Estimation of Air Quality: A Case Study

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ABSTRACT-
An investigation was undertaken to study the pollution levels in the villages in Korba district. The Presence of number of power plants & various industries in Korba district gave a support for the existence of Environmental problem in this area. Many industrial emissions from existing Thermal power plants, coal & Bauxite mines were being continuously released in to the atmosphere. This paper presents ambient air quality of villages in Korba district. Four different villages (Tiwarta, Chainpur, Burganihapara and Renki) were selected for the study and compared. The parameters studied were Particulate matter (PM10, PM2.5), Sulphur Dioxide, Nitrogen Oxides and Ammonia. The results were compared with National Ambient air Quality Standards-NAAQS-2009, (Environment (Protection) seventh amendment rules - 2009), A Gazette notification released by Ministry of Environment and Forests, Government of India. From overall analysis, it was observed that the concentration of all the above parameters is within the prescribed limit of Central Pollution control Board.

Keyword: Emissions, Particulate matter, parameters, Pollution, Ambient.

I INTRODUCTION

Air pollution may be described as contamination of the atmosphere by gaseous, liquid, or solid wastes or by-products that can endanger human health and welfare of plants and animals, attack materials, reduce visibility, or produce undesirable odors. Although some pollutants are released by natural sources like volcanoes, coniferous forests, and hot springs, the effect of this pollution is very small when compared to that caused by emissions from industrial sources, power and heat generation, waste disposal, and the operation of internal combustion engines. Fuel combustion is the largest contributor to air pollutant emissions, caused by man, with stationary and mobile sources equally responsible.

The Presence of number of power plants & various industries in Korba district gave a support for the existence of Environmental problem in this area. Many industrial emissions from existing Thermal power plants, coal & Bauxite mines were being continuously released in to the atmosphere.

So the Ambient air analysis has been carried out in the villages of Korba district at various Sampling points for various Air Pollutants like Particulate matter(PM10,PM2.5), Sulphur Dioxide, Nitrogen oxides and Ammonia.

(a) Study Area:- Korba industrial area is part of Korba Dist. situated at 22- 22' N and 82-42'E latitude with the 304.8 meter above sea level. The ambient air quality of Korba surrounding villages is continuously degrading due to industrial activities. Therefore, we have decided to analyze the ambient air quality of the study area, so that some remedies for the improvement could be possible.

II SAMPLE COLLECTION

Ambient air samples were collected from four different villages Korba district during the pre monsoon season (March-April 2013) using standard methods of Indian standard and CPCB guidelines and analyzed in laboratory for different pollutants. The various parameters were analyzed are reported given below.

Particulate matter(PM10,PM2.5) in ambient air were sampled and analyzed as per IS 5182, (Part IV) and followed Central Pollution Control Board guide lines(Gravimetric method), Sampling and analysis of Sulphur dioxde were done by following the method IS:5182,(part-II,West & Gaeke method), Sampling and analysis of Nitrogen Oxides were done by following the method IS:5182(Part-VI,Sodium Arsenite method) and Sampling and analysis of Ammonia were done by following the method EPA ISC Part-II method-401(Indophenol blue method).

III RESULTS AND DISCUSSION

In this study we selected four villages in Korba district, those are Tiwarta, Chainpur, Burganihapara and Renki, and these villages are nearer to many Coal based thermal Power plants.

In the above said villages we collected air samples by following standard methods.

Collected samples were analyzed for different pollutants like Particulate matter (PM10, PM2.5), Sulphur Dioxide, Nitrogen Oxides and Ammonia.

The concentration levels of different pollutants were compared with National Ambient air Quality Standards-

NAAQS-2009,(Environment(Protection)seventh amendment Environment and Forests, Government of India and the rules - 2009),A Gazette notification released by Ministry of results and observations were given below.

Table 1 – Concentration of PM10

S. No	Name of the village	Unit	Concentration of PM10	CPCB Standard Limit
1	Tiwarta	µg/m3	63.8	100
2	Chainpur	µg/m3	61.2	100
3	Burganihapara	µg/m3	63.6	100
4	Renki	µg/m3	62.2	100

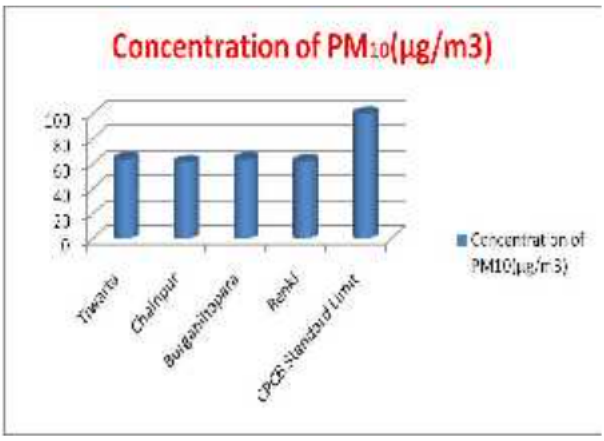


Table 2 – Concentration of PM 2.5

S. No	Name of the village	Unit	Concentration of PM2.5	CPCB Standard Limit
1	Tiwarta	µg/m3	41.2	60
2	Chainpur	µg/m3	40.8	60
3	Burganihapara	µg/m3	42.3	60
4	Renki	µg/m3	40.1	60

