

## AMBIENT AIR POLLUTION DUE TO ADULTERATION OF FUEL

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Urban air pollution is one of the important concerns in developing countries like India with high vehicular density. Records show that the number of vehicles in the country increases at a very fast rate. The increase in the number of vehicles increases the level of pollutants. The main causes of increased pollution due to vehicles are a) lack in requisite infrastructural development in the operation of old fleets b) poor vehicle maintenance c) poorly maintained road conditions and d) the most important is low fuel quality and the use of adulterated fuels.

Several reports from US, Europe and Australia indicated significant association between acute morbidity and mortality from cardiopulmonary diseases and the levels of major pollutants in the ambient air. This project was initiated on the request of Deputy Commissioner of Police (Traffic), Ahmedabad to examine the level of air pollutants due to adulteration of fuels.

A preliminary study was conducted to check the level of pollutants due to the adulteration of petrol with Kerosene.

The results of preliminary study are summarized in Tables 1 – 4. The data show that the suspended particulate matter (SPM) and carbon monoxide (CO) increase with the increase in the proportion of Kerosene in petrol while sulphur dioxide (SO<sub>2</sub>) and Nitrogen oxides (NO<sub>x</sub>) decrease. The decreasing trend in the levels of SO<sub>2</sub> and NO<sub>x</sub> may be due to either adsorption on SPM or due to conversion of NO<sub>x</sub>, SO<sub>2</sub> in nitrite (NO<sub>3</sub>) and sulphate (SO<sub>4</sub>) respectively.

**Table –1 Concentration of SO<sub>2</sub> due to adulteration of fuel**

Concentration	SO <sub>2</sub> µg/m <sup>3</sup>		
	100P	50P+50K	25P+75K
% of fuels	100P	50P+50K	25P+75K
Number	5	5	5
MIN	29.00	10.80	7.50
MAX	57.80	87.90	25.80
MEAN	41.40	31.30	14.58
SD	11.35	32.73	7.43
Fuel Consumption in ml	261.00	242.00	220.00
SO <sub>2</sub> /liter	158.60	129.87	66.30

*P= Petrol      K=Kerosene*

**Table –2 Concentration of NO<sub>x</sub> due to adulteration of fuel**

Concentration	NO <sub>x</sub> µg/m <sup>3</sup>		
	100P	50P+50K	25P+75K
% of fuels	100P	50P+50K	25P+75K
Number	5	5	5
MIN	18.00	17.00	15.90
MAX	71.40	46.30	47.80
MEAN	45.90	38.10	33.68
SD	19.79	11.94	11.59
Fuel Consumption in ml	261.00	242.00	220.00
NO <sub>x</sub> /liter	175.80	157.40	153.10

*P= Petrol K=Kerosene*

**Table –3 Concentration of SPM due to adulteration of fuel**

Concentration	SPM $\mu\text{g}/\text{m}^3$		
	100P	50P+50K	25P+75K
% of fuels	100P	50P+50K	25P+75K
Number	5	5	5
MIN	967.00	1278.00	1278.00
MAX	2933.00	3767.00	3889.00
MEAN	1548.80	2320.00	2555.60
SD	790.72	1066.85	1088.43
Fuel Consumption in ml	261.00	242.00	220.00
SPM /100ml	593.4	958.6	1161.6

*P= Petrol      K=Kerosene*

**Table – 4 Concentration of CO due to adulteration of fuel.**

Concentration	CO ppm		
	100P	50P+50K	25P+75K
% of fuels	100P	50P+50K	25P+75K
Number	5	5	5
MIN	5.00	6.00	26.00
MAX	71.00	90.00	118.00
MEAN	38.40	47.00	70.00
SD	29.35	37.63	41.21
Fuel Consumption in ml	261.00	242.00	220.00
SO <sub>2</sub> /liter	147.10	194.20	318.20

*P= Petrol      K=Kerosene*

The levels of SPM and CO increase along the increasing the % of kerosene in petrol. The CO is very harmful to health because it reacts with iron in hemoglobin form carboxy hemoglobin to decrease the function of hemoglobin.