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Characterization of TCE-degrading bacteria and their application to wastewater treatment

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Two bacterial strains capable of degrading TCE were isolated from soil contaminated with various chlorinated alkenes and identified as *Alcaligenes odorans* N6 and *Nocardia* sp. H17. The other strains were able to degrade toluene and identified as *Pseudomonas putida* and *Sphingomonas chlorophenolica*. *A. odorans* N6 and *Nocardia* sp. H17 degraded 84% of initial amount in the minimal salts medium containing 200 M TCE as its sole source of carbon and energy for 1 day. The optimal pH for their growth was in a range of 7.0 - 8.0. The mixed culture of 4 toluene-degrading isolates degraded 95% of 200 M TCE with 1.5 mM toluene as an inducer, whilst they could not degrade TCE without the inducer. The degradation efficiency of 200 M TCE by the mixed culture of 6 isolates was 72% without the inducer for 1 day, but it was 82% and with toluene as an inducer. In the continuous treatment of wastewater including TCE, TCE was completely removed within 18 hrs with activated sludge and microbial consortia, that was shorter than 27 hrs with only activated sludge. Therefore, it seems that the microbial consortia composed of 6 isolates can be applied to the biological treatment of TCE-containing wastewater in any condition with/without an inducer.