The impact of Nitrogen Oxides concentration decreases in atmosphere Due to Lockdown of COVID-19

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Abstract: **The objective of this paper is to review the effect of present lockdown due to COVID-19 Corona pandemic on atmosphere and air pollution. The by analyzing the data of the different major pollutants present in air like NO_2 , NO and NO_x measured by the air pollution control board during the lockdown and before the lock down. Mathematical model applied on the several variable and compared simultaneously and concluded that the yearly lock down worldwide is necessary to save the environment. Especially the nitrogen Oxide level present in the air can be controlled by the same type of the lockdown yearly.**

Keywords: **Ozone (O$_3$) has damaging effects on human health level of NO_2 , NO and NO_x is decreased by 2.765916667, 4.092833333, 6.3305 $\mu g/m^3$.**

I. INTRODUCTION

Nitrogen Oxides are a family of corrosive and hazardous gases. These gases form when fuel is burned at high temperatures. NO_x Pollution is emitted by automobiles, trucks and various non-road vehicles (e.g., construction equipment, boats, etc.) as well as industrial sources such as power plants, industrial boilers, cement kilns, and turbines. NO_x Often appears as a brownish gas. It is a strong oxidizing agent and plays a major role in the atmospheric reactions with volatile organic compounds (VOC) that produce ozone (smog) on hot summer days. Ozone (O$_3$) has damaging effects on human health and environment. The significant reductions of O$_3$ depend on nitrogen oxides (NO_x) and volatile organic compounds. NO_x is a major precursor of O$_3$. In this study I analysed data collected from the air pollution control board of the India for some particular places of India during the lockdown due to COVID-19 Corona virus pandemic. The air quality index and pollutants present in the air like Pm2.5, pm10, CO2, OZONE, NO2 etc measured by the air pollution control board are very different from other days. This shows that the air quality is being better during this present lockdown situation and impact of NO_x concentration decreases. The average level of NO_2 , NO and NO_x is decreased by 2.765916667, 4.092833333, 6.3305 $\mu g/m^3$ respectively during this lockdown.

II. MATERIALS AND METHODS

The real time data of continuous ambient air quality, monitoring by Central Pollution Control Board.

STUDY AREA:

Sector-10, Gandhinagar – GPCB centre, Gujrat, India.

DATA:-

The data collected from CPCB site http://cpcb.nic.in/report.php presented by graph, Daily data of NO_2 , NO and NO_x which shows the emission level in $\mu g/m^3$.
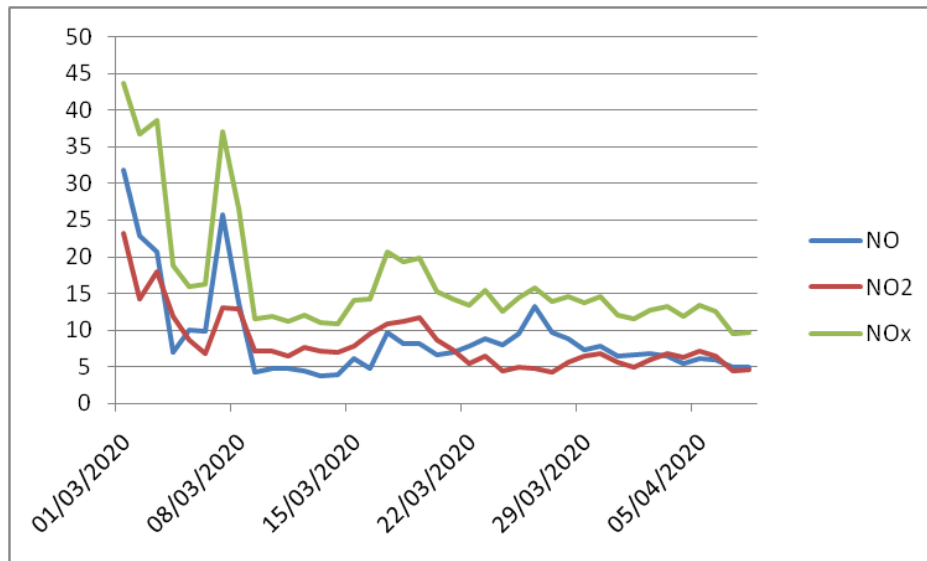
Figure:-1.2

III. MATHEMATICAL MODEL

A forecast/prediction of Nitrogen Oxide present in the air can be made though Differential equation in which unknown variable can be expressed as a function of certain number of known variables. Concentration level of Nitrogen of Oxide can be expressed as

$$V^{total}\frac{dC}{dt} = E^{emm}.C(t) - E^{exha}C(t) \qquad (1)$$

Where, V^{total}=Total volume of air,

E^{emm}=Total amount of emitted Nitrogen Oxide.

E^{exha}= Total amount of exhausted Nitrogen Oxide.

$C(t)$ = Concentration level of Nitrogen of Oxide at time t.

Here the emission level is always higher then exhausted level in normal days so in equation (1) we can consider $E^{emm} < E^{exha}$.

Now the solution for equation (1) is

$$C(t) = \alpha e^{\frac{Kt}{V}} \qquad (2)$$

Where, $K = E^{emm} - E^{exha} > 0$

α is integration constant.

IV. CONCLUSION

Here the equation (2) shows that the concentration level of the Nitrogen Oxide will be increasing exponentially with time whenever the emissions level is higher then the exhaust level.

Now if we consider the lockdown situation every year for some smaller period them at that time the emission level became a lower than exhaust level so the constant K will became a negative in equation (2) so the concentration will be decreased for that time.

Hence the yearly strict lockdown for a week or the monthly one lockdown is more beneficial to the current situation of environment.

REFERENCES

[1]   http://cpcb.nic.in/report.php

[2]   An introduction to mathematical modelling by glenn marion, Bioinformatics and statistics, Scotland,-2008

[3]   Mathematical Modeling of Air Pollutants: An Application to Indian Urban City, June 2011, Piyush Goyal, Anikender Kumar.