

# KB-1<sup>®</sup>

## Bioaugmentation Culture

For bioaugmentation  
of chlorinated ethene  
contaminated sites



Contact SiREM for a quotation or more information on our line of leading bioaugmentation cultures

**toll free: 1-866-251-1747**  
**phone: (519) 822-2265**

KB-1<sup>®</sup> is a naturally occurring, non-pathogenic microbial culture that contains *Dehalococcoides* (*Dhc*), the only group of microorganisms documented to promote the complete dechlorination of chlorinated ethenes to non-toxic ethene. Although *Dhc* are found in the environment, research indicates these microorganisms are not ubiquitous and not all *Dhc* are capable of complete dechlorination of chlorinated ethenes. At sites where *Dehalococcoides* are absent, tetrachloroethene (PCE) and trichloroethene (TCE) dechlorination typically stalls at cis-1,2-dichloroethene (cDCE), despite ample electron donor availability. KB-1<sup>®</sup> is used to establish complete dechlorination at sites that do not contain *Dhc* (or the right *Dhc*), and to accelerate dechlorination rates to achieve treatment goals. Bioaugmentation of aquifer systems with KB-1<sup>®</sup> provides an active microbial community capable of complete reductive dechlorination, ensuring that PCE, TCE, cDCE and vinyl chloride (VC) are completely dechlorinated to ethene, without undue acclimation periods, and at rates that are suitable for achieving remedial goals.

**KB-1<sup>®</sup> is the most field-demonstrated culture of its type, and its robustness has been demonstrated for both source area and plume remediation in both porous media and fractured bedrock environments.**

### Benefits of KB-1<sup>®</sup> Include:

- Low cost: single application
- Works with all commonly used electron donors
- Natural microbial culture (not genetically modified or engineered)
- Certified to be free of known human pathogens
- Rigorous quality control procedures ensure each shipment is of the highest quality, stable, safe, effective and free of chlorinated volatile organic compounds
- Shipped overnight in specially designed stainless steel vessels that prevent exposure to air and which are safe and easy to handle

### All KB-1<sup>®</sup> purchases include:

- Technical support from an experienced SiREM field technician to support successful application to your site
- Complimentary Gene-Trac<sup>®</sup> *Dehalococcoides* tests to verify the successful delivery and persistence of KB-1<sup>®</sup> in site groundwater
- KB-1<sup>®</sup> guarantee - complete dechlorination to ethene\*

\*Some conditions apply

# KB-1<sup>plus</sup>

## Bioaugmentation Culture

### Overcome Inhibition at Mixed Chlorinated Solvent Sites



KB-1<sup>®</sup> Plus are custom-blended microbial culture formulations for bioaugmentation of sites with inhibitory concentrations of chlorinated ethanes and chlorinated methanes, which are often comingled with chlorinated ethenes. KB-1<sup>®</sup> Plus has been demonstrated to dechlorinate in excess of 200 milligrams per liter (mg/L) of 1,1,1-trichloroethane (1,1,1-TCA) to chloroethane and carbon tetrachloride, chloroform to dichloromethane (DCM) to non-chlorinated end products. Chloroethane can be further degraded under aerobic conditions. These cultures have been developed by SiREM in collaboration with the University of Toronto<sup>1,2</sup> and the United States Geological Survey<sup>3</sup>.

#### Benefits of KB-1<sup>®</sup> Plus include:

- Overcome inhibition of chloroethene dechlorination caused by 1,1,1-TCA and chloroform
- Only a single application required
- Works with all commonly used electron donors
- Natural microbial culture (not genetically modified)
- Pathogen free
- Rigorous quality control ensures each shipment is effective, stable and safe
- Shipped overnight in specially designed stainless-steel vessels that prevent exposure to air and are safe and easy to handle

#### All KB-1<sup>®</sup> Plus purchases include:

- KB-1<sup>®</sup> Plus Guarantee\*
- Technical support to ensure a successful application to your site
- Complimentary Gene-Trac<sup>®</sup> *Dehalococcoides* and *Dehalobacter* tests to verify the successful delivery, growth and persistence of KB-1<sup>®</sup> Plus microbes in site groundwater

**Contact SiREM for a quotation or more information on our line of leading bioaugmentation products.**

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#### References

- <sup>1</sup>Groster, A. and E. A. Edwards. 2006. Growth of *Dehalobacter* and *Dehalococcoides* spp. during Degradation of Chlorinated Ethanes. *Appl. Environ. Microbiol.* 72: 428–436.
- <sup>2</sup>Groster, A., M. Duhamel, S. Dworatzek and E. A. Edwards. 2010. Chloroform respiration to dichloromethane by a *Dehalobacter* population. *Environmental Microbiology.* 12: 1053–1060.
- <sup>3</sup>Jones E. J. P., M. A. Voytek, M.M. Lorah, J. D. Kirshtein. 2006. Characterization of a Microbial Consortium Capable of Rapid and Simultaneous Dechlorination of 1,1,2,2-Tetrachloroethane and Chlorinated Ethane and Ethene Intermediates. *Bioremediation Journal*, Volume 10: 153-168.

\*Some conditions apply