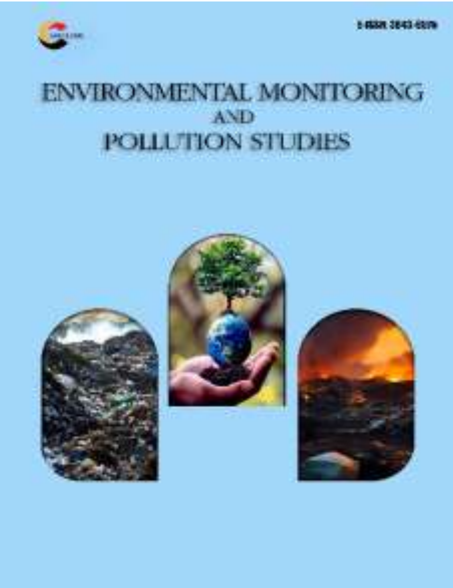
Original Research

Environmental Monitoring And Pollution Studies

https://cartcarl.com/journal/environmental-monitoring-and-pollution-studies

E-ISSN: 3043-6575



Assessment of Ambient Air Pollutants Concentration Around the Idu Industrial Area of Abuja, Nigeria

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Received: 25 May 2025
Accepted: 30 June 2025
Published: 16 July 2025

Citation

Edem, G.A., Agbagwa, I.O., Ogoro, M. (2025). Assessment of Ambient Air Pollutants Concentration Around the Idu Industrial Area of Abuja, Nigeria. *Environmental Monitoring and Pollution Studies, 2(1), 51-57* *https://doi.org/10.70726/emps.2025.215157*

Abstract

Industrial activities release major pollutants into the environment thereby causing air pollution which could be a threat to human, animal and plant life and it affects the aesthetic quality of the environment. The study assessed the ambient air pollutants concentration around the Idu industrial area of Abuja, Nigeria. The sampling procedure involves measuring the levels of Carbon Monoxide (CO), Nitrogen dioxides (NO2), Sulphur dioxide (SO2), Ammonia (NH3), and Particulate Matter (PM10) in the air using Aerosol Mass Monitor (831, U.S.A) for PM and Aeroqual series (200, U.S.A) for gaseous pollutants. The samples were collected on Mondays between 12 noon – 3pm for 4 weeks. The mean concentration of NH3 ranged from 0.01 ppm to 0.02 ppm, SO2 ranged from 0.01 ppm to 0.11 ppm, NO2 ranged from 0.01 ppm to 0.11 ppm, CO ranged from 1.58 ppm to 4.48 ppm and PM10 ranged from 3.3 ppm to 4.68 ppm across the locations and weeks. The finding revealed that all pollutants are within the allowable limit of World Health Organization (WHO), United State Environmental Protection Agency (USEPA) and Federal Ministry of Environment (FME). Therefore, the industrial activities have not negatively impacted the ambient air quality of the environment with all the assessed pollutants; however, there is need for continuous monitoring mechanism, regulations and enforcement measures to ensure the air quality of the environment is constantly unpolluted.

