

Evaluation of Indoor Air Quality in Selected Laboratories of a Tropical Educational Institution

Prepared by: Tan Sheng Chuan

ABSTRACT

This comparative study was conducted to assess the indoor air quality (IAQ) of selected air-conditioned (AC) laboratories and naturally ventilated (NV) workshops of INTI International University. Carbon dioxide (CO₂), carbon monoxide (CO), formaldehyde (HCHO), particulate matters (PMs) and total volatile organic compounds (TVOCs) were selected as measuring variable. Measurements of indoor air pollutants (IAP) were performed according to the guidelines set by Industrial Code of Practice of DOSH standard 2010. The measured IAP concentrations in each sampling area were well below the recommended limits of DOSH standard 2010 except for Statics and Dynamics (S&D) laboratory and Molecular-biosciences (MB) laboratory. The CO₂ concentration in S&D laboratory was found to be 2 times higher than the specified limit of DOSH standard 2010 due to inadequate ventilation rate and high occupant density. The HCHO concentration in MB laboratory was found to be 3 times greater than the recommended limit and this phenomenon was due to long term exposure of chemical substances and improper disposal ways of used chemical substances. The concentration of PMs found to be high in NV workshops due to lack of housekeeping. Besides, subjective measurements were carried out by developing questionnaire in order to record the prevalence of Sick Building Syndromes (SBS). All the results obtained were analyzed statistically and the outcomes showed that most of the IAP were not normally distributed ($P < 0.05$) within the sampling areas. SBS symptoms like dry eyes, watery eyes, tiredness and dry throat were found significant ($P < 0.05$) in both AC laboratories and NV workshops. This study suggested that increase in ventilation rates will reduce the concentration of IAP and the good practice of housekeeping will reduce the prevalence of SBS symptoms.

Keywords: Indoor Air Quality (IAQ), Indoor Air Pollutants (IAP), Air-conditioned laboratories, Naturally Ventilated workshops, Sick Building Syndromes (SBS)