Study of Air quality in different areas of Pune City

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Abstract: Air pollutants were studied in different areas of Pune city- Hadapsar, Lohegaon, Katraj, Shivajinagar, Bavdan and Sadashiv peth . Major air pollutants were analysed such as PM10, PM 2.5 , NO_x and SO_2 using Ambient Fine Dust sampler in month of October 2018 and 2019.

It was found that Shivajinagar area showed highest concentration of pollutants above the permissible limits in month of October 2018. October 2019 showed lower concentration of air pollutants due to Rainfall which washed away all the pollutants**.**

Index Terms - **Particulate matter 10(PM 10),Particulate matter 2.5(Particulate matter 2.5),NO_x,SO_2**

I. INTRODUCTION

Air Pollution has become a major issue all around the Word and in India too. Pune has been severely affected by Air Pollution. Increase in Air Pollutants in Pune is due to rapid Urbanization and developmental activities, increase in vehicle number, burning of agricultural wastes. High concentration of these pollutants is responsible for causing respiratory illness among people of Pune City.

II. STUDY AREA

Area selected for the study of air pollutants was Pune city. Pune city is second largest city in Indian State of Maharashtra. Estimated population of Pune city is 3.13 million. Pune city is located in coordinates of 18°31' 13"N and 73°51'24E. Areas selected for air pollutant analysis were –Shivajinagar, Hadapsar, Lohegaon, Katraj , Bavdhan and Sadashiv Peth . Major air pollutants that were studied here were Particulate matter 10 (PM 10), Particulate matter 2.5 (PM 2.5), NOX and SO2   in month of October 2018 and October 2019.

Air quality was measured using Ambient Fine Dust Sampler –EME/LAB/I136 . Particulate matter 10 (PM 10) was measured byusing test method IS5182(Part 23): 2006 (RA 2017), Particulate 2.5 was measured by using test method USEPA quality Assurance handbook Vol.II,Part 2, Quality Assurance document 2.12, Sulphur dioxide (S02) was measured using IS5182(Part 2): 2001 (RA 2017), Oxides of Nitrogen are measured using IS5182(Part 6): 2006 (RA 2017).Some data was also obtained from IITM (Indian Institute of Tropical Meteorology) Pashan , Pun

Figures -1 Showing Ambient Fine Dust Sampler and Locations where Machine was placed
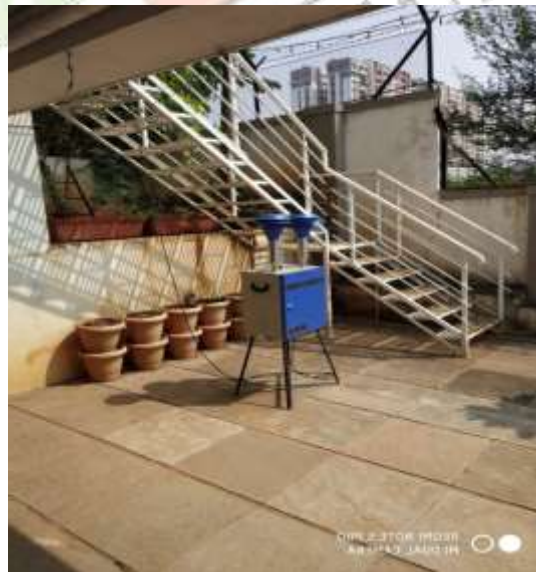

