

UNIVERSITY GRANTS COMMISSION

**BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002.**

Final Report of the work done on the Major Research Project.

1. Project report No. Final
2. UGC Reference No.F. 42-425/2013 (SR) dated 22/3/2013
3. Period of report: from **April 01, 2013 to March 31, 2017.**
4. Title of research project:

`Study on variation of biochemical indicators of stress due to deposition of urban dust on foliar surface of selected plants in National Capital Region of Delhi'

5. (a) Name of the Principal Investigator: **Prof. Umesh Kulshrestha**
 (b) Deptt.: School of Environmental Sciences

(c) University/College where work has progressed

Jawaharlal Nehru University, New Delhi

6. **Effective date of starting of the project:** April 01, 2013
7. **Grant approved and expenditure incurred during the period of the report:**
 Total amount approved: Rs. 10,61,800/-
 Total expenditure: Rs. 10,59,788/-

Summary of the project:

The abundance of atmospheric dust in the atmosphere in the Indian region, significantly affects various surfaces through its freefall deposition including the leaves, water bodies, vegetation, soils etc resulting in alterations in the nature and composition of the surface. Sometimes the impact of dustfall deposition on plants results in changes in their biochemistry and related physiochemical parameters. This study revealed that the accumulation of atmospheric dust on plant leaves affects the physio-biochemical properties of the plants. In the present study, impact of chemical components of dust was noticed on the biochemical constituents of a medicinally important tropical plants Arjun (*Terminalia arjuna*) and Mulberry (*Morus alba*) at a residential (Jawaharlal Nehru University, JNU) and an industrial site (Sahibabad, SB) in Delhi. The dust was characterized for major ions. The elemental composition of individual deposited dust particles was also characterized by using a scanning electron microscope (SEM) coupled with an energy dispersive x-ray system (EDX). The results indicated that high SO_4^{2-} fluxes were responsible for higher concentrations of stress indicators such as ascorbic acid, proline amino acid in foliar samples at industrial site. Dustfall fluxes of SO_4^{2-} were recorded around 3 times higher at industrial site than at residential site because of higher level of SO_2 emissions at industrial site from various industries and diesel driven vehicles. SO_2 oxidation onto the foliar surfaces can give rise to high SO_4^{2-} fluxes, in addition to direct deposition of dust particles. Scanning Electron Microscope (SEM) results showed that stomatal pore sizes were different at two sites. Besides this, guard cells of foliar were also found to be ruptured at industrial site indicating higher level of stress due to dust pollution of mega city. API (Air Pollution Index) values suggested Arjun and Morus plants as very good performers indicating that these species can be used for green belt development in NCR Delhi.