

Ambient Air Quality and Noise monitoring in Haridwar City of Uttarakhand State (India)

Sushil Bhadula and B. D. Joshi*

Dept. of Zoology, Uttaranchal College of Science and Technology, Dehradun

*Dept. of Zoology and Environmental sciences

Gurukula Kangri University, Haridwar

Abstract: In the present study, four parameters viz. RSPM, SPM, SO₂ and NO₂ were studied during October to December 2011, at three busy intersections of Haridwar city namely; Singh Dwar, Prem Nagar Ashram Chowk and Chandi Chowk to assess the impact of vehicular emission on air quality of concerned area. Noise levels were also monitored for sites with the help of Sound Level Meter. The minimum and maximum value for RSPM were recorded 86.20 µgm⁻³ and 99.75 µgm⁻³ at Prem Nagar Ashram Chowk and Chandi Chowk, respectively. The minimum 285.90 µgm⁻³ and maximum 400.50 µgm⁻³ value for SPM were recorded at Prem Nagar Ashram Chowk and Singh Dwar, respectively. The minimum 7.15 µgm⁻³ and maximum 9.10 µgm⁻³ values for SO₂ were recorded at Prem Nagar Ashram Chowk and Chandi Chowk, respectively. The minimum 9.99 µgm⁻³ and maximum 11.39 µgm⁻³ value for NO₂ were recorded at Prem Nagar Ashram Chowk and Chandi Chowk, respectively. In the present study, it was found that the noise level in all three different sites was higher as comparison to the standard prescribed limit of noise.

[Sushil Bhadula and B. D. Joshi. **Ambient Air Quality and Noise monitoring in Haridwar City of Uttarakhand State (India)**. *Rep Opinion* 2013;5(2):43-45]. (ISSN: 1553-9873). <http://www.sciencepub.net/report>. 11

Keywords: Ambient; Air; Quality; Noise; monitor

Introduction

Air pollution is the presence of undesirable substances in ambient atmosphere, resulting from the human activity, in sufficient concentration, for a sufficient time and under circumstances which interfere significantly with the comfort and health. The long term exposure to even low levels of Particulate Matter (PM) are responsible for deleterious health problems, including asthma, bronchitis, pneumonia, upper and lower respiratory tract disorders (Mohanraj and Azeez, 2004). The largest causes and sources of air pollution are transportation, and industrial activities that use a number of chemicals and synthetic materials, besides energy constituents.

The effects of air pollution on health are very complex as there are many different sources and their individual effects vary from one to the other. Air pollutants that are inhaled have serious impact on human health affecting the lungs and the respiratory system; they are also taken up by the blood and pumped all round the body.

In urban areas, vehicular pollution contributes to air quality problems. Road traffic produces volatile organic compounds, suspended particulate matter (SPM), oxides of sulphur (SO_x), oxides of nitrogen (NO_x), and carbon monoxide (CO), which makes adverse health effects on the exposed population (Ingle, et. al. 2005). It is being realized that during relatively a short period of about 200 years of recent history of human civilization and industrial activities, almost one half part of the land surface has been

transformed by human activities with heavy concentration of pollutants in Air (Fenger, 2009).

Materials and methods

In this present study, three locations i.e. Singh Dwar, Prem Nagar Ashram Chowk and Chandi Chowk within Haridwar city were selected. All three sites have a difference of about 2-5 km to each other and are on the same Highway. Monitoring of particulates was done as per the norms prescribed by the Central Pollution Control Board of Govt. of India, and the analysis of gaseous pollutants viz. SO₂ and NO₂ were carried out as per the modified method given by West and Gaecke (1956) and Jacob and Hochheiser (1958), respectively. The sampling was done weekly for a period of 24 hours on each sampling site, by Envirotech Respiratory Dust Samplers (APM 460) on the same dates and timings. Noise levels were also measured on all selected sites for 18 hours of study between 0600- 2400 hrs with the help of Sound Level Meter. Ambient sound levels were compared with that of the standards prescribed in Environmental Protection Rules, 1986 (vide Tripathy 1999) and standards of CPCB (vide Kudesia and Tiwari 1994).

Results

The results of the intensive ambient air monitoring at selected three locations in the city are summarized below in Table 1.

Table-1: Results of Air monitoring in Haridwar City

S. No.	Parameters	Singh Dwar	Chandi Chowk	Prem Nagar Ashram Chowk
1.	RSPM (μgm^{-3})	90.50	99.75	86.20
2.	SPM (μgm^{-3})	400.50	390.20	285.90
3.	SO ₂ (μgm^{-3})	8.70	9.10	7.15
4.	NO ₂ (μgm^{-3})	10.65	11.39	9.99

Table-2: Ambient noise quality (dB) in different zones.

