluted area.

**KEYWORDS:** Light Absorption, Chlorophyll Content, Photosynthesis

## I. INTRODUCTION:

The Environment is the total surroundings having both biotic and abiotic factors. These factors are interrelated to each other. The biotic components not only depend on abiotic factors but also on man related activities. The Plantproductivitydependsonleafphotosyntheticratea ndtheleaflifedurationaswellas the availability of other factors as nitrogen, water and temperature. Chlorophyll is one of the mostimportant and abundant photosynthetic pigments. The amount of chlorophyll within acanopy is positively correlated with vegetation productivity and plant health (Dash andCurran, 2007). Haridwar which is famous as a pilgrim center, attracts people for their aesthetic satisfaction. The National River Gangasignifies the importance of the city as a place of religious importance. Haridwar hosts several religious festivals throughout the year. During these festivals, a heavy influx of vehicles can be observed. In last few decades, the rapid urbanization and industrialization has been witnessed by the mountainous state Uttarakhand. Along with these developmental activities, the environmental pollution has become a serious environmental problem to all types biota in the said area(Chauhan and Sanjeev, 2008). Vehicular emission is becoming a serious threat to the life of all types of vegetation (Chauhan and Joshi, 2008). Many workers found in their studies that light absorption has been negatively affected by the environmental pollution (Tsega and Prasad, 2014; Yunus et.al, 1979; Swami and Chauhan, 2015 and Swami et.al, 2004).

## II. MATERIALS AND METHOD:

To conduct the present study, three study sites namely Motichoor (Near Railway Crossing), Ranipur More and BHEL Sec 3 were selected. Monitoring of particulate matter (PM10) was undertaken as per the norms prescribed by the Central Pollution Control Board of Govt. of India. The sampling was done for a period of 24 hours on each sampling site, by Envirotech Respiratory Dust Samplers (APM 460) on the same dates and timings. The fresh matured leaf samples of Mangiferaindicawere collected during the study period of January 2022 to August 2022 on the basis of different seasons. The leaves were collected manually from the bottom of the tree crown, about 8-10 feet above fromthe soil. Chlorophyll content was determined by using the method of Singh et al. (1991). The absorbance of the filtered extract was measured with a UV-Visiblespectrophotometer (Model UV-1800, Environtech) at 600 nm to 700 nm.

## III. RESULTS AND DISCUSSION

The results of present study were given in Table 1 to Table 4. Out of the three selected sites, Motichoor is found most polluted area while BHEL Sec 3 is reported least polluted. BHEL Sec 3 area has been considered as Control site in terms of anthropogenic activities round the year.

