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COMPARATIVE MINERALISATION OF PYRENE IN A SPIKED AND AGED SOIL BY A PYRENE-DEGRADING BACTERIUM ISOLATED FROM A PAHS-CONTAMINATED SOIL AND EFFECT OF THE PRESENCE OF CYCLODEXTRIN

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A pyrene-degrading bacterial strain E2BCU-2008-S8.3 was isolated from an aged PAHs-contaminated soil from the North of Spain. The strain was identified as *Achromobacter* sp. by 16S rDNA gene sequence analysis technique. To screen for the ability of this bacterium to mineralise pyrene, the strain was cultured in a Tryptic Soy Broth medium diluted 20 times, inoculated at 24°C and exposed in triplicate to 166 Bq g^{-1} of soil of ^{14}C-pyrene. In adition, 0.5 mg of nonradiolabeled pyrene was added to each culture. *Achromobacter* sp. mineralised (degraded to CO_2) 55.5% of the pyrene at the end of the study. To investigate how degradation might be optimized in a pyrene spiked and aged soil, pyrene mineralisation by the indigenous microbial community was monitored over 140 days, and compared with mineralization in the presence of: i) hydroxyporpil-β-cyclodextrin (HPBCD) as amendment (biostimulation), ii). *Achromobacter* sp. addition and 3. a combination of HPBCD and *Achromobacter* sp. The ability of indigenous microflora to mineralise ^{14}C-pyrene was appreciable (30.5%). Addition of HPBCD resulted in an important reduction of lag phase duration, from 79 to 54 days, but with no increase of the total extent of mineralization (31.0%). The high reduction of lag phase is related with the fact that HPBCD improves the solubility of pyrene and as a consequence the pyrene bioavailable fraction is ready to be degraded as soon as HPBCD is added. On the other hand, the addition of *Achromobacter* sp. alone resulted in a drastic reduction of lag phase, from 79 to 45 days, however the total extent of mineralization of ^{14}C-pyrene was slightly lower (25.7%) than in non amended soil, this result indicates that the introduced bacteria limits the activity of the indigenous microorganisms in the studied soil.