

UNIVERSITI TEKNOLOGI MARA

**Particulate Matter Concentration inside Air Conditioned Public Bus in
Klang Valley**

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Project Paper Submitted In Partial Fulfillment of the Requirements

for the Degree of

Bachelor in Environmental Health and Safety (Hons)

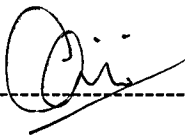
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DECLARATION

Project entitled Particulate Matter Concentration Level Inside Air Conditioned Public Bus in Klang Valley is a presentation of my original research work. Wherever contributions of others are involved, every effort is made to indicate this clearly, with due reference to the literature, and acknowledgement of collaborative research and discussions. The project was done under the guidance of Dr. K. Subramaniam as Project Supervisor. It has been submitted to the Faculty of Health Sciences in partial fulfillment of the requirement for the Degree of Bachelor in Environmental Health and Safety (Hons).

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ABSTRACT

Particulate Matter Concentration Levels inside Public Bus in Klang Valley

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Particulate Matter exposure has been a concern in our daily lives such as our place of work, environment and home. The Department of Environment is responsible for controlling environmental pollution, while the Department of Occupational Safety and Health is responsible for exposures of workers in the workplace environment. However, less consideration has been given to the microenvironment we are living in such as public transportation and other places where we may be exposed to and where we spend some time. This study was done to measure the concentrations of the PM₁₀ and PM_{2.5} in the public bus transportation. The measurements were done by using TSI's DustTrak Aerosol Monitor and Quest EVM-7/CO Advanced Particulate and Air Quality Monitor with PID with logging interval of 30second and run for 30 minutes each sample which represents the exposure time for the bus commuters. One way Anova was used to analyse the effects of travelling periods (morning: 8.00am-12.00pm and afternoon: 12.00-7.00pm) on the concentration of the particulate matter in buses. Post hoc analysis of Kramer Multiple Comparison was used to analyse the groups involved. Independent t-test was used to analyse types of bus as a factor that contributed to the high concentration of particulate matter. Descriptive data and inferential data showed that both PM₁₀ and PM_{2.5} are affected by the type of bus and the travelling period. The study found that the highest exposure for both PM₁₀ and PM_{2.5} are at the morning peak time for the Metro Bus (n=24) with PM₁₀ mean exposure=198.8±...µg/m³ and PM_{2.5}=67.08±20.73µg/m³ while for Rapid KL (n=26) the PM₁₀=156.54±35.21µg/m³ and PM_{2.5}=41.81±7.54µg/m³. One way Anova result (p<0.001) with significance difference (p<0.05) between AM Peak travelling time and the PM peak travelling period. Independent t-test (p<0.001) showed a significance difference (p<0.05) between Rapid KL Bus and Metro Bus for both PM₁₀ (mean difference=198.8±5.63ug/m³) and PM_{2.5} (mean difference=97.6±5.771ug/m³) concentrations. This phenomenon could be due to the microclimate inversions and high density of PM concentrations in the micro-environment. In Malaysia there are no specific legislation on the concentration of particulate matter in vehicles for PM₁₀ and PM_{2.5}. However as a working place for the drivers the USECCHS, Regulations 2000 was complied with PM₁₀=3mg/m³ and no standards set for PM_{2.5}.

Keywords: Particulate Matter, Public Bus, Microenvironment