Microbial growth rate and distribution of doubling time at different concentration of oil sludge medium

ABSTRACT

Microorganisms play a critical part in the development of a sustainable ecosystem and biosphere. The generation time, which differs among bacteria is influenced by many environmental factors as well as the nature of the bacteria species. In this present work, the growth curves of five consortia locally isolated beneficial microorganisms (LIBeM) in mixtures of (LIBeM) Candida tropicalis-RETL-Cr1, Chromobacterium violaceum-MAB-Cr1, Pseudomonas aeruginosa-BAS-Cr1, Sphingomonas paucimobilis-RETOS-Cr1, and Stenotrophomonas maltophilia-RAS-Cr1 were reported. A laboratory scale was conducted to observe the doubling time (dt) observed for each consortium LIBeM at varied concentration levels of oil sludge (2%, 5%, 10%, 15% and 20%) v/v. After 24 hours of incubation, the growth of microorganisms was determined using spectrophotometer at 600nm and the standard growth profile were plotted according to the concentrations studied. The results showed that consortia LIBeM at 2% and 5% v/v oil sludge showed the similar growth pattern in the sigmoid curve over a 24-hour period. However, at 10%, 15%, and 20% (v/v) concentrations, the growth tendency is increased and remains consistent during the incubation period. Study on growth rate and doubling time (dt) had showed that Consortia 3 consists of C. tropicalis –RETL-Cr1+ S. maltophilia-RAS-Cr1+ P. aeruginosa-BAS-Cr1 performed the highest growth rate with 0.16 hour-1 and lowest doubling time (dt) of 4.41. This result is critical for determining the efficiency and tolerance of LIBeM for petroleum degradation at various concentration levels of oil sludge in real-world applications.