



INFORMATION

ABC-Olé is an emulsified fatty acid ester product designed for anaerobic bioremediation sites where emulsified vegetable oil (EVO) products are being evaluated. ABC® (Anaerobic BioChem), which has been on the market since 2004, is a patented mixture of water soluble substrates, fatty acids, and a phosphate buffer. ABC-Olé is a modified blend of ABC and contains fatty acid ester content ranging from 30 to 55%. ABC-Olé contains emulsified fatty acid esters, a phosphate buffer, and a small percentage of fast burning substrate. ABC-Olé is better suited for high permeability environments where groundwater flow constantly introduces hydrogen demand.

VEGETABLE OIL

Vegetable oil is an example of a triglyceride. All triglycerides react with water to form glycerin and three long-chain fatty acids. Most oils react with water to produce fatty acids with 18 carbon atoms (thus C18), but other fatty acids such as C14 and C16 can be produced. When emulsified oil is used for bioremediation, it is actually the fatty acids that are the slow-release substrate.



At some sites, the vegetable oil does not effectively hydrolyze which results in insufficient fermentable carbon and incomplete dechlorination. ABC-Olé can contain up to 55% emulsified fatty acids esters. Fatty acid esters are used rather than oil because the need for the water reaction is eliminated. Fatty acid esters also have less surface tension than vegetable oils so they are more readily distributed in the environment. There is a balance to be struck between short-lived and long-lived carbon substrates. Other emulsified oil products typically contain glycerin (or lactate) in the EVO to provide a short-lived component.

ADVANTAGES

ABC-Olé is a mixture of emulsified fatty acid esters, fast-acting organic substrate, and pH buffers, all in one product. In most applications, there is no need to purchase and mix additional amendments. The other advantages are summarized below:

- o **Time:** Unlike EVO, with fatty acid esters there is no waiting for hydrolysis to occur and subsequent conversion to glycerin and fatty acids
- o **Formulation:** Emulsified fatty acid esters are pH neutral, so less buffering is required to maintain optimal pH conditions
- o **Efficiency:** Unlike fatty acids and EVO, fatty acid esters don't react with pH buffers and bases to form soaps, which can cause foaming in wells and tanks
- o **Distribution:** Fatty acid esters have lower viscosity and lower surface tension than vegetable oils, allowing better distribution when injected into the subsurface
- o **Ease of use:** No chase water is required
- o **Cost:** Emulsified fatty acid esters are comparable in price to EVO

EASE OF APPLICATION

ABC and ABC-Olé are accepted by regulators, easily applied, cost effective and specifically designed to optimize the remediation process. ABC-Olé has been accepted as an Innovative Remediation Technology by the Florida Department of Environmental Protection Waste Cleanup Program. It is shipped in a concentrated formulation which can be applied via Direct Push (DPT), conventional monitoring or injection wells and soil blending applications.