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Assessment of the Physicochemical Qualities and Prevalence of Vibrio Pathogens in the Final Effluents of Two Wastewater Treatment Plants in Eastern Cape Province, South Africa

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Abstract : Treated wastewater effluent has been found to encompass high levels of pollutants, including disease-causing bacteria such as Vibrio pathogens. The current study was designed to evaluate the physicochemical qualities and prevalence of Vibrio pathogens in treated effluents of two wastewater treatment plants (WWTP) in Eastern Cape Province, South Africa over the period of six months. Parameters measured include pH, temperature, electrical conductivity, salinity, turbidity, total dissolved solid (TDS), dissolved oxygen (DO), and free chlorine; and these parameters were simultaneously monitored in the treated final effluents of the two wastewater treatment plants using standard methods. The ranges of values for the physicochemical are: pH (7.0–8.6), total dissolved solids (286.3–916.5 mg/L), electrical conductivity (572.57–1704.5 mS/m), temperature (10.3–28.6 °C), turbidity (4.02–43.20 NTU), free chlorine (0.00–0.19 mg/L), dissolve oxygen (2.06–6.32 mg/L) and biochemical oxygen demand (0.1–9.0 mg/L). The microbiological assessment for both WWTPs revealed the presence of Vibrio counts ranging between 0 and 8.76×104 CFU/100 mL. The obtained values of the measured parameters and Vibrio loads of the treated wastewater effluents were found outside the compliance levels of the South African guidelines and World Health Organization tolerance limits for effluents intended to be discharged into receiving waterbodies. Hence, we conclude that these WWTPs are important point sources of pollution in surface water with potential public health and ecological risks.

Keywords : effluents, public health, South Africa, Vibrio, wastewater
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