

Assessment of Pathogenic Bacteria in Universiti Teknologi MARA Retention Ponds

Amirah Hannani Yusri^a, Noreen Husain^{b*}

Structured Abstract

Background: A retention pond, or retention basin, is an artificial pond used to regulate stormwater runoff and improve water quality. However, urban settings have led to the conversion of land into leisure parks. Contaminants in stormwater, such as heavy metals and pathogenic bacteria, can cause water-borne illnesses like cholera, leptospirosis, diarrhea, and cryptosporidiosis. Research is needed to assess pathogenic bacteria and brain-eating Amoeba in retention ponds, preventing potential health risks.

Methods: Water samples were taken systematically from four retention ponds on the UiTM Puncak Alam campus. The pH values of these samples were analysed to determine the chemical environment of the ponds. To assess microbial presence, bacteria were isolated on nutrient agar and their morphological traits were assessed by Gram-staining. Additionally, a series of biochemical tests, including the catalase test, coagulase test, and indole production test, were conducted to identify and confirm the presence of specific pathogenic bacteria.

Results: The study evaluated the presence of pathogenic bacteria in the retention ponds at Universiti Teknologi MARA. Bacterial isolates were identified using various biochemical tests, Gram staining, and colony morphology. The findings revealed the presence of pathogenic bacteria, including *Listeria monocytogenes*, *Bacillus cereus*, *Salmonella spp.*, *Pseudomonas aeruginosa*, and *Klebsiella pneumoniae*. The pH of the water in the retention ponds was also measured, with results indicating varying pH levels that could influence bacterial growth. These bacteria pose significant health risks as they can cause infections such as skin, respiratory, and gastrointestinal disorders. The study highlights the importance of regular monitoring and controlling bacterial contamination and pH levels in retention ponds to ensure they do not pose a threat to public health.

Conclusion: In conclusion, the retention ponds at Universiti Teknologi MARA have varying pH levels conducive to bacterial growth. Pathogenic bacteria, including *Salmonella spp.* and *Pseudomonas aeruginosa*, were identified, posing significant health risks. The study underscores the need for regular monitoring and maintenance to mitigate these risks. Recommendations include implementing best management practices, improving filtration systems, and conducting routine water quality assessments, alongside public education on the dangers of recreational use of these ponds.

Keywords: Retention ponds, pathogenic bacteria, stormwater management, Gram staining, biochemical tests

*Correspondence: noreen2790@uitm.edu.my

^a School of Biology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia

^b Faculty of Pharmacy, Universiti Teknologi MARA, Puncak Alam, Malaysia