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Indoor Air Quality and Health Risk Assessment among Occupants in Pasta Panas, Seksyen 7, Shah Alam

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Structured Abstract

Background: Indoor air quality (IAQ) plays a crucial role in ensuring the health and comfort of occupants, especially in enclosed food premises. This study aimed to investigate IAQ and the associated health risks among occupants of Pasta Panas restaurant. The study focused on physical, chemical and biological parameters of indoor contaminants and evaluated the exposure through environmental monitoring and health risk assessment.

Methods: IAQ parameters were measured using calibrated instruments over an eight-hour working period. Walkthrough observations, complaint surveys and questionnaires were conducted to identify the sources of contamination and occupant health symptoms. Health risk assessments for both carcinogenic and non-carcinogenic were calculated using the United States Environmental Protection Agency (USS EPA) inhalation exposure model. The parameters were assessed using a Quest EVM-7, Temtop Formaldehyde Detector, Aeroqual Handheld Monitor, and a Biotage Single-stage Impactor with a Biological Sample Pump

Results: This study showed several parameters exceeded the recommended limits under ICOP IAQ 2010, particularly temperature, relative humidity, formaldehyde, $PM_{2.5}$, PM_{10} and total bacteria count. Key contributing factors included poor ventilation, cooking emissions and high occupancy. Health symptoms frequently reported included headaches, fatigue, drowsiness, coughing and stuffy nose, which corresponded with the IAQ findings. The result indicated a potential cancer risk for $PM_{2.5}$ which exceed the acceptable limits, while hazard quotient values showed low risk for $PM_{2.5}$ and moderate risk for PM_{10}. These findings highlight the short-term and long-term mitigation strategies to improve IAQ problems and health concerns of the occupants.

Conclusion: In conclusion, these findings underline the critical need for focused mitigation techniques to limit exposure and enhance indoor air quality in food industry settings. This study contributes to the future of occupational health standards in Malaysia's food and beverage industry. Building services and HVAC engineering demonstrate the critical for demand-controlled ventilation (DCV) in dining spaces. Future restaurant designs should move away from static ceiling cassette unit and toward 'smart' system that use real-time sensors to adjust airflow based on CO_2 and humidity spikes.

Keywords: Indoor Air Quality, Health Risk Assessment, Restaurants, Health Symptoms

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