Keywords: Air Pollution, Air Pollutants, Industrial Activities, Abuja, WHO

Introduction

Air pollution has emerged as a serious worldwide concern in the 21st century. It is a major threat to public health as well as crop production worldwide. Long-term exposure to contaminated air generates severe health risks and mortality-related environmental circumstances (Mahmud et al., 2023) and builds a footprint toward climatic changes. Dyspnea, hemoptysis, upper airway pain, coughing, and chest tightness are some of the moderate respiratory problems caused by being exposed to nitrogen dioxide (NO_2), Sulfur dioxide (SO_2), and ozone (O_3) (Langematz, 2019; Mahmud et al., 2023). Besides, inhaling high carbon monoxide (CO) can be hazardous for humans (USEPA, 2019). According to the First World Health Organization Global Conference on Air Pollution and Health, frequent airborne pollutants cause 7 million deaths per year (WHO, 2018). Worldwide study shows that O_3 pollution may reduce the basic agricultural yield by 3–16%, with losses expected to increase by 2030 (Emberson, 2020). It is estimated that 68% of the global population will reside in urban regions by 2050, up from the current 55.5% (United Nation [UN], 2019). Despite accounting for only 2% of Earth's total area, urban areas consume 78% of global energy and emit more than 60% of carbon dioxide (Mahmud et al., 2023). On the other hand, about 80% of the global GDP is concentrated in such urban areas through high-frequency trading, industrialization, and high population concentration. As a result, in a globalizing world, urban areas play a focal role in extending a region's economic prosperity (Mahmud et al., 2023). Sources of air pollutant emissions differ from one pollutant to another. Chemical industries, vehicular traffic and petroleum refineries emit large quantities of sulphur dioxide into the atmosphere (Alani et al., 2021). Vehicular emissions have been identified as one of the major sources of SO2 and NO2, contributing to air pollution. Urban air pollution is primarily caused by anthropogenic activities such as manufacturing, mining, energy generation, construction, and urban waste management, as well as increased car usage, low fuel efficiency, gas flaring, and inefficient environmental policies (Komolafe et al., 2014; Wambebe & Duan, 2020, 2020; Mahmud et al., 2023). Both natural and anthropogenic (man-made) activities affect the quality of the natural environment which in turn poses great threat to the health of the public and the entire ecosystem. The constant activities of man such as burning and clearing of bush, agricultural and industrial activities in the quest for development result to pollution emission. This degrades the natural environment and adversely affects the human health, animals and vegetation (Nwanakwere & Oyedokun, 2020).

Industrial activities release major pollutants into the environment thereby causing air, water and land pollution, as well as noise. Industrial pollution is thus a threat to both human, animal and plant life and it affects the aesthetic quality of the environment (Henry et al., 2019). Noise, which could stress, related illness and diseases such as cancer, kidney failure nervous disorders, leukemia, mental retardation, hearing failure or total deafness is a fallout of industrial pollution (Ogedengbe and Onyuanyi 2017; Henry et al., 2019). Human exposure to air pollution may result in a variety of health effects, depending on the types of pollutants, the magnitude, duration and frequency of exposure and the associated toxicity of the pollutants of concern (Henry et al., 2019). Studies such as Wambebe and Duan (2020), Ekoh (2020), Ishaya and Omede (2022), Chukwu et al. (2022) and Ishaya et al. (2023) considered the air quality of Abuja, but not related to the industrial activities; hence, the study assess the ambient air pollutants concentration around the Idu industrial area of Abuja, Nigeria.

Materials and Method

Abuja is the capital city of Nigeria; it is located in the center of Nigeria. Abuja is bounded by four states: Kaduna in the north, in the west by Niger state, in the east and southeast by Nasarawa state and in the southwest by Kogi state. Abuja became the capital of Nigeria on 12th December 1991 (Wambebe & Duan, 2020). Abuja is also Nigeria's administrative and political center with GPS coordinates 9°5′ N 7°32′ E (Figure 1) and has a total land area of 7315 km2 (2824 sq. mi). Abuja currently has a population of more than 2.5 million people (Wambebe & Duan, 2020). The city population has grown by almost 140% making Abuja not just the fastest growing city in Africa, but also one of the fastest growing in the world (Wambebe & Duan, 2020).

Data Collection and Analysis

The sampling procedure involves measuring the levels of Carbon Monoxide (CO), Nitrogen dioxides (NO_2), Sulphur dioxide (SO_2), Ammonia (NH_3), and Particulate Matter (PM10) in the air. The samples were collected on Mondays between 12 noon – 3pm for 4 weeks. The particulate matter was sampled using an Aerosol Mass Monitor (831, U.S.A), whereas the concentrations of gaseous pollutants were assessed using an Aeroqual series (200, U.S.A). The sampling spots' geographical coordinates were determined using the Garmin GPSmap 76.

Ten (10) samplings points was identified around the industrial area based on various activities and closeness to the selected companies. The sampling instruments (Aerosol Mass Monitor and Aeroqual series) were pre-calibrated to avoid interference and error in readings and all measurements were reported in units of ppm. On arrival at the field, the instruments were switched on in a clean environment to perform bump test and calibration test. The instruments are automated but the reading was repeated three times for each pollutant and the average across the three (3) readings were recorded as final reading. Doing this will improve the accuracy of the reading and minimize unintended bias and error. During the data-collecting process, the coordinates of sample points were recorded and each sampling point were assigned a generic name and combined with a numeric identifier. The study adopted descriptive statistics, namely the mean value, to analyse the data. The findings were presented in tabular format.

