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Image	Delegate ID	Theme	Details
	YSC 12444	Bio Diversity, Environment & Climate Change	**Category :** Biology **Organisation :** RAJA N.L KHAN WOMEN'S COLLEGE (AUTONOMOUS) **Designation :** COLLEGE CONTRACTUAL TEACHER

Abstract Background: Air pollution poses an acute problem for the world as its control through effective remedial measure is rather difficult to achieve. Vegetation sustain and support the biosphere to a great extent. Any damage to vegetation, therefore, results in damage to the entire natural environmental balance. (Tiwari and Rai, 2006).

Problem: In the recent years, various types of anthropogenic activities, such as industrialization, urbanization, increased number of vehicles become a great threat to the whole ecosystem. In urban areas various types of pollutants such as SOx, NOx, ozone (O3), carbon monoxide (CO), volatile organic compounds (VOCS), SPM, RSPM are released due to these anthropogenic activities, which have an adverse impact on the surrounding vegetation.

Methods: Studies were carried out to determine the morphological and anatomical alterations of few important tree species viz., Ashwathho (Ficus religiosa), "Bot" (Ficus benghalensis), and "Sal" (Shorea robusta) to air pollution caused by the nearby industries. 20 trees of each type were selected for the study. Morphological parameters assessed included length of leaf, petiole and vein, breadth of leaf, total area as well as dust deposition. Various anatomical characteristics were also observed which comprised of T.S of stem, petiole and leaf.

Results: There were significant changes in foliar morphology. Leaves became smaller with reduced length and width. Upon visual inspection, leaves detected at the polluted site had more chlorotic damage and necrosis while in some cases leave abscission was also noted. The anatomical sections revealed deposition of metal elements in the cortical cells of both the stem and leaf portions. Conclusion: The present study concluded that common industrial site plants growing at the most dominated points of industrial emission are heavily affected due to higher concentrations of air pollutants. Higher suspended particulate matter levels may have induced these macro and micro structural changes in the selected industrial site plants.

References:

1. Tiwari, S., M. Agrawal and F.M. Marshall, 2006. Environ. Monit. Assess., 119: 15-30

2. Zeng, T.; Ananth, N.; Hoffmann, R. J. Am. Chem. Soc.2014, 136, 12638 – 12647.

Assessment of Industrial Adjoining Air Quality and its Impact on Foliar Macro and Microstructural Alterations in *Shorearobusta* Gaertn. f.

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Abstract: The main air pollutants from industries are oxidized and reduced forms of carbon (CO_2, CO, CH_4), of nitrogen (NO_2, NO, NH_3), SO_2, O_3, C_6H_6 vapours, Hg, volatile phenols, Cl_2, etc, suspended particulate matter (PM10 and PM2.5)heavy toxicogenic metals (Pb, Ni, Cd, As), polycyclic aromatic hydrocarbons PAHs, etc.Atmospheric pollutants producedeleterious effects on the plants.They can either have direct toxic impact or indirectly cause damage by altering soil pH followed by solubilization of toxic metal salts.

Air pollution index was calculated using the formula given by Rao and Rao, 1989 from June-October, 2019. The various air pollutant levels were measured by different sensors. The foliar morphological, anatomical and pathological alterations of "Sal" (Shorearobusta Gaertn. f.) were observed. Industrial sites selected for sampling were: Tata Metaliks (Kharagpur), Rashmi Metaliks Ltd. (Kharagpur) and the Visaka Industries Ltd. (near Salboni). The control site was the Gopegarh forest near Midnapur Town, West Midnapur, West Bengal.25 trees from each site were selected for the study. Morphological parameters assessed included Length and breadth of leaf, length of leaf petiole and vein; total area as well as dust deposition was assessed. Anatomical characteristics of petiole and leaf were observed.

Air Quality Index showed interesting trends for a period of five months. It was observed that the sample collected from industrial polluted sites showed extensive reduced growth along with chlorotic foliar damage as compared to samples collected from control sites. There was also significant deposition of particulate matters in their tissue sections.