Katraj Area

Lohegaon area

Shivajinagar area

Sadashiv Peth
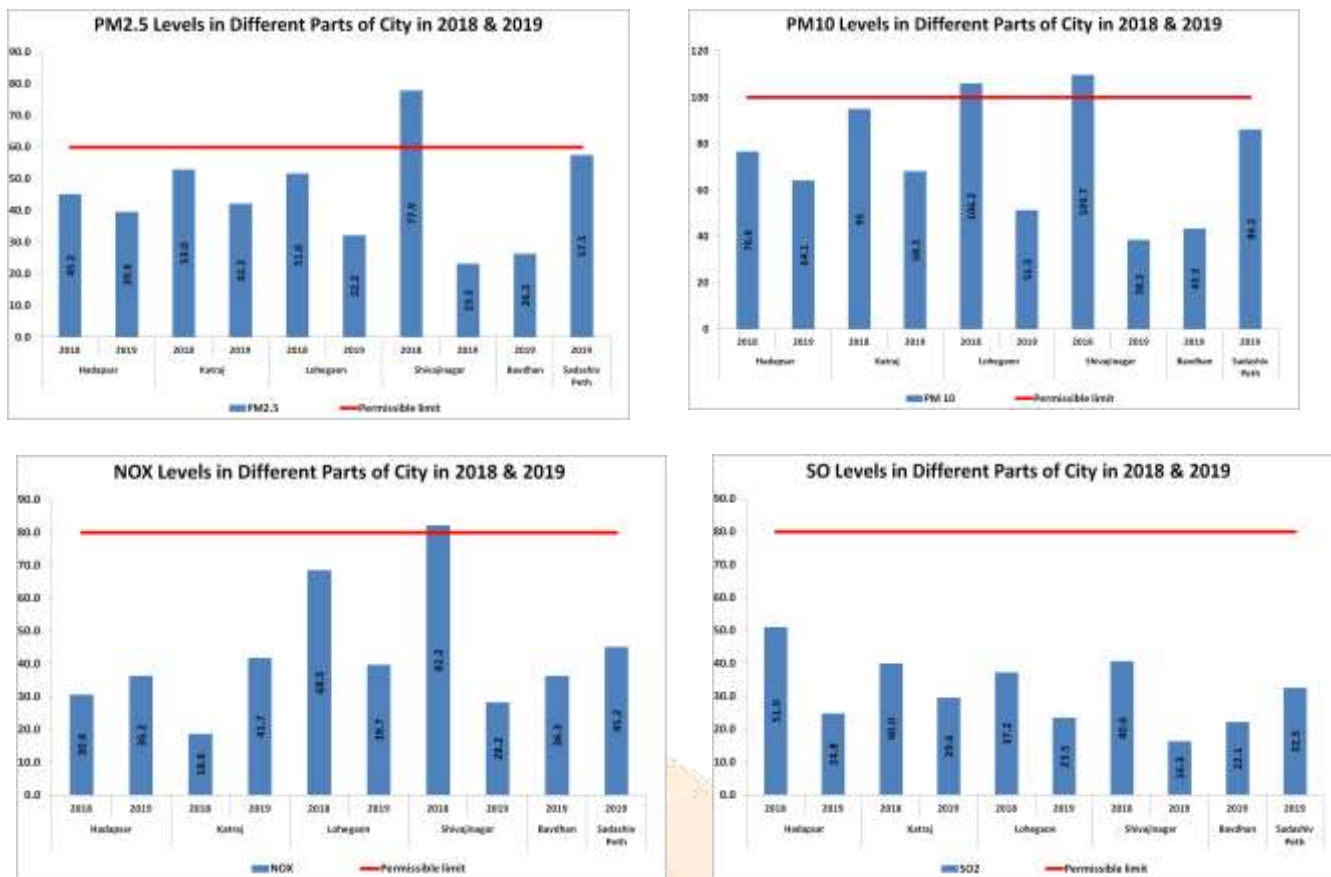

Hadapsar

Bavdhan

RESULTS AND DISCUSSION-

Figure 2- Tables showing Graphical representation of air data of 2018 and 2019

It was found that PM 10 (Particulate matter) concentration in Hadapsar area was found to be 76.6 μm^3 in October 2018 and 64.1 μm^3 in 2019. PM 10 concentration in Katraj area was found to be 95 μm^3 in October 2018 and 68.2 μm^3 in October 2019. Lohegaon area showed concentration 106.2 μm^3 in October 2018 and 51.3 μm^3 in October 2019. Shivajinagar area showed concentration of PM 10 as 109.7 μm^3 in October 2018 and 38.5 μm^3 in October 2019. Bavdhan showed PM 10 concentration 43.3 μm^3 in month of October 2019. Lohegaon area and Shivajinagar area showed concentration of Particulate matter 10 above the permissible limit in October 2018. Concentration of PM 10 was found to be low due to Rainfall in Month of October 2019.

Particulate Matter 2.5 (PM 2.5) in Hadapsar area was found to be 45.2 µm3 in October 2018 and 39.6 µm3 in October 2019, Katraj area showed concentration of PM 2.5 as 53 µm3 in October 2018 and 42.2 µm3 in October 2019, Lohegaon showed concentration as 51.6 µm3 in October 2018 and 32.2 µm3 in October 2019. Shivajinagar area showed concentration of PM 2.5 as 77.9 µm3 in October 2018 and 23.2 µm3 in October 2019. Bavdhan showed concentration of PM 2.5 as 26.3 µm3 and Sadashiv peth showed concentration as 57.5 µm3 .Shivajinagar showed highest concentration of PM 2.5 in month of October 2018. Concentration of PM 2.5 was found to be low in month of October 2019 due to Rainfall.

SO2 concentration was found to be 51 µm3 in October 2018 and 24.8 µm3 in Hadapsar area, Katraj showed 40 µm3 in October 2018 and 29.6 µm3 in October 2019, Lohegaon showed 37.2 µm3 in October 2018 and 23.5 µm3 in October 2019. Shivajinagar area showed 40.6 µm3 in October 2018 and 16.3 µm3 in October 2019. Bavdhan showed 22.1 µm3 in 2019. Sadashiv peth showed 32.5 µm3 in 2019. All areas showed concentrations of SO2 below the permissible limit in 2018 and 2019 years. Concentration of SO2 was low due to rainfall in 2019.

NOx concentration in Hadapsar area was found to be 30.6 µm3 in October 2018 and 36.2 µm3 in October 2019. Katraj area showed 18.6 µm3 in October 2018 and 41.7 µm3 in October 2019 , Lohegaon area showed 68.5 µm3 in October 2018 and 39.7 µm3 in October 2019. Shivajinagar showed 82.2 µm3 in October 2018 and 28.2 µm3 in October 2019. Bavdhan showed 36.3 µm3 in October 2019 and Sadashiv peth showed 45.2 in October 2019.Shivajinagar area showed NOx concentration above permissible limits in October 2018. Concentration of NOx was found to be low in 2019 due to rainfalls.

Conclusion –

Shivajinagar area was found to be having higher concentration of Pollutants as compared to other areas. Also Rainfall in October 2019 was another factor causing decline of air pollutants in all areas because most the pollutants were washed away with rains. Plantation trees are one of the ways in which these air pollutants can be reduced.

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