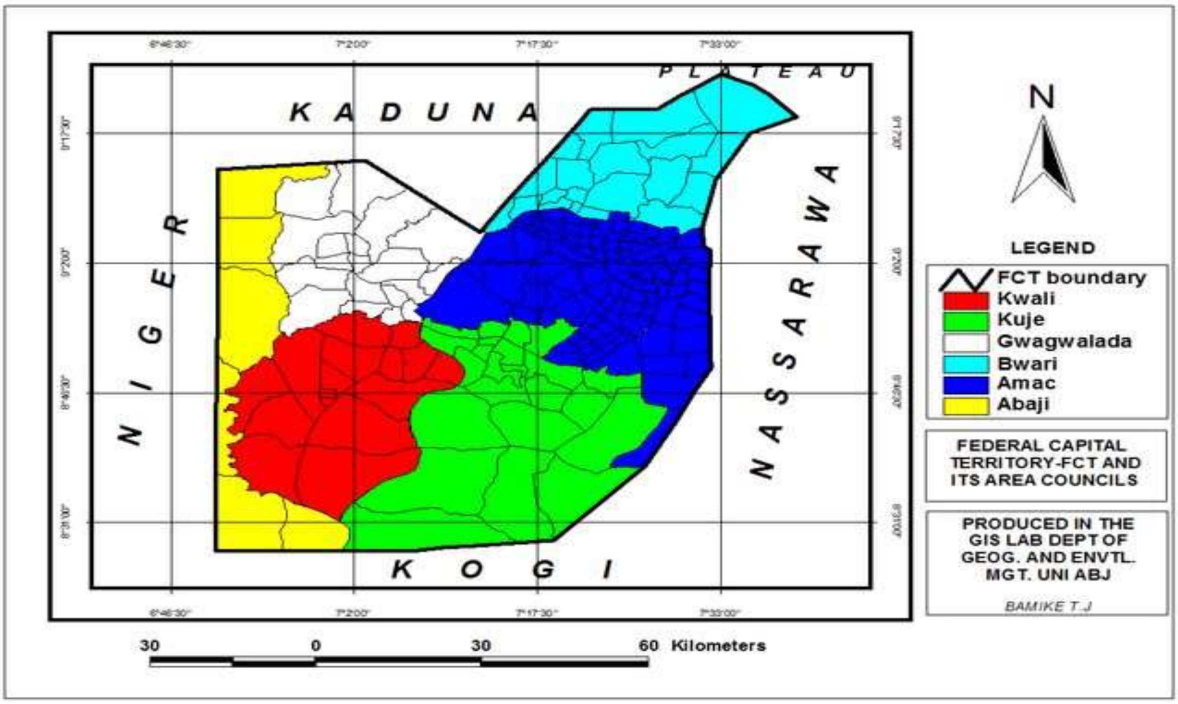

Figure 1: Overview of the Study Area

Results And Discussion

The ambient pollutants (CO, SO_2, NO_2, NH_3 and PM_{10}) concentrations across various days of the week over four weeks reading was undertaken and the outcome was presented in Table 1-3. During the Week I of Monday, the NH_3 concentrations ranged from 0.01 ppm at L1-L8 to 0.02 ppm at L1 with mean and standard deviation (SD) of 0.01 and 0.004 respectively. During the Week II, the NH_3 concentrations were 0.01 ppm across all locations with mean and standard deviation (SD) of 0.01 and 0.01 respectively. During the Week III, the NH_3 concentrations were 0.01 ppm L1-L4 and L9 to 0.02 ppm at L5-L6 and L10 with mean and standard deviation (SD) of 0.01 and 0.005 respectively. During the Week IV, the NH_3 concentrations were 0.01 ppm at L1 to 0.04 at L6 with mean and standard deviation (SD) of 0.02 and 0.01 respectively. The mean concentration of NH_3 across the locations ranged from 0.01 ppm to 0.02 ppm. The concentrations reported for the study were lower to those reported by Ogunleye et al. (2022), Etim (2016), Ipeaiyeda and Adegboyega (2017) and Ogungbe et al. (2019). The outcome shares similar low concentration reported by the study conducted by Mahmud et al. (2023) which indicated low concentration of the pollutant in the Northern part of Nigeria. The concentration of NH_3 according to Etim (2016) NH_3 concentration is influenced by various factors such as engine, fuel type and surrounding environment.

