

Studies on ambient air quality out side of Electro-graphite industry of Mandideep area, Bhopal (India)

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ABSTRACT

Ambient air quality studies around Mandideep Industrial area was carried out during the period May 1998 to June 1999. Air samples were collected and analysed on a number of monitoring sites. The parameter include SO₂, NO₂ and SPM concentrations. Results are discussed with respect to possible impact on human health.

Key words: Ambient air water quality, Mandideep, Bhopal.

INTRODUCTION

Due to rapid industrialization it lead to air pollution. Beside that out unplanned and excessive exploitation of available natural recourses have been also a causing for pollution problem in major cities line Bhopal Capital of Madhya Pradesh. Air pollution is mainly affecting the urban environment all over the world. (Ledder better 1973 and Painter 1974). Although ambient air quality is being monitored regularly in the city are of study. The main problem of pollution is due to the industrial units are located close to residential pollution. Emission form such industrial units may exert hazardous effects which is compounded by automobiles emission (Sundaresan 1991).

Mandideep as an industrial growth center developed by AKVN where, over 60 medium and Large Scale Units are running successfully. It includes mainly Chemical, Electro graphite, Dyes Plastic and Rubber Industries etc.

MATERIAL AND METHODS

The main objective of ambient air quality monitoring (AAQM) is to assess the existing ambient Level of air pollution. The SPM, SO₂ and NO₂

concentration were observed at 7 sampling station in September and December 98 and February and April 1999. These stations were located in different direction and were at distance from 0.5 to 5.0 Km form the plant premises. The parameter chosen for AAQM were suspended particulate matte (SPM), Sulfur dioxide (SO₂) and Nitrogen dioxide.

Sample were collected round the clock during survey period. The gaseous pollutant SO₂ and NO₂ were collected on 8 hourly. For simultaneous particulate and gaseous sampling a tapping was provided in the hopper of the Hi-vol. Sampler for creating necessary suction head. The sample of gases were drawn at 0.5 Lit/min. flow rate. The samples were analysed as per standard method.

SPM samples were collected with Hi-vol., samples operated at the rate 1.5 M³/min. The ambient SPM concentration were determined by collecting the particulate matter for 24 Hrs. on a pre-weighed glass fiber of 20 × 25 size and re-weighed after sampling. In order to avoid humidity factor and other material losses. The filter paper were always oven dried at 80°C and kept in desiccators before weighing. The SPM results are reported monogram before weighing. The SPM

results are reported monogram per cubic meter of air drawn through filter ($\mu\text{g}/\text{m}^3$).

Sulfur dioxide (SO_2) was measured by using wet Chemical method devised as per reference EPA methods, which is a modification of west and Gaeke.

Nitrogen dioxide (NO_2) was collected by bubbling air through Sodium Hydroxide, Sodium arsenite solution to form a stable solution of sodium nitrate. The nitrate ion produced, sulronamide.1 Nephthyle ethylene diamine diahydrochloride to form an A_2O dye and then determined calorimetrically at 550mm

RESULTS AND DISCUSSION

The observed value of SPM concentration at different sampling station are given in Table 1. A peak of SPM concentration of $283 \text{ mg}/\text{m}^3$ was noted in December 98 at higher secondary school (1Km NW) followed by that of $226 \mu\text{g}/\text{M}^3$ in April 99 for AKVN office compound (1.5 km) $206 \mu\text{g}/\text{m}^3$ in April 99 for Itaya (3 Kmg.E) of $166 \mu\text{g}/\text{m}^3$ in December 98 for Luppeir Laboratories (2.5 Km.NE) abd $127 \mu\text{g}/\text{m}^3$ in April 99 for Samardha (5 Km NE). Excepting at Higher Secondary School the SPM values at all places were followed to be maximum in April and minimum in September. The observed SO_2 concentration value of different locations are given in Table -2.

Table - 1: Particulate pollution level in ambient air concentration of suspended particulate matter (SPM $\mu\text{g}/\text{M}^3$)

Year	Month	Stations						
		AKVN	HSS	Lupin	Patel nagar	CI	Itaya	Samardha
1998	Sept.	46	89	73	126	96	38	-
	Dec.	17	283	153	-	157	167	-
1999	Feb.	203	165	75	-	149	53	98
	Apr.	226	142	-	-	166	206	127
Average		163	170	1003	126	142	118.5	112.5

Table - 2: SO_2 level in ambient air concentration of SO_2 (SPM $\mu\text{g}/\text{M}^3$)

Year	Month	Stations						
		AKVN	HSS	Lupin	Patel nagar	CI	Itaya	Samardha
1998	Sept.	-	-	-	-	-	-	-
	Dec.	14	21	10	-	10	16	-
1999	Feb.	77	17	7	-	28	6	36
	Apr.	41	21	-	-	-	11	23
Average		44	19.6	8.5	-	19	11	13.3

The sulfur dioxide concentration on the observed sites was measured in December 1988 and February and April 99. The minimum and maximum SO_2 levels including all the places were between 8.6 and $77 \mu\text{g}/\text{m}^3$. The highest values of $77 \mu\text{g}/\text{m}^3$ were recorded at AKVM office compound,

but at other places the levels were very low and there was a indication of a seasonal variation in the pollutant concentration in the area of study. The observed values of concentration of NO_2 at different locations⁷ are given in Table -3.

Table - 3: NO₂ level in ambient air concentration of NO₂ (SPM µg/M³)

Year	Month	Stations						
		AKVN	HSS	Lupin	Patel nagar	CI	Itaya	Samardha
1998	Sept.	-	-	-	-	-	-	-
	Dec.	12	14	8	6	6	-	10
1999	Feb.	18	16	14	10	8	10	12
	Apr.	22	18	12	-	6	8	16
Average		17.3	16	11.3	8	7	9	12.7

In the present study, it is clear that the minimum and maximum NO₂ levels including all places were between 6.0 and 22 µg/m³. The highest value of 22 µg/m³ NO₂ recorded at AKVN office compound but at places the levels were very low.

From the data on air quality in about 5Km radius around the plant premises. It can be concluded that the concentration of SPM, SO₂ and NO₂ were much below the standard laid down for these pollutants for industrial cum residential (mixed) area.

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