The present study concluded that industrial emission adversely impact *Shorearobusta* Gaertn. fdue to high concentrations of air pollutants. Increased amount of suspended particulate matter might also have induced several morphological and anatomical changes in it.

Keywords: Air Quality, Structural Alterations, *Shorearobusta* Gaertn. f

Assessment of Industrial Adjoining Air Quality and its Impact on Foliar Macro and Micro structural Alterations in *Shorea robusta* Gaertn. f.

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INTRODUCTION :

❖**Air pollution poses an acute problem for the world as its control through effective remedial measure is rather difficult to achieve.**

❖**The main air pollutants from industries are oxidized and reduced forms of carbon (CO_2, CO, CH_4), of nitrogen (NO_2, NO, NH_3), SO_2, O_3, C_6H_6 vapours, Hg, volatile phenols, Cl_2, etc.**

❖**Particulate matter air pollution is when considering air pollution because it has an unlimited number of sources.**

METHODOLOGY:

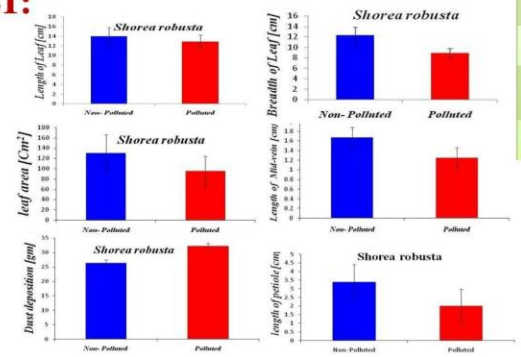
- To evaluate the air quality , the samples were collected from the selected industrial site. The air quality monitoring for Co_2, HCHO , volatile compound, SO_2 and NO_2 , PM_{10} and $PM_{2.5}$
- The air pollution index was calculated by formula given by Rao and Rao (1989).

  $API = ¼[(PM_{10})/(S_{PM10}) + (PM_{2.5})/(S_{PM2.5}) + (SO_2)/(S_{SO2}) + (NO_2)/(S_{NO2})] \times 100$
- Selected plant sp. - ***Shorea robusta***.
- The foliar morphological characters **Length and breadth of leaf, length of leaf petiole; total area, dust deposition** and **anatomical sections of stems** and **pathological symptoms** were observed.

SL. NO	Location	Latitude	Longitude	Altitude
1	Gope garh(control)	22.4187° N	87.2820° E	23 m
2	Rashmi metaliks	22°22'36.54" N	87°17'05.15"E	34.75 m
3	Tata metaliks	22°23'25" N	87°16'55" to 87°17'30" E	61 m
4	Visaka industries	22.5958° N	87.3224° E	25 m

RESULT:

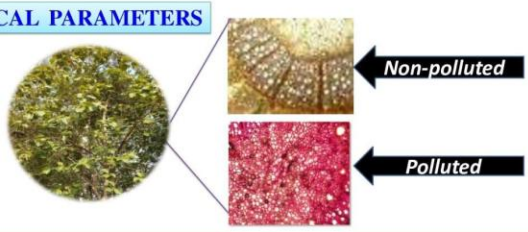
MORPHOLOGICAL PARAMETERS



AIR POLLUTION INDEX

API	0-50	51-101	101-200	201-300	301-400	401-500
CATEGORY	GOOD	SATISFACTORY	MODERATELY POLLUTED	POOR	VERY POOR	SEVERE

ANATOMICAL PARAMETERS



PATHOLOGICAL SYMPTOMS

CONCLUSION :

- **Leaf length and leaf breadth were found to be decreased in tree samples due to an impact of air pollution.**
- **The stem sections showed deposition of various macromolecules in tree samples collected from polluted site as compared to non-polluted site.**
- **Sites of industrial areas were heavily polluted compared to the control site.**

REFERENCES

❖Chandhari, P. R. and Gajghate, D. G. (2000), Assessment of air pollution effect plants for monitoring of environmental pollution, ***Herba Polonica*** 46, 198–212.

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❖Zeng, T.; Ananth, N.; Hoffmann, R. *J. Am. Chem. Soc.*2014, *136*, 12638 – 12647.