

Biodegradation of petroleum hydrocarbons by some marine bacteria

As a consequence of identifying limitations of traditional cleanup techniques, the concept of bioremediation of oil pollution has emerged as a highly effective alternative. The present study was aimed at isolation and identification of petroleum hydrocarbon degrading bacteria from marine environments, and evaluation of their biodegradation potential. Using the enrichment culture technique, ten bacterial species capable of utilizing petroleum hydrocarbons were isolated and identified as *Micrococcus sp*, *Pseudomonas picketti*, *Beneckea harveyi*, *Alcaligenes cupidus* and *Beneckea natrigenes*. In evaluating the biodegradation potential of petroleum hydrocarbons, the isolated bacterial species were experimented as monocultures as well as mixed cultures. As petroleum hydrocarbons, crudeoil (Iranian Light) was used and degradation was analyzed by Gas-Liquid Chromatography. When crude oil is the sole source of carbon and energy available for bacteria, it will be attacked and assimilated at the expense of *n*-alkanes. Therefore, the rate of biodegradation of crude oil was estimated by analyzing and quantifying residual *n*-alkanes.

Monoculture of *Alcaligenes aestu* degraded medium and long chain alkanes extensively. But, *Pseudomonas picketti* was unable to show degradation to any extent. As a mixed culture, *Pseudomonas picketti*, *Beneckea harveyi* together with *Alcaligenes* sp. were most effective when compared with other culture combinations. The isolated *Corynebacteriu* sp. showed more than 50% degradation of crude oil as a monoculture but, when it is present in mixed culture combinations, above such of degradation was not observed. All the bacterial cultures biodegraded medium chain n-alkane fraction more readily and the long chain alkane fraction to a lesser extent. The elimination of the short chain n-alknes below C12 was mainly due to the volatile nature of those hydrocarbons. In the presence of glucose as an alternative carbon source, the degradation of alkanes was elevated, but the commencement of the biodgradation was delayed for fourteen days. The degradation of petroleum hydrocarbons was depended on exogenous sources of nitrogen and phosphorous.