

Indoor Air Quality and Health Risk Assessment Among Occupants at Level 2 Office of Axalta Powder Coating Systems Malaysia

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Structured Abstract

Background: Indoor air quality (IAQ) has emerged as a significant health concern due to the adverse effects associated with prolonged exposure to indoor air contaminants. Office environments, particularly those utilizing split unit air conditioning and insufficient ventilation are susceptible to the accumulation of physical, chemical and biological contaminants. This study was conducted to evaluate the IAQ and associated health risks among occupants at Level 2 office of Axalta Powder Coating Systems Malaysia, with the purpose of identifying the major indoor air contaminant sources and recommending appropriate mitigation measures.

Methods: A cross-sectional assessment was conducted involving the selection of study location, ethics approval, and determination of sampling points. IAQ monitoring involved the measurement of physical, chemical and biological parameters using standardized instrumentation over a typical 8-hour working hours. Walkthrough inspections, complaint and structured questionnaire surveys were conducted to assess environmental conditions and reported health symptoms. Health Risk Assessment (HRA) was conducted in accordance with United States Environmental Protection Agency (US EPA) methodology, including non-carcinogenic and carcinogenic risk.

Results: The results showed that temperature, carbon dioxide, PM_{2.5}, bacterial and fungal count exceeded the maximum acceptable limit sets by ICOP IAQ 2010, ASHRAE 62.1 2022, ASHRAE 55 2020 and WHO2007. Identified contaminant sources included insufficient ventilation, emissions from office equipment and materials as well as human occupancy. Questionnaire findings showed that environmental factors and reported symptoms further supported the monitoring data. HRA results showed that formaldehyde and PM_{2.5} exceeded acceptable carcinogenic risk limits, whereas non-carcinogenic hazard quotient values for CO₂, PM_{2.5} and formaldehyde remained below the threshold of 1.0.

Conclusion: In conclusion, this study highlights the presence of elevated IAQ parameters and associated health risks within the assessed office environment. The findings highlight the necessity for implementing both short and long-term IAQ improvement strategies to ensure the health and well-being of occupants in office settings.

Keywords: Indoor air quality, health risk assessment, office, symptoms, strategies

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