Indoor Air Quality ($PM_{2.5}$ and PM_{10}) and Toxicity Potential at a Commercial Environment in Akure, Nigeria†

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INTRODUCTION

- **In general, neither developing nor developed countries take the effects of air pollution for granted.**

- **Pollutant gases (O_3, NO_2, SO_2, and CO) and particulate matter (PM - PM_{10} and $PM_{2.5}$) are the main culprits of air pollution.**

- **Various studies have shown particle pollution exposure to a variety of problems, including: premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma [1].**

- **The studies on pollutant toxicity potential have been motivated by growing human health concerns about PM inhalation.**

Objective

- **The objective of this study was to assess the levels of $PM_{2.5}$, PM_{10}, the $PM_{2.5}/PM_{10}$ ratio, and the toxicity potential (TP) of a commercial area in Akure, Ondo State, Nigeria.**

MATERIALS AND METHODS

- **Study Location: The research was carried out at the Federal College of Agriculture, Akure, REC campus commercial area (5 14 23.94 E 7 5 49.34 N).**

- **Sensor Used: A low-cost Canāree A1 sensor an Intelligent Particle Sensor**

- **Duration: Three-month monitoring**

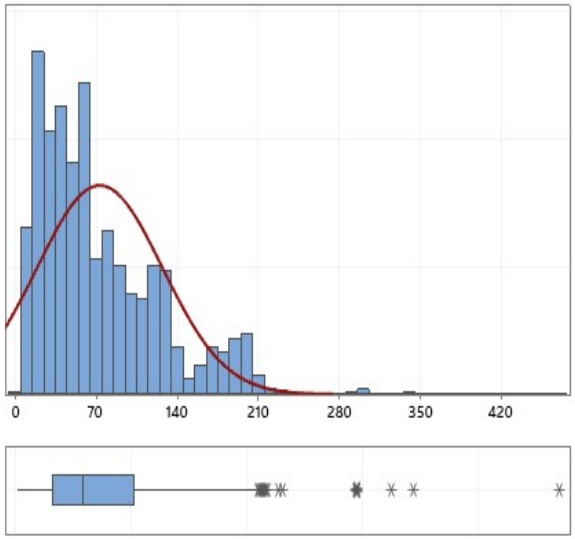
(March to May 2022) of PM_{10} and $PM_{2.5}$ in the study for 6 h each day.

Canāree low-cost sensor

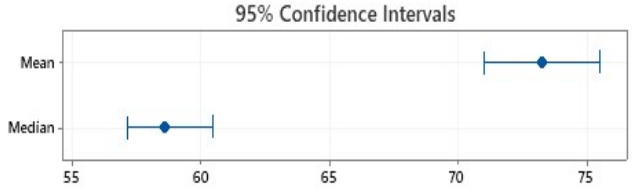
- **Statistical Analysis: The generated data was statistically manipulated using Minitab and Excel 2013 software, producing basic summary reports and a bar chart, respectively**

RESULTS AND DISCUSSION

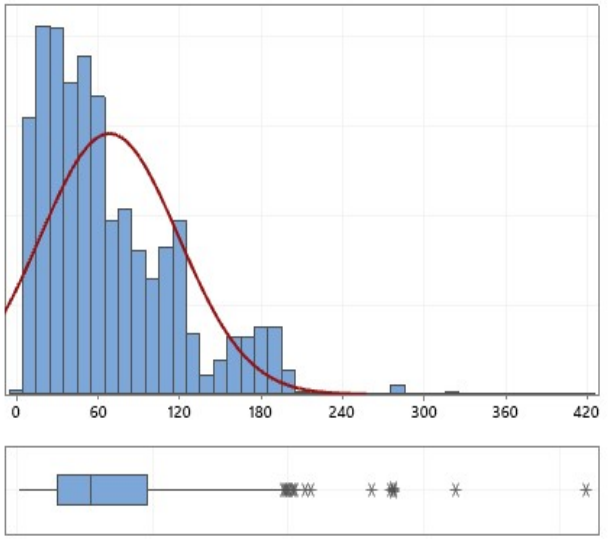
Summary Report for PM10 (µg/m3)



