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AMBIENT AIR QUALITY MONITORING IN BHIWANDI CITY (MAHARASTRA, INDIA)

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ABSTRACT

Air pollution is on rise in Bhiwandi city due to increasing vehicular activity and emission from textile industry. The present study aims to measure the concentration of various pollutants present in the air and seasonable changes, its effects on level of air pollution. The periodically collected air samples like SO_x, NO_x and RSPM were analysed. From the results of pollutants, the level of RSPM beyond the standard value may be due to heavy traffic and emission from Textile Industries which may be hazardous to both environment and human beings. From the data collected the levels of concentration of pollutants was observed in relation to seasonal climatic changes.

Keywords: Ambient Air; Textile Industries; Vehicular Load; Air Sample; Tuberculosis

INTRODUCTION

Now-a-days in the name of industrialisation, modernisation & progressive culture the world is suffering from the problem of air pollution which has attained global proportion.

Air pollution is defined as, "the presence of one or more contaminants in the atmosphere which is injurious or tends to be injurious to human health, animal or plant life". Air pollution can cause health problems and it can damage the environment and property.

The present study is an attempt to address the problem of air pollution in Bhiwandi city.

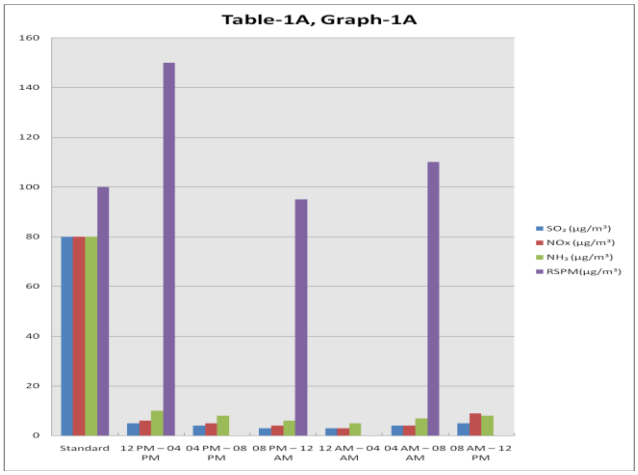
About Bhiwandi City-Bhiwandi is a part of Thane district. It is 60 km to the North – East of Mumbai and 15 km North – East of thane city. Bhiwandi is famous centre of handlooms and also has the largest concentration of power-looms and dyeing mills in the country. The power-looms operate in the residential premises too, haphazard & crowded nature of this industry has created several problems. The problem of air pollution is due to heavy traffic, emissions from textile industries & dyeing mills. The vehicular emissions & emissions from the industries is the main culprit in the making the life of the residents miserable. Hence it requires continuous ambient air monitoring.

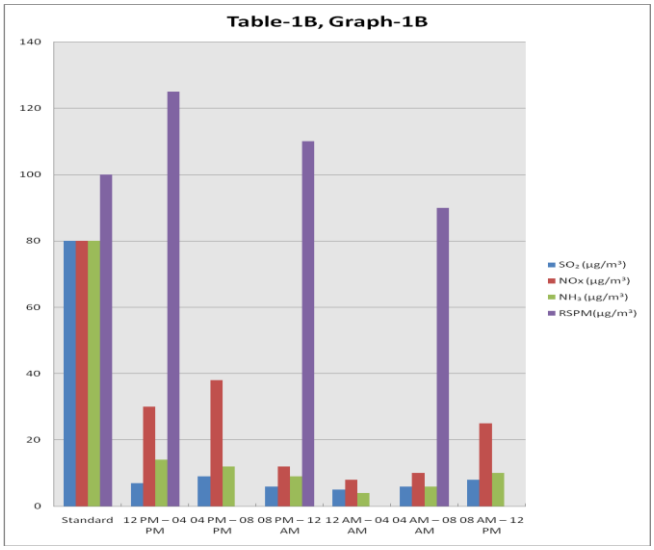
MATERIALS AND METHODS

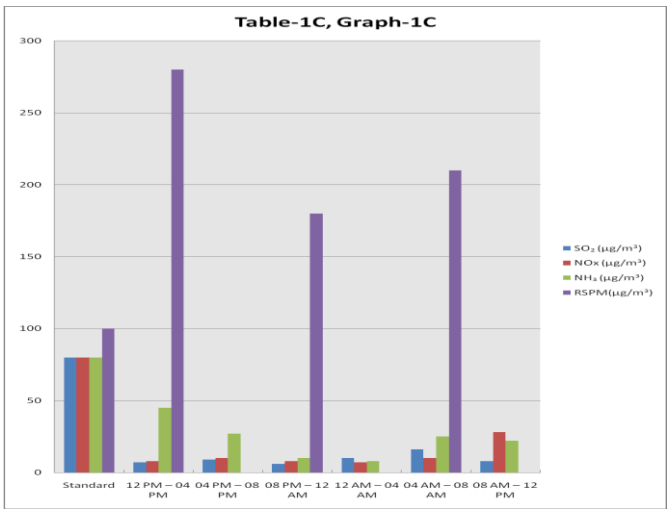
The concentration level of pollutants in ambient air is calculated from the collected sample. Continuous monitoring method is applied on both gases & particulate matter. Methods for sampling & analysis of the parameters under study have been well established & authenticated [2]. The pollutants analysed are SO_2, NO_x, NH_3 & RSPM. All samples were collected seasonally in October 2008, December 2008, February 2009 and April 2009. The location for 24 hours air monitoring was I.G.M Hospital in Bhiwandi. Air pollutants were collected and analysed for every four hours continuously for

