

PLUS
KB-1
PLUS

KB-1[®]

PLUS

**The gold
standard just
got brighter.**



KB-1[®] is widely used to remediate groundwater containing chlorinated ethenes, such as tetrachloroethene (PCE) and trichloroethene (TCE), to the environmentally-acceptable end product ethene. To date, KB-1[®] has been used to bioaugment more than 83 sites in the United States and Europe. Unfortunately, many sites containing PCE and TCE are also contaminated with other chlorinated solvents such as 1,1,1-trichloroethane (1,1,1-TCA), which can inhibit the bacteria (*Dehalococcoides*) that mediate the final steps of PCE and TCE dechlorination to ethene. 1,1,1-TCA has been reported to be a co-contaminant with TCE at approximately 20% of USEPA National Priorities List sites.

Through continuing research and development activities, the University of Toronto and SiREM have isolated specific bacteria (*Dehalobacter*) that can effectively dechlorinate 1,1,1-TCA to chloroethane (Grostern & Edwards, 2006). This discovery has led to the formulation of KB-1[®] Plus – a preparation of KB-1[®] that contains not only *Dehalococcoides* organisms to dechlorinate PCE and TCE to ethene, but also *Dehalobacter* organisms to effectively degrade 1,1,1-TCA to chloroethane, which is readily degraded to CO₂. The *Dehalobacter* strains work synergistically with *Dehalococcoides* in KB-1[®] to dechlorinate TCE and 1,1,1-TCA at high concentrations. SiREM recommends KB-1[®] Plus for use at sites where chlorinated ethenes and 1,1,1-TCA are co-mingled.

KB-1[®] Plus provides all the benefits of KB-1[®] bioaugmentation including:

- Stringent quality control /quality assurance procedures to verify every batch
- Optional field application support
- Ready when you are delivery
- Free of charge culture for re-application (where required)
- Complimentary Gene-Trac testing for *Dehalobacter* and *Dehalococcoides*

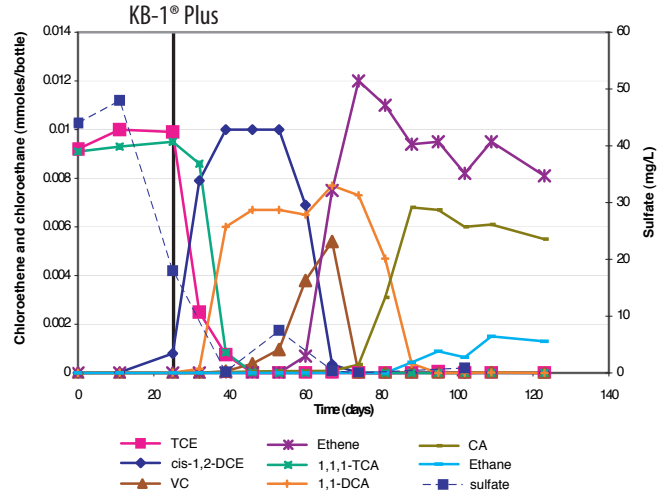
Reference:

Grostern, A. and E. A. Edwards. 2006. Growth of *Dehalobacter* and *Dehalococcoides* spp. during Degradation of Chlorinated Ethanes. *Appl. Environ. Microbiol.* 72: 428–436.

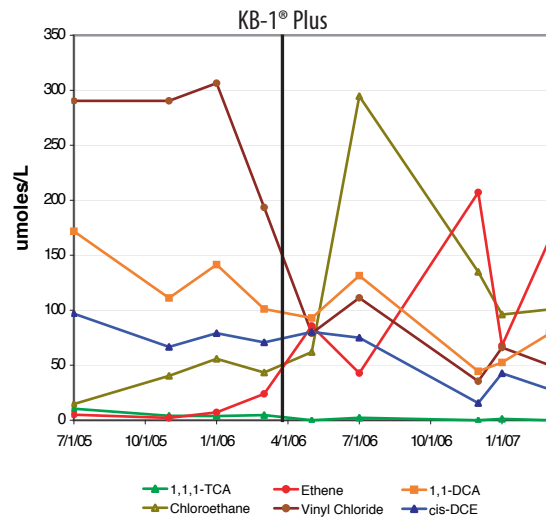
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KB-1[®] Plus



Microcosm study results: 1,1,1-TCA and TCE were reduced rapidly after bioaugmentation with KB-1[®] Plus, end products of ethene, chloroethane and ethane were observed



KB-1[®] Plus application in Kansas: 1,1,1-TCA and vinyl chloride were persisting at a site undergoing active bioremediation. After application of KB-1[®] Plus, rapid decreases in 1,1,1-TCA and vinyl chloride concentrations were observed along with corresponding increases in ethene and chloroethane concentrations.