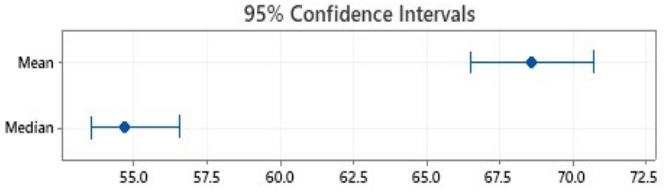
Anderson-Darling Normality Test	
A-Squared	64.92
P-Value	<0.005
Mean	73.234
StDev	53.939
Variance	2909.414
Skewness	1.30262
Kurtosis	2.39927
N	2210
Minimum	1.263
1st Quartile	32.858
Median	58.610
3rd Quartile	102.955
Maximum	469.799
95% Confidence Interval for Mean	
70.984	75.484
95% Confidence Interval for Median	
57.187	60.501
95% Confidence Interval for StDev	
52.394	55.578



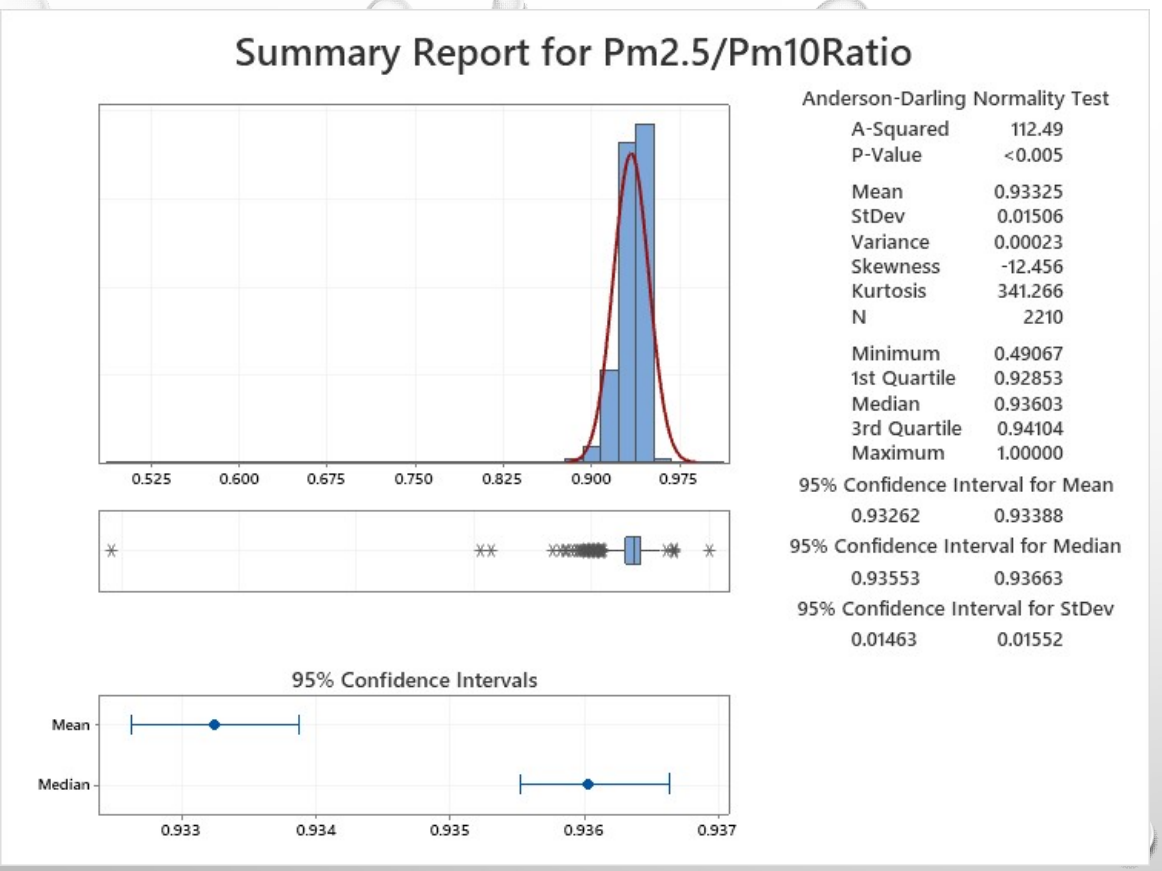
Summary Report for PM2.5 (µg/m3)