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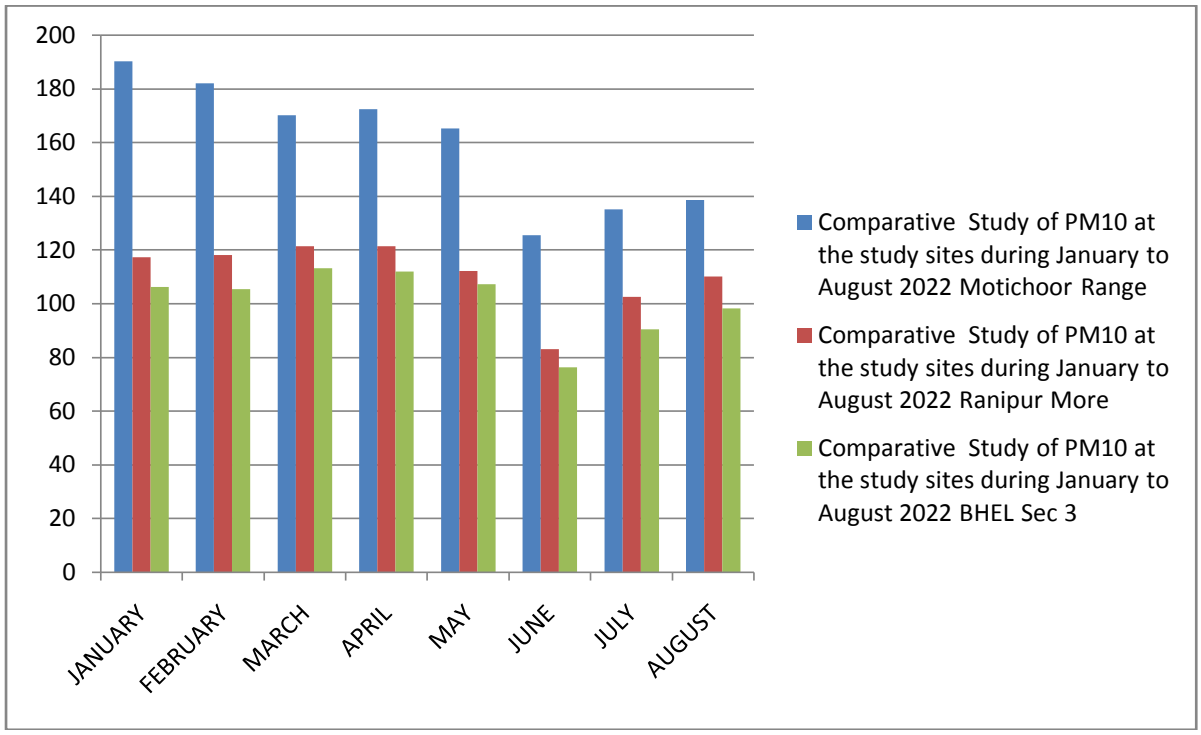


**Graph 1: Comparative Study of PM10 at the study sites during 2022**

**Table 1: Total Chlorophyll of Mangiferaindica during the study period (Winter Season 2022)**

| S.No. | Study Sites | Total Chlorophyll (mg/g) |
|---|---|---|
| 1 | Motichoor | 3.25 |
| 2 | Ranipur More | 3.82 |
| 3 | BHEL Sec 3 | 4.60 |

**Table 2: Total Chlorophyll of Mangiferaindica during the study period (Summer Season 2022)**

| S.No. | Study Sites | Total Chlorophyll (mg/g) |
|---|---|---|
| 1 | Motichoor | 4.02 |
| 2 | Ranipur More | 4.10 |
| 3 | BHEL Sec 3 | 4.98 |

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**Table 3: Total Chlorophyll of Mangiferaindica during the study period (Rainy Season 2022)**

| S.No. | Study Sites | Total Chlorophyll (mg/g) |
|---|---|---|
| 1 | Motichoor | 4.05 |
| 2 | Ranipur More | 4.32 |
| 3 | BHEL Sec 3 | 5.10 |

**Table 4: Absorption of Light by the leaves of Mangiferaindica during the study period**

| Wave length (nm) | Absorption of light % | |
|---|---|---|
| | Mangiferaindica (Least Polluted Site) | Mangiferaindica (Most Polluted Site) |
| 600 | 25 % | 17% |
| 620 | 32% | 22% |
| 640 | 38% | 25% |
| 660 | 45% | 37% |
| 680 | 75% | 60% |
| 700 | 90% | 75% |

During the present study, thetotalaveragechlorophyllcontentinMangiferaindic aleaveswas recorded 4.25 mg/g. The lowest total chlorophyll in case of Mangiferaindica was recorded 3.25 mg/g at Motichoor study site during the winter season. While the highest value 5.10 mg/g for the same was noted at BHEL Sec 3 during rainy season. The reduction of 36.27 % in the total chlorophyll content in the leaves samples of Mangiferaindica from polluted site in comparison to control site was also observed during the study period.

Light is one of the most important environmental factors which certainly affect the physiology of the plants. Low absorption of light causes slow growth, decrease of leaf weight and flower bud number. Photosynthesis is the only process which is governed by the chlorophyll content and light absorption. But due to the presence of air pollutants, the chlorophyll content got a rapid decrement which ultimately reduces the photosynthesis process through diminishing the absorption of light. It was also seen in the present study. The results of the study clearly show the impact of air pollution on the leaves of Mango trees.

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