

EMULSIFIED LECITHIN SUBSTRATE IDEAL FOR ENHANCED REDUCTIVE DECHLORINATION

ELS® is a microemulsion of food-grade carbon that supports the treatment of a wide range of groundwater contaminants. ELS® creates reducing conditions and promotes enhanced reductive dechlorination reactions. ELS® is specially designed for easy on-site handling and addition to the subsurface via existing wells, hydraulic injection networks, or direct push technology.

ELS® is available as ELS® MICROEMULSION, an easy to use 25% formulation or ELS® CONCENTRATE, ideal for larger scale projects.

KEY BENEFITS

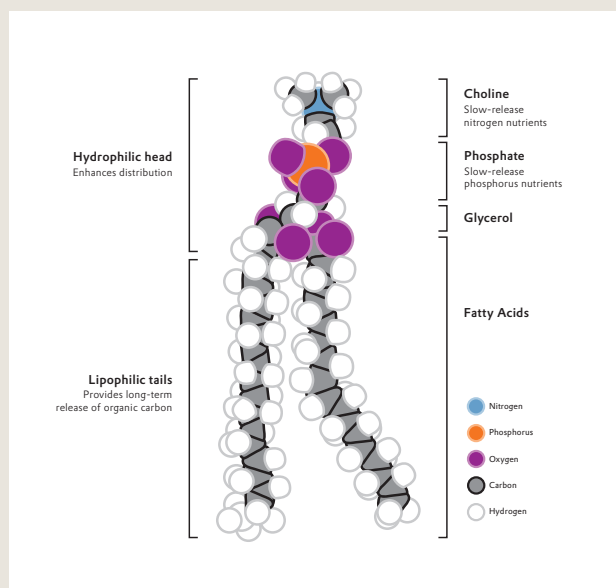
- Stimulation of biotic reductive dechlorination through the generation of strong reducing conditions
- Structurally bound nutrients phosphorous and nitrogen released to bacteria via the fermentation of the lecithin molecule
- Easy to handle and cold water soluble

CONTAMINANTS TREATED

- Chlorinated solvents such as PCE, TCE, TCA, DCA, CCl₄, chloroform and methylene chloride
- Chlorobenzenes including di- and tri-chlorobenzene
- Energetic compounds such as TNT, DNT, HMX, RDX, nitroglycerine and perchlorate
- Most pesticides including DDT, DDE, dieldrin, 2,4-D and 2,4,5-T
- Chlorofluorocarbons
- Nitrate compounds
- Chromium

THE SOUND SCIENCE OF ELS®

Organic carbon addition in the saturated zone is well-known to promote conventional enzymatic reductive dechlorination reactions. This happens because the carbon in the subsurface will support the growth of indigenous microbes in the groundwater environment. As bacteria feed on the soluble carbon, they consume dissolved oxygen and other electron acceptors, thereby reducing the redox potential in groundwater. As bacteria ferment the ELS®, they release a variety of volatile fatty acids (VFAs) such as lactic, propionic and butyric, which diffuse from the site of fermentation into the groundwater plume and serve as electron donors for other bacteria, including dehalogenators. The biogenolysis/hydrogenolysis reaction for the reduction of PCE is shown on the following page.



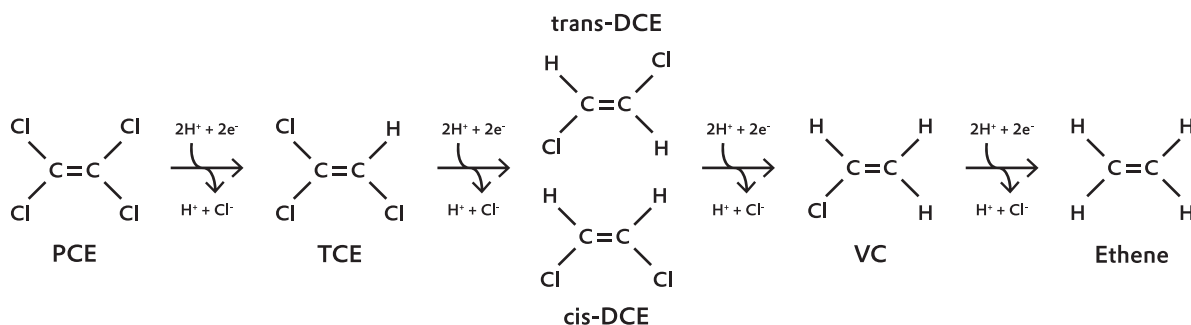
Lecithin itself is composed primarily of phospholipids, which have both hydrophilic and hydrophobic regions in their molecular structure. As a result ELS[®] emulsions tend to be stable emulsions, expectedly more stable than with only hydrophobic compounds. Further, phospholipids support remediation by providing essential nutrients (carbon, nitrogen, phosphorus) to bacteria. ELS[®] is recommended for plume treatment.

APPLICATION METHODS

- Direct push injection
- Gravity feed through existing wells
- Low pressure injections
- Recirculation systems

Evonik recommends the use of Dhc inoculants when using ELS[®] for cVOC contaminants when existing counts have not been quantified. Evonik recommends the use of a buffering agent when using ELS[®].

For more information and detailed case studies, please visit our website.



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