During the Week I, the SO_2 concentration ranged from 0.01 ppm at L1-L2, L4 - L9 to 0.1 ppm at L3 with mean value and SD of 0.02 and 0.03 respectively. During the Week II, the SO_2 concentration ranged from 0.01 ppm at L2-L4, L6, L7 and L10 to 0.02 ppm at L1, L5-L6 and L7-L8 with mean value and SD of 0.01 and 0.01 respectively. During the Week III, the SO_2 concentration ranged from 0.01 ppm at L3-L5 and L10 to 0.4 ppm at L7 with mean value and SD of 0.1 and 0.01 respectively. During the Week IV, the SO_2 concentration ranged from 0.01 ppm at L1-L7 to 0.04 ppm at L10 with mean value and SD of 0.01 and 0.01 respectively. The mean concentration of SO_2 ranged from 0.01 ppm to 0.11 ppm across all the studied locations and the concentrations were within the acceptable limit of 75ppm for USEPA and 20ppm for WHO respectively. The SO_2 reported are within allowable limit of various standard guidelines for air quality while the concentration was similar to those reported by Obanya et al. (2018) for a transportation sector and within the range of those reported by Ishaya and Omede (2022) for different human activities related area in Abuja. The concentrations reported for the study were lower to those reported by Ogunleye et al. (2022) and Ipeaiyeda and Adegboyega (2017) for poultry factory and industrial estate respectively. Similar outcome was reported by study conducted by Ogungbe et al. (2019) where the SO_2 concentration of bus-stop studied are within allowable limit of USEPA and WHO.

Table 1: Air Pollutants Concentration Measured During Monday (12 noon-3 pm)

L	WEEK 1					WEEK 2					WEEK 3					WEEK 4				
	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)
L1	0.02	0.01	0.05	5.1	4.1	0.01	0.02	0.01	3.8	4.6	0.01	0.3	0.03	3.1	4.1	0.01	0.01	0.05	5.1	5.6
L2	0.01	0.01	0.20	3.1	1.1	0.01	0.01	0.02	1.2	3.4	0.01	0.1	0.2	4.1	5.3	0.03	0.01	0.01	4	4.1
L3	0.01	0.1	0.07	1.7	2.3	0.01	0.01	-	3.1	2.3	-	0.01	0.02	2	3.3	0.03	0.01	0.01	3	5.3
L4	-	0.01	0.02	2.1	3.3	0.01	0.01	0.02	0.03	5.1	0.01	0.01	-	-	4.0	0.02	0.01	0.02	2.6	5.2
L5	0.01	0.01	-	7.0	2.0	0.01	0.02	0.01	2.1	5.6	0.02	0.01	0.01	3.1	3.8	0.02	0.01	0.01	5.7	4.8
L6	0.01	0.01	0.06	3.1	1.9	0.01	0.01	0.02	5	3.1	0.02	0.02	-	5	4.5	0.04	0.01	0.02	9	7.1
L7	0.01	0.02	0.01	4.1	2.8	0.01	0.01	0.01	0.01	2.3	-	0.4	0.01	7	3.3	0.01	0.01	0.04	5.1	4.3
L8	0.01	0.01	0.02	2	2.5	0.01	0.02	0.02	2.	2.2	-	0.10	0.41	6.1	4.8	0.02	-	0.02	5.0	6.7
L9	-	0.01	-	3	1.3	0.01	0.02	0.01	1.8	4.9	0.01	0.01	0.03	4	5.6	0.03	-	0.01	6.1	6.9
L10	-	0.02	0.01	5.0	1.8	0.01	0.01	0.02	0.01	3.7	0.02	0.03	0.2	5.1	3.4	0.02	0.04	0.02	3.1	7.3
Mean	0.01	0.02	0.06	3.62	2.31	0.01	0.01	0.02	1.91	3.72	0.01	0.10	0.11	4.39	4.21	0.02	0.01	0.02	4.87	5.73
SD	0.004	0.03	0.06	1.68	0.91	-	0.01	0.01	1.70	1.27	0.01	0.14	0.15	1.58	0.82	0.01	0.01	0.01	1.88	1.19

