UNIVERSITI TEKNOLOGI MARA

ENVIRONMENTAL EXPOSURE ON *LEGIONELLA SPP.* IN COOLING SYSTEMS AT SELECTED HOSPITALS IN KLANG VALLEY

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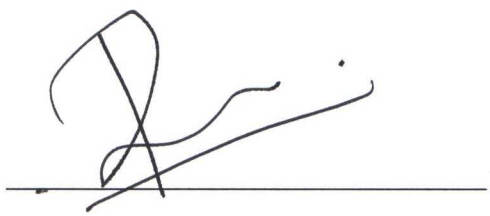
DECLARATION

I hereby declare that this dissertation is my original work, which is not previously and concurrently submitted by any other person at UiTM or other institutions.



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Muhammad Rushdi Ibrahim

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Abstract

This paper describes the environmental exposure of *Legionella spp.* at three (n=3) selected hospitals in the Klang Valley. The study involves the isolation of *Legionella spp.* using positive pressure membrane filtration method, and then the calculation of exposure dose. The exposure dose is then plotted onto the satellite map at the sampling location, indicating the environmental exposure to the residential population. The results showed that 20% of the cooling towers in Kuala Lumpur were contaminated; 11% for Sungai Buloh; and 66.67% of cooling towers in Serdang Hospital was contaminated. The exposure dose ranges from 0.90 $cfum^3/mL/kg/day$ to 50 $cfum^3/mL/kg/day$. There is a significant difference between the bacterial growth for morning and evening sample, due to the evening sample taken on microbiocide treatment day (p= 0.005). Chlorine was used as disinfection method for the cooling water, but there is a significance difference between the concentrations of free chlorine on the sample with the standard concentration based on standard by Ministry of the Environment Singapore (p= 0.00). Statistical analysis also revealed that treatment using microbiocide is significantly associated with the bacterial growth (p= 0.009). Nevertheless, in order to determine the overall environmental exposure, the cooling towers in other buildings and also environmental factors such as weather, wind direction and velocity has to be considered. The low number of Legionnaires' disease is also linked with the formation of anti-Legionella antibodies, but further research is needed to confirm this. As a conclusion, *Legionella spp.* was isolated in the cooling towers (n=31) of selected hospitals in Klang Valley, with the exposure dose up to 50 $cfum^3/mL/kg/day$. Chlorine was used to disinfect the cooling water, but the dose is not up to the referral standard from Singapore.