**Seasonal Variation of Outdoor Bio-aerosol Transport and the Attendant Health Risks at High Traffic Density at PortHarcourt city, Nigeria**

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**Abstract**

Port Harcourt, a bustling metropolis in Nigeria, experiences high traffic congestion, leading to elevated air pollution levels. This pollution includes bio-aerosols, airborne particles of biological origin, such as bacteria, fungi, and allergens. Bio-aerosols can pose significant health risks, particularly for vulnerable populations like children and the elderly. This study aims to investigate the seasonal variations in outdoor bio-aerosol concentrations and diversity at high traffic density locations in Port Harcourt city, Nigeria. The study will further assess the potential health risks associated with exposure to these bio-aerosols, considering seasonal variations in their composition and abundance. Air samples were collected at various locations with high and low traffic density using Settle Plate Method. The collected samples were analyzed to identify and quantify the types and concentrations of bio-aerosols present. Meteorological data, such as wind speed and direction, were measured to assess their influence on bio-aerosol dispersion. The potential health risks associated with the identified bio-aerosols were evaluated based on their known health effects and exposure levels. The study revealed the potential health risks associated with exposure to these bio-aerosols, informing public health interventions and air quality management strategies. However, the seasonal variations in bio-aerosol composition and their associated health impacts in Port Harcourt remain poorly understood. This study will contribute to a better understanding of the bio-aerosol burden in Port Harcourt city and its potential impact on public health and also to develop targeted interventions to reduce exposure to harmful bio-aerosols and improve air quality, particularly in areas with high traffic density.

**Keywords: Bio-aerosols, traffic density, air pollution, public health, seasonal variation, Port Harcourt, Nigeria**