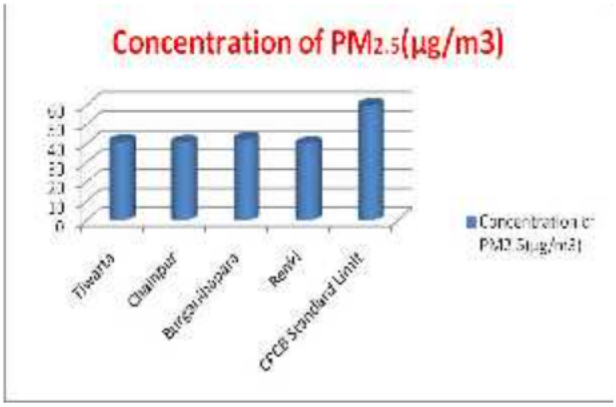


Table 3 – Concentration of Sulphur dioxide:

S. No	Name of the village	Unit	Concentration of SO2	CPCB Standard Limit
1	Tiwarta	µg/m3	51.9	80
2	Chainpur	µg/m3	58.2	80
3	Burganihapara	µg/m3	54.6	80
4	Renki	µg/m3	56.9	80

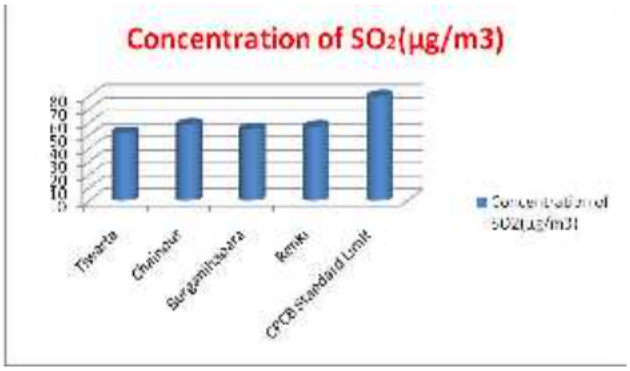


Table 4 – Concentration of Nitrogen Oxides

S. No	Name of the village	Unit	Concentration of NOx	CPCB Standard Limit
1	Tiwarta	µg/m3	49.6	80
2	Chainpur	µg/m3	42.5	80
3	Burganihapara	µg/m3	43.6	80
4	Renki	µg/m3	44.9	80

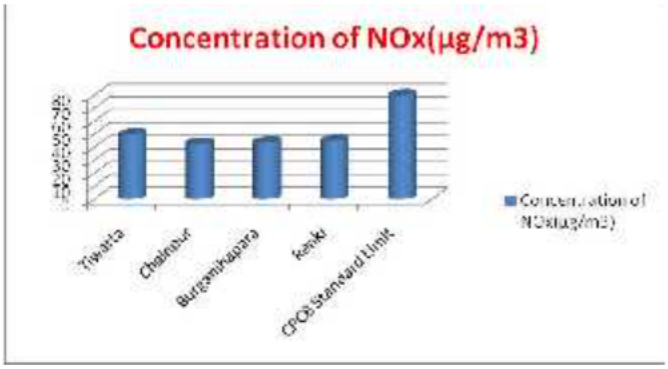
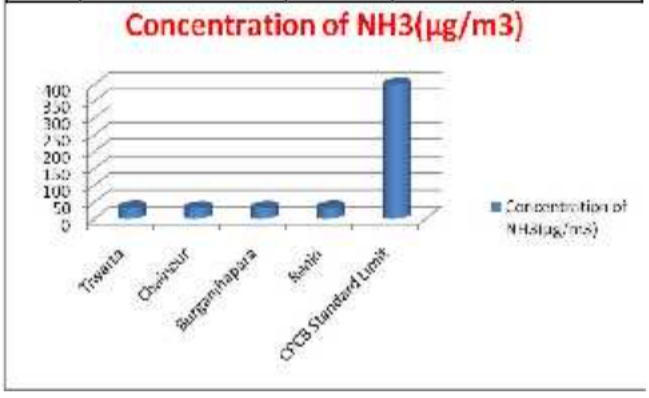


Table 5– Concentration of Ammonia

S. No	Name of the village	Unit	Concentration of NH3	CPCB Standard Limit
1	Tiwarta	µg/m3	32.9	400
2	Chainpur	µg/m3	31.5	400
3	Burganihapara	µg/m3	32.1	400
4	Renki	µg/m3	33.2	400



Ammonia:

IV CONCLUSION

By observing the above results, it can easily be concluded that concentration of estimated pollutants are within the prescribed limit of Central Pollution control Board Except for Ammonia rest of the pollutants (i.e. Particulate matter

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