Table 2: Air Pollutants Concentration Measured During Wednesday (12 noon-3 pm)

L	WEEK 1					WEEK 2					WEEK 3					WEEK 4				
	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)
L1	0.02	0.03	0.03	3.1	6.1	0.01	0.01	0.05	5.1	5.6	0.02	0.01	0.05	4.1	4.6	0.02	0.01	0.05	5.5	5.1
L2	0.01	0.1	0.2	4.1	4.3	0.03	0.01	0.01	4	4.1	0.01	0.01	0.20	1.1	3.4	0.01	0.01	0.20	3.8	3.1
L3	0.01	0.01	0.02	2	4.3	0.03	0.01	0.01	3	5.3	0.01	0.1	0.07	2.3	2.3	0.01	0.1	0.07	2.9	4.3
L4	0.01	0.01	0.01	4	4.0	0.02	0.01	0.02	2.6	5.2	0.01	0.01	0.02	3.3	5.1	0.01	0.01	0.02	2.4	3.7
L5	0.02	0.01	0.01	3.1	4.8	0.02	0.01	0.01	5.7	4.8	0.01	0.01	0.01	2.0	5.6	0.01	0.01	0.03	7.1	2.5
L6	0.02	0.02	0.02	4.7	4.5	0.04	0.01	0.02	9	7.1	0.01	0.01	0.06	1.9	3.1	0.01	0.01	0.06	3.1	2.9
L7	0.01	0.4	0.01	6	2.3	0.01	0.01	0.04	5.1	4.3	0.01	0.02	0.01	2.8	2.3	0.01	0.02	0.01	4.1	3.8
L8	0.01	0.10	0.41	6.1	5.8	0.02	0.02	0.02	5.0	6.7	0.01	0.01	0.02	2.5	2.2	0.01	0.01	0.02	2.5	3.5
L9	0.01	0.01	0.03	4.2	3.6	0.03	0.04	0.01	6.1	6.9	0.02	0.01	0.04	1.3	4.9	0.01	0.01	0.03	3.3	2.3
L10	0.02	0.03	0.2	5.3	5.4	0.02	0.04	0.02	3.1	7.3	0.02	0.02	0.01	1.8	3.7	0.01	0.02	0.01	5.4	2.8
Mean	0.01	0.07	0.09	4.26	4.51	0.02	0.02	0.02	4.87	5.73	0.01	0.02	0.05	2.31	3.72	0.011	0.021	0.05	4.01	3.4
SD	0.01	0.12	0.13	1.32	1.11	0.01	0.01	0.01	1.88	1.18	0.01	0.03	0.06	0.91	1.27	0.003	0.03	0.06	1.53	0.86

Table 3: Air Pollutants Concentration Measured During Saturday (12 noon-3 pm)

