

DEGRADATION OF TRICHLOROETHYLENE AND BENZENE BY
EMBEDDED *BURKHOLDERIA CEPACIA* G4

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ABSTRACT: The aerobic bacterium *Burkholderia cepacia* (formerly *Pseudomonas cepacia*) strain G4 is capable of rapid oxidative TCE degradation, but its use in bioreactors has hitherto been limited in part by its poor adhesion capabilities. To overcome this limitation, we embedded G4 in a novel hydrophilic polyurethane foam and tested the degradative potential of the foam/bacterial aggregates. Foam containing phenol-induced G4 removed up to 95-97.5% of TCE from 3-ppm test solutions. TCE removal by embedded cells sometimes equalled that by free cells. Substantial benzene degradation was also seen. The presence of glucose and yeast extract impaired TCE and benzene degradation by both embedded and unembedded G4. Variable results obtained with actual groundwaters suggested that groundwater composition also affects TCE removal. Freshly induced G4 degraded TCE most rapidly during the first 24 h of exposure. When stored at 4°C after enzyme induction, the organism lost >50% of its TCE-degrading capacity within 3 days. However, it proved possible to induce enzyme activity after G4 had already been embedded. In practical applications, bacterial growth and immobilization could therefore be separated from induction and use of foam/bacterial aggregates. Repeated induction and reuse might also extend the lifetime of the product.