Anderson-Darling Normality Test	
A-Squared	65.45
P-Value	<0.005
Mean	68.583
StDev	50.636
Variance	2564.037
Skewness	1.26819
Kurtosis	2.04574
N	2210
Minimum	1.263
1st Quartile	30.772
Median	54.698
3rd Quartile	96.241
Maximum	419.126
95% Confidence Interval for Mean	
66.471	70.695
95% Confidence Interval for Median	
53.563	56.567
95% Confidence Interval for StDev	
49.186	52.175



RESULTS AND DISCUSSION … contd



Anderson-Darling Normality Test

A-Squared	112.49
P-Value	<0.005
Mean	0.93325
StDev	0.01506
Variance	0.00023
Skewness	-12.456
Kurtosis	341.266
N	2210
Minimum	0.49067
1st Quartile	0.92853
Median	0.93603
3rd Quartile	0.94104
Maximum	1.00000

95% Confidence Interval for Mean

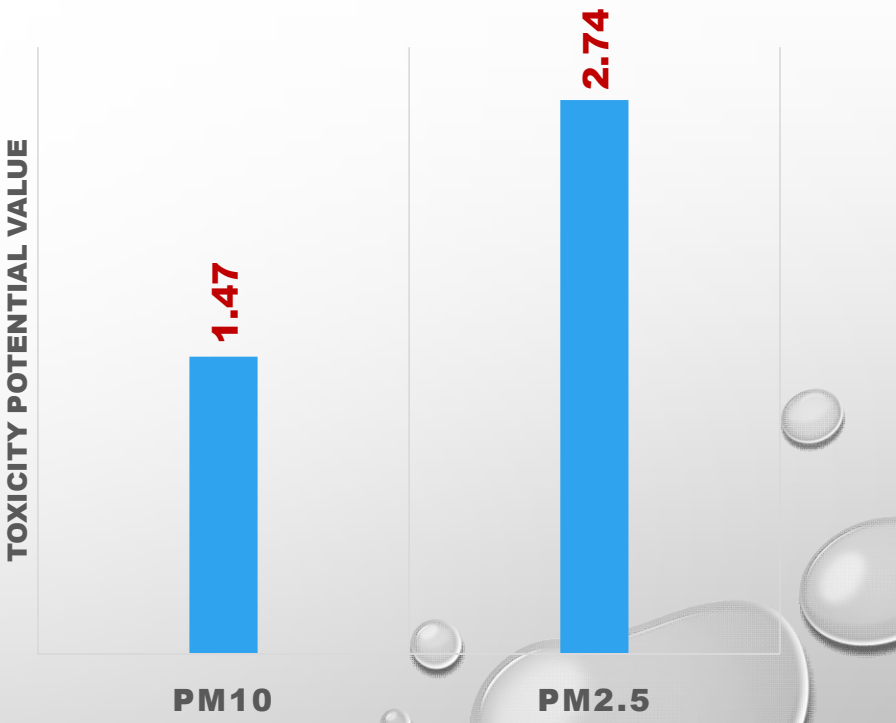
0.93262	0.93388

95% Confidence Interval for Median

0.93553	0.93663

95% Confidence Interval for StDev

0.01463	0.01552



$PM_{2.5}$ AND PM_{10} TOXICITY POTENTIALS

CONCULSIONS

The findings

- **that the WHO 2021 guidelines were exceeded.**
- **The $PM_{2.5}/PM_{10}$ ratios were low**
- **The presence of PM could be attributed to fumes from the generator and vehicles in the study area.**
- **TP greater than one**
- **There is a health concern, especially for the vulnerable (the sick, children, and the elderly).**
- **Constant monitoring is advised.**

REFERENCES

[1]. WHO. WHO global air quality guidelines: particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. World Health Organization. 2021. https://apps.who.int/iris/handle/10665/345329.

COLLABORATION

As Researchers, my team and I are ready to collaborate with you regarding to air pollution mitigation

END

THANKS FOR LISTENING