

The present work is a laboratory-scale study of perchlorate (ClO_4^-) degradation using *Proteus* sp. LMNCRE in a batch reactor. The average hourly value of perchlorate degradation rate in this system was 1.95 mg/L at optimum pH 7.5 and 0.25% NaCl salinity. The microbial growth and degradation kinetics have been studied to a variety of ClO_4^- levels (0 to 100 mg/L) under anoxic conditions. The biomass optical-density value of strain gradually increased from 0-0.37 during the operating period of 30h. The perchlorate level in which the bacterium could withstand for effective removal was found to be 75 ± 2.0 mg/L with zero order reaction coefficient (k) of 2.08 mg/L/h. The observed anoxic degradation rate of strain was 87.0 ± 0.6 % within 12 h of incubation period at 25 mg/L of initial perchlorate level. From the experimental findings, the uptake of perchlorate by the bacterium is suggested to obey a zero-order substrate-utilising kinetic model, allowed the growth rates constants to be determined.