S. No.	Time (in hrs)	Singh Dwar	Chandi Chowk	Prem Nagar Ashram Chowk
1.	600	58.4	66.6	56.2
2.	900	57.5	69.7	58.4
3.	1200	72.7	87.9	70.7
4.	1500	70.2	98.3	73.7
5.	1800	76.4	93.2	78.3
6.	2100	68.9	80.3	70.4
7.	2400	60.6	56.7	62.6

Discussion

Raina and Aggarwal (2004) made a study on the impact of vehicular exhaust on the some tree species and reported various physical and chemical changes in the plant structure. Akbar *et. al.* (2003) has pointed out the vehicles impact on the road side vegetation and soil for the lead, copper, manganese and zinc and found a heavy degradation for the soil in the concerned area. Wagela *et. al.* (2002) focused on the air contamination by the vehicles on the selected road side plants. Senthilnathan (2008) has monitored the ambient air quality in the urban area of Chennai city and observed the exceeded values of particulate matter in respect of standard limits.

The increasing concentration of pollutant in the atmosphere due to vehicular exhaust can affects the respiratory system of the human being. This certainly needs attention of city administration as also pointed out by Guttikunda and Aggarwal (2009) who suggested that the governing bodies need to make special provisions in transport sectors to prevent and control pollution. Human activities viz., urbanization, transportation and celebration of a variety of festivities are also the main cause of noise, being faced at global level, besides a number of developmental activities. It is not harmful only for human being but it is also health hazard to all living beings. Even the non living things are not left unaffected by high intensity of noise. (Pawar & Joshi 2005). To mitigate the problem of noise pollution in the concern city, it is suggested that some remedial measures should be taken as plantation of trees, restricted use of pressure

horns, loud speakers and record players, which will be highly useful to mitigate the unwanted sound.

Acknowledgement

Authors are grateful to Indian Academy of Environmental Sciences, Haridwar for financial support to carry out this study.

Correspondence address

Dr. Sushil Bhadula
Department of Zoology
Uttaranchal College of Science & Technology,
Dehradun, Uttarakhand
Email: sushil86.ntl@gmail.com
Mob: +91-9027571658

References

1. Mohanraj, R., Azeez, P. A., 2004. Health effects of air borne particulate matter and the Indian scenario. *Curr. Sci.* 87 (6), 741-748.
2. Fenger, J., 2009. Air Pollution in the last 50 years – From local to global. *Atmospheric Environment* 43, 13-22.
3. West, P. W., Gaecke, G. C., 1956. Fixation of Sulphur Dioxide as Sulfitomercurate III and Subsequent Colorimetric Determination. *Anal Chem* 28, 1816.
4. Jacob, M.B., Hochheiser, S., 1958. Continuous sampling and ultra-micro determination of Nitrogen dioxide in air. *Anal Chem.*30, 426.
5. Tripathy, D. B. (1999) Noise Pollution. A.P.H. Publishing Corporation, New Delhi.

6. Kudesia, V. P. and Tiwari, T. (1994) Noise Pollution and its Control. Pragati Prakashan, Meerut.
7. Raina, A. K. and Aggarwal, B. (2004). Effect of vehicular exhaust on some trees in Jammu-II. *J. Ind. Pollut. Cont.* 20 (2): 229-232.
8. Akbar, K. F. Ahmad, Z. Shad, M. A. and Ansari, T.M. (2003). An ecological study of roadside vegetation and soils in Sahiwal district. *J. Biol. Sci.* 3 (7): 627-634
9. Wagela, D.K., Pawar, K. Dube, B. and Joshi, O.P. (2002). Lead monitoring in air, soil and foliar deposits at Indore city with special reference to automobile pollution. *J. Env. Biol.* 23(4): 417-421.
10. Senthilnathan, T., 2008. Measurements of Urban Ambient Air Quality of Chennai city. *Indian J. of Air Pollution Control* 8(1), 35-47.
11. Guttikunda, S. K., Aggarwal, R., 2009. Contribution of vehicular activity to air pollution in Hyderabad, India: Measurements, Chemistry and Analysis. *Ind. J. of Air Poll. Control* 9 (1), 37-46.
12. Pawar, C. T. and Joshi, M. V. (2005) Urban development and sound level in Ichalkaranji city, Maharashtra. *Indian J. Environ. & Ecoplan.* 10(1):177-181.

2/15/2013