

BTEX measurement in ambient air of urban Kuala Lumpur using continuous monitoring and passive sampling techniques

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Level of Benzene, Toluene, Ethyl benzene, m,p-Xylene and o-Xylene (BTEX) in ambient air, especially in urban area is important to measure due to their health risk effects to human. This study aims to evaluate the BTEX level using two different measurement techniques, i.e. continuous monitoring and passive sampling using a sorbent tube. Both methods were conducted simultaneously during January 2017 to sample urban ambient air of Kuala Lumpur (3.168133° N, 101.700433° E). Continuous monitoring was performed using online GC-FID, meanwhile passive sampling method was deployed for 5-7 days using the Tenax GR® sorbent tube and analysis was performed by Thermal Desorption Gas Chromatography Mass Spectrometry (TD-GCMS). Average results for BTEX were 1.69, 5.09, 1.03, 2.44 and 1.05 ppbv, respectively, with continuous monitoring. Monthly average results for BTEX with passive sampling method were 1.50, 6.69, 1.24, 2.31 and 2.84 ppbv, respectively. Two sample T-Test found the $p > 0.05$ for Benzene, Ethylbenzene and m,p Xylene indicated that both techniques were comparable. Toluene to benzene ratios (3.01 to 4.46) indicated that the ambient air of KL was mainly polluted with vehicle emission. The benzene level (5.07 $\mu\text{g}/\text{m}^3$) was slightly higher than European Union (EU) annual permissible limit of 5.00 $\mu\text{g}/\text{m}^3$ for benzene in ambient air which can possess a cancer risk. Therefore, routine measurement of hazardous air pollutants such as BTEX is necessary for health risk information and the abatement strategy.

Keywords: BTEX, ambient air, urban, Kuala Lumpur, continuous monitoring, passive sampling