

Biological monitoring of road side plants exposed to air pollution

■ D. SARALA THAMBAVANI AND V. PRATHIPA

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SUMMARY: The quality of air with respect to SPM, RPM, SO₂ and NO_x of the various traffic and industrial area of Dindigul town has been assessed. The effect of air pollution has been recorded on the various parameters of the leaves- chlorophyll 'a', chlorophyll 'b', total chlorophyll content and carotenoid of some plant species viz., *Azadiracta indica*, *Delonix regia*, *Moringa tinctoria*, *Calotropis gigantea*, *Thyme rosemary* and *Cynodon dactylon* growing along the roadside of traffic and industrial area. The result indicated that the photosynthetic pigment of the leaves decreased in all the studied species at the polluted sites. Changes in the concentration of photosynthetic pigments such as chlorophyll 'a', chlorophyll 'b' and total carotenoid were inferred in the selected plant species at different sampling sites. Reduction in chlorophyll 'a', chlorophyll 'b' and total carotenoid found in all the plant species at traffic and tannery sites compared to the control site.

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The use of plants as monitors of air pollution has long been established as plants are the initial acceptors of air pollution. They act as the scavengers for many air borne particulates in the atmosphere. Demand of rapid modes of transportation has increased many folds during the last few decades because of the continuous rise in the human population. This in turn has led a tremendous increase in the number of different types of vehicles, which now has become a major source of air pollution throughout the world. The use of automobiles is growing fast, globally at large and with much greater space in developing countries.

Urban air pollution is worsening due to upward trends in power consumption, industrialization, vehicle use and scores of other developmental activities taken up by human beings. It has been estimated that vehicular pollution is the primary cause of air pollution in the urban areas (60%), followed by the industries (20-30%) in India (Sivasamy and Srinivasan, 1997). There are five major harmful substances released into the atmosphere in sufficient quantities as a result of natural events or by human activities.

They are carbon monoxide, hydrocarbons, particulates, sulphur dioxide and nitrogen compounds (Deepa, 1993). The role of air pollutants causing injury to plants either by direct toxic affect or modifying the host physiology renders it more susceptible to infection. In severe case of pollution, the injury symptoms were expressed as foliar necrosis or completely disappearance of the plant. Several plants could be used as biomonitor, which can detect the presence of gaseous pollutants. Leaf is most sensitive and reliable part than any other parts of plant like stem, root, flower, fruit and seed, it may act as a persistent absorber and is exposed to the polluted environment. Several studies have been carried out in India to highlight the existing air quality status in relation to SPM, NO₂ and SO₂ (Tiwari *et al.*, 1993; Gajghate and Hasan, 1995; Joshi and Mishra, 1998; Naik and Purohit, 1998; Alam *et al.*, 1999; Mohanty, 1999; Prakash and Allappat, 1999; Venkatasubramaniam *et al.*, 1999; Sivacoumar, 2000; Tripathy and Panigrahi, 2000) and effect of air pollutants on micromorphological parameters of different plant species (Salgare and Nath, 1991; Salgare and Swain, 1991; Modi *et*

**Author for
correspondence :**

**D. SARALA
THAMBAVANI**

Department of
Chemistry, Sri Meenakshi
Govt College for Women,
MADURAI (T.N.)
INDIA
E-mail:
sarala_dr@yahoo.in

See end of the article for
Copied authors'