

AIR QUALITY IN DEVELOPING CITIES OF PUNJAB

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Abstract- The air we breathe is a mixture of gases and small solid and liquid particles. Some substances come from natural sources while others are caused by human activities such as our use of motor vehicles, domestic activities, industry and business. Air pollution occurs when the air contains substances in quantities that could harm the comfort or health of humans and animals or could damage plants and materials. These substances are called air pollutants and can be either particles, liquids or gaseous in nature. Keeping the air quality acceptable has become an important task for decision makers as well as for non-governmental organizations. Particulate matter and gaseous emissions of pollutant emission from industries and auto exhausts are responsible for rising discomfort, increasing airway diseases and deterioration of artistic and cultural patrimony in urban centers EPA, (1994).

The project investigates the concentration of the pollutants Sulphur Dioxide, Nitrogen Dioxide and Particulate Matter (size less than $10\mu\text{m}$) generated at sites of Verka Milk Plant (Residential Area), Vishavkarma Chowk (Commercial Area) and Nahar Spinning Mill (Industrial Area) of the LUDHIANA city. The major pollutants as suggested by the Punjab pollution control board is Sulphur Dioxide, Nitrogen Dioxide and Particulate Matter. The maximum value of Particulate Matter was found to be $472\mu\text{g}/\text{m}^3$ at Nahar Spinning Mill, for Sulphur dioxide was found to be $15\mu\text{g}/\text{m}^3$ at Nahar Spinning Mill, and for Nitrogen dioxide was found to be $36\mu\text{g}/\text{m}^3$ at Nahar Spinning Mill.

I. INTRODUCTION

Air pollution can be described as the introduction of various chemicals particulates or biological material materials which can cause diseases, discomfort or death to humans and damage to natural environment. Air pollutant can be described as a substance in air that can cause harm to human and environment. In India, pollution has become a great topic of debate at all levels and especially the air pollution because of the enhanced anthropogenic activities such as burning fossil fuels, i.e. natural gas, coal and oil to power industrial processes and motor vehicles. Among the harmful chemical compounds, this burning puts into the atmosphere, are carbon dioxide (CO_2), carbon monoxide (CO), nitrogen oxides (NO_x), sulphur dioxide (SO_2), and tiny solid particles-including lead from gasoline additives-called particulates (Goyal P. et al., 2003).

Potential health hazards due to particulate air pollution are a significant concern in both urban areas and rural areas in the United States. Several air sheds are currently classified by United States Environmental Protection Agency (US EPA) as non attainment areas for airborne particulate matter with an aerodynamic diameter of less than $10\mu\text{m}$ (PM10).

Non-attainment areas are identified based on National Ambient Air Quality Standards (NAAQS) set by the Clean Air Act Amendments (CAAA) of 1990 (Pulugurtha Srinivas S. et al., 2006).

II. OBJECTIVE

Main objective of the study:-

A. To know the air quality at Ludhiana city.

B. Comparison of the experimental data with the prescribed standard given by Central pollution Control Board.

III. METHODOLOGY

According to the CPCB (Central Pollution Control Board) the methods prescribed for the pollutant gases and the particulate pollutants are very sensitive ones yet percentage of errors are very less. The methods prescribed for the gases SO_2 , NO_x and the Particulate Matter PM10 are respectively:

1. Respirable Dust Sampler Method
(For the measurement of suspended particulate matter, SO_2 , NO_x concentration.)
2. Spectrometer Photo Meter is used to analysis the concentration SO_2 , NO_x .

Location of sampling source:-

1. Verka Milk Plant (Residential Area)
2. Vishav Karma Chowk (Commercial Area)
3. Nahar Spinning Mill (Industrial Area)

The pollutants under study are:

1. Sulphur Dioxide
2. Nitrogen Dioxide
3. Particulate Matter

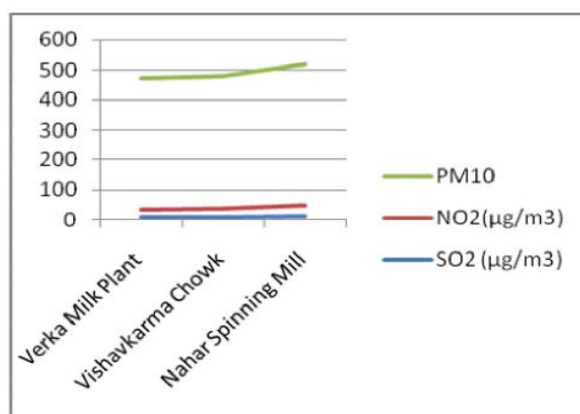
IV. STANDARD VALUES

Sr. No.	Pollutant	Time Weighted Avg.	Ind., Resi., Rural
1	Sulphur Dioxide ($\mu\text{g}/\text{m}^3$)	24 Hrs.	80
2	Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)	24 Hrs.	80
3	Particulate Matter PM_{10} ($\mu\text{g}/\text{m}^3$)	24 Hrs.	100

V. RESULTS

Sr. No.	Location	Sulphur Dioxide ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide ($\mu\text{g}/\text{m}^3$)	Particulate Matter PM_{10} ($\mu\text{g}/\text{m}^3$)
1	Verka Milk Plant	9	25	438
2	Vishav Karma Chowk	12	27	442
3	Nahar Spinning Mill	15	35	470

VI. GRAPHICAL REPRESENTATION



CONCLUSION

The air quality parameters at different locations of Ludhiana city are found to be more than prescribed limit. The maximum value of particulate matter was found to be $470 \mu\text{g}/\text{cu-m}$ at Nahar Spinning Mill, for sulphur dioxide was found to be $15 \mu\text{g}/\text{cu-m}$ at Nahar Spinning Mill, and for nitrogen dioxide was found to

be $35 \mu\text{g}/\text{cu-m}$ at Nahar Spinning Mill but the values of RSPM at all the locations was more than the Standard by CPCB. The values of SO_2 and NO_x at all the locations was less than the standard by CPCB. Thus due to these pollutants various respiratory diseases was found to present in people of Ludhiana and can affect the life of people with various other health hazards.

RECOMMENDATIONS

1. Regular monitoring of the air should be done.
2. The results of the analysis of air should be published for the purpose of record.
3. Strict laws should be imposed on the industries which release their effluents directly into the air without initially treating it.
4. Educating the people about the various problems specially the labor class that works in industries will also help to clean the environment as the best way to manage the environment, is to manage ourselves.

REFERENCES

- [1] EPA, (1994) Measuring Air Quality. The pollutant standards Index, U.S. Environmental Agency. Office of Air Quality planning and standards (MD10). Research Triangle park, NC, 27711, EPA 451/K94001.
- [2] EPA (1999C), The Air Quality Index, US. Environmental Protection Agency. Office of Air Quality planning and standards, Research Triangle park, NC27711.
- [3] CPCB (2001), National Air Quality standard, www.cpcb.gov/air/index.
- [4] (Pulugurtha Srinivas S. et al., 2006 National Ambient Air Quality Standards (NAAQS) set by the Clean Air Act Amendments (CAAA) of 1990).
- [5] (Goyal P. et al., 2003). *Air Quality Monitoring*. Vol. 1. *Measuring of SO2, NO and NO2*.

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