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Biodegradation kinetics of acenphtylene, flourene and phenantrene: a comparative study

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Polycyclic Aromatic Hydrocarbons (PAH) are environmental contaminants produced in many human activities and presents toxic and carcinogenic characteristics. Their low solubility in water leads to slow biodegradation rates and consequently environmental persistence. The present work intends to determine the degradation rates of three aqueous phase PAH's (acenphtylene, flourene and phenantrene) by a mixed culture of microorganisms. The three PAH were dissolved in water at a concentration approximately of 1 mg L^{-1}. A mixed culture taken from contaminated site was used to inoculate the samples. Batch experiments were performed at room temperature (~20°C) and PAH consume was measured during the experiment time. PAH samples were extracted and concentrated by solid phase micro extraction (SPME) and measured by GC-FID. Biomass was measured as volatile suspended solids at the beginning and at the end of experiment to ensure that no significant biomass was grown. The culture was able to degrade acenphtylene, flourene and phenantrene. The biokinetics parameters (k and Ks) were determined using a saturation type kinetics biodegradation model and the results were very similar for the three PAH's. The main microorganisms identified (by API 20NE test) in the culture were *Pseudomonas putida*, *Pseudomonas aeruginosa*, *Alcagenes faecalis* and *Xanthomonas maltophilia*.