L	WEEK 1					WEEK 2					WEEK 3					WEEK 4				
	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)	NH_3 (ppm)	SO_2 (ppm)	NO_2 (ppm)	CO (ppm)	PM (ppm)
L1	0.01	0.01	0.05	2.1	2.6	0.02	0.01	0.05	3.5	4.1	0.01	0.02	0.01	1.8	4.8	0.02	0.01	0.05	1.1	4.1
L2	-	0.01	0.01	4	1.1	0.01	0.01	0.20	3.8	3.2	0.01	0.01	0.02	1.2	3.4	-	0.01	0.20	3.1	1.1
L3	0.03	0.01	0.01	3	1.3	0.01	0.1	0.07	1.9	3.3	0.01	0.01	-	2.1	2.3	0.01	0.1	0.07	1.7	2.3
L4	0.02	-	0.02	2.6	2.2	0.01	0.01	0.02	2.4	3.6	0.02	0.01	0.02	-	4.1	-	0.01	0.02	2.1	3.3
L5	0.02	0.01	0.01	5.1	2.8	0.01	0.01	0.03	4.1	2.4	0.01	0.02	0.01	2.1	3.6	0.01	0.01	-	-	2.0
L6	0.04	0.01	0.02	1.1	1.1	0.01	0.01	0.06	2.1	2.7	0.01	0.01	0.02	-	3.1	0.01	0.01	0.06	3.1	1.9
L7	-	0.01	0.04	5.1	4.3	0.01	0.02	0.01	3.7	1.8	0.01	0.01	0.01	-	2.3	0.01	-	0.01	4.1	2.8
L8	0.02	0.01	0.02	4.0	1.7	0.01	0.01	0.02	2.6	2.5	0.04	0.02	0.02	2.5	2.2	0.01	0.01	0.02	2.1	2.5
L9	0.03	0.02	0.01	3.1	3.9	0.01	0.01	0.03	2.3	3.3	0.01	0.02	0.01	3.9	4.9	-	0.01	-	3.6	1.3
L10	0.02	0.04	0.02	1.1	2.3	0.01	0.02	0.01	3.4	1.8	0.01	0.01	0.02	1.5	2.7	-	0.02	0.01	3.2	1.8
Mean	0.02	0.01	0.02	3.12	2.33	0.01	0.02	0.05	2.98	2.87	0.01	0.01	0.02	2.16	3.34	0.01	0.02	0.06	2.68	2.31
SD	0.01	0.01	0.01	1.45	1.11	0.003	0.03	0.06	0.80	0.76	0.03	0.005	0.005	0.88	1.01	0.004	0.03	0.06	0.98	0.91

L:Location (1-10), SD: Standard Deviation, Relative Humidity (Average): 24.7%, Noise (Average): 55.7 DB, Temperature (Average): 33.4 °C and Windspeed (Average): 1.11 m/s

During the Week III, the SO_2 concentration ranged from 0.01 ppm at L3-L5 and L10 to 0.4 ppm at L7 with mean value and SD of 0.1 and 0.01 respectively. During the Week IV, the SO_2 concentration ranged from 0.01 ppm at L1-L7 to 0.04 ppm at L10 with mean value and SD of 0.01 and 0.01 respectively. The mean concentration of SO_2 ranged from 0.01 ppm to 0.11 ppm across all the studied locations and the concentrations were within the acceptable limit of 75ppm for USEPA and 20ppm for WHO respectively. The SO_2 reported are within allowable limit of various standard guidelines for air quality while the concentration was similar to those reported by Obanya et al. (2018) for a transportation sector and within the range of those reported by Ishaya and Omede (2022) for different human activities related area in Abuja. The concentrations reported for the study were lower to those reported by Ogunleye et al. (2022) and Ipeaiyeda and Adegboyega (2017) for poultry factory and industrial estate respectively. Similar outcome was reported by study conducted by Ogungbe et al. (2019) where the SO_2 concentration of bus-stop studied are within allowable limit of USEPA and WHO.

During the Week I, the NO_2 concentration ranged from 0.01 ppm at L7 and L10 to 0.2 ppm at L2 with mean value and SD of 0.06 and 0.06 respectively. During the Week II, the NO_2 concentration ranged from 0.01 ppm at L1, L5, L7 and L9 to 0.02 ppm at L2, L4, L6 and L8 with mean value and SD of 0.02 and 0.01 respectively. During the Week III, the NO_2 concentration ranged from 0.01 ppm at L5 to 0.41 ppm at L8 with mean value and SD of 0.11 and 0.15 respectively. During the Week IV, the NO_2 concentration ranged from 0.01 ppm at L2, L3, L4 and L9 to 0.05 ppm at L1 with mean value and SD of 0.02 and 0.01 respectively. The mean concentration of NO_2 across the locations ranged from 0.01 ppm to 0.11 ppm was within the acceptable limit of 53ppm for USEPA and 200ppm for WHO respectively. The concentration reported there-in is low to those reported by the study conducted by Ipeaiyeda and Adegboyega (2017), higher than those reported by Ishaya and Omede (2022) and within the range reported by the study conducted by Ugbebor et al. (2019). Accordingly, the concentration NO_2 has been reported to be influenced by heat emanating from motor vehicles on the highway and electric utilities from residential and industries that burn fuels (Ipeaiyeda and Adegboyega, 2017). Fossil fuel combustion contributes more than the natural sources. Vehicle exhaust is known to enhance the concentration of NOx in the atmosphere (Ipeaiyeda and Adegboyega, 2017).

