



ABSTRACT

Air pollution is a burning argument which the world is facing now-a-days. When pollutants infect the ambient air environmental pollution arises, which affect routine life of human and animal adversely. From fast few decades a huge downfall occurred in the ambient air quality because of lack of scrubber technologies in industrial stacks, low quality of fuel and heavy machinery used without maintenance. To understand the current situation of Lahore city the research was formulated. HORRIBA APMA 360 was used to measure the ambient gases for the period of 24 hrs. Fine dust sampler IPM-FDS was used to calculate PM_{10} and $PM_{2.5}$ and Digital Noise level meter for noise. The ambition of this study was to analyze the outdoor air quality of Lahore city and its comparisons with Pak-EPA and US-EPA standards. Five monitoring stations was selected by keeping in view the industrial and commercial cum with residential zones of Lahore. It was observed that the average concentration of PM_{10} at Kalma chowk, Thokar, Phatak, Qartaba and Begum Kot were $212 \mu\text{g}/\text{m}^3$, $285 \mu\text{g}/\text{m}^3$, $245.3 \mu\text{g}/\text{m}^3$, $219 \mu\text{g}/\text{m}^3$, $239 \mu\text{g}/\text{m}^3$ and $PM_{2.5}$ were $144 \mu\text{g}/\text{m}^3$, $165.3 \mu\text{g}/\text{m}^3$, $157.6 \mu\text{g}/\text{m}^3$, $151 \mu\text{g}/\text{m}^3$, $146.5 \mu\text{g}/\text{m}^3$ respectively, which are above the standards array by Pak-EPA and US-EPA. During study we found many activities that causing the current situation of Lahore air quality such as infrastructure developments projects, road widening and Orange train projects etc. Similarly the level of CO at Kalma Chowk was $4.03 \pm 0.67 \text{mg}/\text{m}^3$, Begum Kot $6.8 \pm 0.64 \text{mg}/\text{m}^3$, Phatak $5.6 \pm 0.71 \text{mg}/\text{m}^3$, Thokar $7.2 \pm 0.8 \text{mg}/\text{m}^3$ and Qartaba Chowk $5.4 \pm 1.07 \text{mg}/\text{m}^3$. NO_2 concentration at Thokar Niaz Baig was $62.9 \pm 6.5 \mu\text{g}/\text{m}^3$, Kalma Chowk $45.8 \pm 7.9 \mu\text{g}/\text{m}^3$, Phatak $48.4 \pm 7.1 \mu\text{g}/\text{m}^3$, Begum Kot $72.8 \pm 5.4 \mu\text{g}/\text{m}^3$ and Qartaba Chowk $41.9 \pm 8.1 \mu\text{g}/\text{m}^3$. Level of NO at Kalma Chowk $18.2 \pm 7.1 \mu\text{g}/\text{m}^3$, Thokar $29.5 \pm 9.3 \mu\text{g}/\text{m}^3$, Phatak $24.9 \pm 9.2 \mu\text{g}/\text{m}^3$ Qartaba Chowk $19.8 \pm 5.5 \mu\text{g}/\text{m}^3$ and Begum Kot $28.1 \pm 5.8 \mu\text{g}/\text{m}^3$. Concentration of SO_2 at Kalma Chowk $75.5 \pm 8.9 \mu\text{g}/\text{m}^3$, Thokar $18.2 \pm 9.8 \mu\text{g}/\text{m}^3$, Phatak $87.9 \pm 3.8 \mu\text{g}/\text{m}^3$, Qartaba Chowk $55.8 \pm 8.2 \mu\text{g}/\text{m}^3$ and Begum Kot $117.6 \pm 6.9 \mu\text{g}/\text{m}^3$. Diesel engines are also a huge source generating $PM_{2.5}$. Ambient gases were monitored for 24hrs, all gases were within the limits of Pak-EPA except NO_2 . NO_2 and SO_2 were above the US-EPA limits. The low quality of fuel used in generators, power stations, heavy machinery and industrial emissions are the main source of exceeding level of gases. LPG, CNG and petrol engines eliminate exceeding amount of CO, NO and SO_2 . The correlation analysis displayed that



CO, NO, NO₂ and SO₂ have positive relation with one and other and negative relation with O₃. During daytime almost all NO converted to NO₂ by reacting with abundant O₃ in the presence of sunlight. When the concentration of NO, CO, NO₂ and SO₂ decreased the value of O₃ increased. The value of Noise was above the limits of standards because of redundant used of horns, construction activities, industrial process and vehicles. Highest value was recorded at Thokar which is 90.4db, Begum Kot 89.7, Phatak 85.2, Qartaba Chowk 83.4db and at Kalma Chowk was 80.7db. The 24hrs data at all different monitoring stations are formulated in tabular and graphical presentation.