

Biodegradation of phenol at low and high doses by bacterial strains indigenous to Okrika River in the Niger Delta of Nigeria

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ABSTRACT:

Assessments on biodegradation at low and high doses of phenol by bacterial strains indigenous to Okrika River in Niger Delta of Nigeria were carried out. Growth at low dose of 0.01 µg/l phenol showed that highest and lowest cell density values of OD_{540nm} of 0.15 and 0.09 in *Pseudomonas* sp. SD1 and *Citrobacter* sp. RW1 while at 1.0 µg/l phenol concentration the highest cell density values of OD_{540nm} of 0.28 was observed in *Staphylococcus* sp. RW2. The highest specific growth rate of 0.019 h⁻¹ at 500 mg/l of phenol was obtained for *Pseudomonas* sp. SD1 while *Citrobacter* sp. RW1 had the lowest specific growth rate of 0.014 h⁻¹ at 500 mg/l of phenol. The specific phenol degradation rate ranges from 55.35 to 130.98 mg/(L.h.OD). The order of specific phenol consumption rate at 1000 mg/l by the organisms is: *Bacillus* sp. SD3 > *Pseudomonas* sp. SD1 > *Citrobacter* sp. RW1 > *Staphylococcus* sp. RW2. *Citrobacter* sp. RW1 exhibited highest growth yield in 250 mg/l of phenol with the growth yield of 6.24 (x 10⁻⁴ A₅₄₀ unit.l/mg). The results showed that the test organisms might be the most suitable bacterial strains for removal of phenols at low and high doses in phenolic polluted media.

Keywords:

Biodegradation, phenol, bacteria, Okrika River.