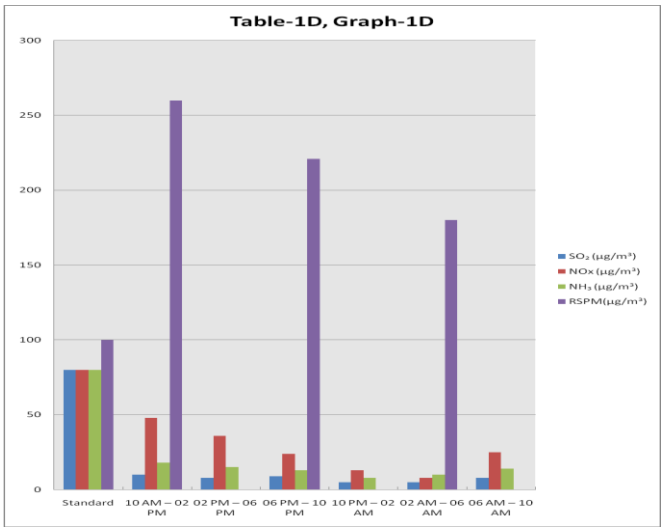
24 hours. The air samples were collected by using respirable dust sampler Envirotech APM 460 NL. The sample analysis was done using spectrophotometer Equiptronic Model EQ480 [S. M. Khopkar 2004]. The method used for determination of sulphur dioxide is modified West & Geake Method [3].

RESULT









RESULTS AND DISCUSSION

In Bhiwandi city, the air pollution is caused by heavy traffic and emissions from the textile industry and dyeing mills. In the vicinity of I. G. M Hospital within 100 meters we find heavy vehicular traffic, Flyover Bridge and Bus station.

From the present study by using Respirable dust sampler machine placed for 24 hours air monitoring in the month of October, December 2008, February, April 2009. The results obtained are shown in the table (1A, 1B, 1C, 1D). The results indicate that the air pollution caused by vehicular traffic & emissions from textile industry. In day time (06:00 AM to 06:00 PM) the level of NO_x, SO_2, NH_3 increases because of increase in traffic & temperature, while during night time (06:00 PM to 06:00 AM) the pollution level of NO_x, SO_2, NH_3 decreases because of minimum traffic & low temperature. The RSPM level increases in night due to industrial emissions. In rainy season (table 1A) the concentration of SO_2 (04 µg/m^3), NO_x (06 µg/m^3), NH_3 (08 µg/m^3) and RSPM (118 µg/m^3) is minimum [2]. In winter season the (table 1C) the concentration of SO_2 (09 µg/m^3), NO_x (12 µg/m^3), NH_3 (21 µg/m^3) and RSPM (223 µg/m^3) increases because of fog in the morning and low temperatures, while in summer season (table 1D) the concentration of SO_2 (08 µg/m^3), NO_x (26 µg/m^3), NH_3 (13 µg/m^3) and RSPM (220 µg/m^3), the level of NO_x increases because of high temperature and high intensity of light conversion of NO to NO_2 increases [2].

RSPM increases beyond standard value (100 µg/m^3) due to heavy traffic and emissions from textile industries which is hazardous to both environment and human beings. The finer particles when inhaled get lodge into the lungs and cause respiratory problems including bronchitis, shortness of breath, painful breathing and tuberculosis [6]. Number of tuberculosis patients has increased in the Bhiwandi city. In I.G.M hospital in 2008 the total patient recorded was near about 1840. Every year tuberculosis patients has increased and one of the cause of this increase is increase in RSPM level in the city. This is the highest in Thane district because most of labourers work in power-loom which might be in contact with cotton fibrous particles.

In Mumbai, MCGM survey finds levels of cancer causing particles up due to rise in vehicular pollution and construction activities resulting in more toxic compounds in Mumbai air. Cancer lurks in the air that Mumbai breathes. Data that MCGM has come up with its latest environmental status report indicate that levels of potent carcinogenic compounds in the air have jumped drastically compared to last year [5].

The following steps will certainly help to improve the quality of air and minimize pollution level in the area [4].

Vehicular air pollution can be controlled by putting a device called catalytic converters in automobiles exhaust system

1. All automobiles running on petrol and diesel should be converted to CNG
2. Construction of fountains in the city help to reduce the pollutants and specially RSPM level
3. Planting of more trees also reduce the pollution
4. In fuel good quality coal i.e. ash-less coal should be used and reduces RSPM level. Chimney height should be increased in industry
5. There is a possibility of removal and control of SO_x from fuel gases, removal of sulphur from fuel burning and use low sulphur fuel.

CONCLUSION

From the result and discussion it can be concluded that the level of pollutants like SO_2, NO_x, NH_3 and RSPM comes down very significantly during rainy season. While in summer season it maximises because of high temperature. The data obtained shows that air pollution is under control instead of RSPM. From the result, RSPM has increased and due to this there may be increase in the patients of respiratory problems and tuberculosis.

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