

Quality Assessment of Domestic Wells in Kampung Kasar, Pasir Mas, Kelantan

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Structured Abstract

Background: Groundwater constitutes an essential natural resource, providing freshwater for domestic, agricultural, and industrial applications, particularly in rural regions. In Kampung Kasar, Pasir Mas, Kelantan, Malaysia, groundwater constitutes the principal source for daily activities. Nonetheless, apprehensions regarding contamination stemming from anthropogenic activities, including agriculture, landfills, and industrialization, underscore the need for a comprehensive assessment of its quality. This study seeks to evaluate groundwater quality in Kampung Kasar by employing both chemical and physical parameters, and subsequently classify the findings following the Malaysian National Water Quality Standards (NWQS).

Methods: Domestic wells samples were obtained from five wells located in Kampung Kasar and subsequently analysed for essential parameters, including Chemical Oxygen Demand (COD), Biological Oxygen Demand (BOD), Total Suspended Solids (TSS), pH, Ammonia Nitrogen (AN), and Dissolved Oxygen (DO). The samples were analysed using standardised laboratory techniques, and results were compared to NWQS thresholds. The Water Quality Index (WQI) values were computed to categorise groundwater contamination levels.

Results: The analysis revealed significant deviations from NWQS limits for several parameters. The Chemical Oxygen Demand (COD) values varied between 21.0 and 50.0 mg/L, exceeding the permissible threshold of 10 mg/L. This discrepancy signifies a substantial degree of both organic and inorganic contamination. The biochemical oxygen demand (BOD) levels, ranging from 5.2 to 20.8 mg/L, surpassed the established threshold of 1 mg/L, indicating a significant degree of organic pollution. The pH values, ranging from 5.33 to 6.65, were below the neutral threshold of 7, thereby indicating the presence of acidic conditions in certain wells. In contrast, the total suspended solids (TSS) values exhibited significant variability, with Wells B and D surpassing the threshold of 25 mg/L. The levels of Ammonia Nitrogen and Dissolved Oxygen typically remained within permissible parameters; however, Well E exhibited slightly elevated ammonia concentrations. The WQI scores classified all wells as Class V which is highly contaminated.

Conclusion: In conclusion, the results of the study indicated that the groundwater in Kampung Kasar is significantly contaminated and is not safe for direct consumption without prior treatment. Therefore, this study emphasizes the importance of strict water quality management to ensure compliance with National Water Quality Standards (NWQS).

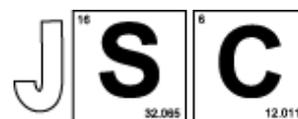
Keywords: Domestic wells, Malaysian national water quality standards, pasir mas, chemical oxygen demand

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