During the Week I, the CO concentration ranged from 1.7 ppm at L3 to 7.0 ppm at L5 with mean value and SD of 3.62 and 1.68 respectively. During the Week II, the CO concentration ranged from 0.01 ppm at L7 to 5.0 ppm at L6 with mean value and SD of 1.91 and 1.70 respectively. During the Week III, the CO concentration ranged from 2 ppm at L3 to 7 ppm at L7 with mean value and SD of 4.39 and 1.58 respectively. During the Week IV, the CO concentration ranged from 2.6 ppm at L4 to 9.0 ppm at L6 with mean value and SD of 4.87 and 1.88 respectively. The mean concentration CO ranged from 1.58 ppm to 4.48 ppm across all the studied locations and the concentrations were within the acceptable limit of 35ppm, 25ppm and 10ppm for USEPA, WHO and FME respectively. The reported concentration is within the range of concentrations reported by similar study conducted by Ugbebor and LongJohn (2018) for transportation activities. The concentration reported therein was lower than those reported by Ogunleye et al. (2022) and Ipeaiyeda and Adegboyega (2017) for poultry factory and industrial estate respectively. The reported concentration was higher than those reported by Ishaya and Omede (2022) for market and motor park area in Abuja and those reported by Ugbebor et al. (2019) for residential areas. The persistent in the concentration of CO across the industrial area and studied locations confirm the similarities in the anthropogenic influence of its availability in the environment. This was previously suggested by the study conducted by Obanya et al. (2018); however, Ipeaiyeda and Adegboyega (2017) asserted that since air has no boundaries, it is conceivable that much of the accumulated atmospheric pollutants from the various sources may eventually migrate by atmospheric convection to a potential sink in the atmosphere of another region or continent.

During the Week I, the PM_{10} concentration ranged from 1.1 ppm at L2 to 4.1 ppm at L1 with mean value and SD of 2.31 and 0.91 respectively. During the Week II, the PM_{10} concentration ranged from 2.2 ppm at L8 to 5.6 ppm at L5 with mean value and SD of 3.72 and 1.27 respectively. During the Week III, the PM_{10} concentration ranged from 3.3 ppm at L3 to 5.6 ppm at L9 with mean value and SD of 4.21 and 0.82 respectively. During the Week IV, the PM_{10} concentration ranged from 4.1 ppm at L2 to 7.3 ppm at L10 with mean value and SD of 5.73 and 1.19 respectively. The mean PM_{10} ranged from 3.3 ppm to 4.68 ppm across the locations and within the acceptable limit of 150 ppm for USEPA but beyond the allowable limit of WHO and FME at 50 ppm and 250 ppm respectively. The concentration of PM_{10} reported across the industrial area locations were within the allowable limit by WHO while the reported concentration lower than those reported by Ugbeboor and LongJohn (2018), Obanya et al. (2018), Ishaya and Omede (2022) and Ogungbe et al. (2019). According to Ajayi et al. (2023), PM_{10} is one of the most important pollutants, as it penetrates sensitive regions of the respiratory system and can cause or aggravate cardiovascular, lung, and cancer diseases. PM can be a primary pollutant or a secondary pollutant from hydrocarbons, nitrogen oxides, and sulfur dioxide.

Conclusion

Emissions from industrial discharge have become one of the key drivers of urban environmental air pollution, limiting the quality of the urban living environment by degrading the ambient air quality. Having assessed the ambient air pollutants concentration around the Idu industrial area of Abuja, Nigeria based on national and international air quality guidelines, the study concluded that the industrial activities have not negatively impacted the ambient air quality of the environment with all the assessed pollutants are within the allowable limit for ambient air pollutants concentration. There is need for continuous monitoring mechanism, regulations and enforcement measures to ensure the air quality of the environment is constantly unpolluted.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Credit Authorship Contribution Statement

Edem, G.A: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Visualization, Project administration, Writing - original draft. **Agbagwa, I.O., and Ogoro, M.:** Supervision, Methodology, Validation, Formal analysis, Data curation, Visualization, Review & Editing.

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