

***** Technical Fact Sheet *****
Volatile Fatty Acids

Volatile Fatty Acids (VFAs) namely acetic acid, propionic acid, butyric acid, and valeric acid are short chain (low molecular weight) organic acids that are produced during the decomposition or fermentation of organic material. Several industries currently monitor or analyze VFAs in order to prevent or control their formation as these acids create unpleasant odors as a result of anaerobic bacterial growth. In the wastewater treatment industry, VFAs are at the forefront of some new biological remediation methods being developed by wastewater treatment plants to replace older chemical processes. One of these, biological phosphorus removal, is a process in which the VFAs generated by the fermentation of organic material either in the collection system or in an unaerated zone of the wastewater treatment plant provide the carbon source for the organisms responsible for biological phosphorus removal or bio-P. One of the great advantages of these alternative biological treatment systems is the fact that these units are cheap to build and maintain and poses few operational problems. Key in this process however is the accurate measurement of VFAs in order to optimize the treatment plant and its processes.

Current analytical methods used to detect VFAs, however, have detection limits which are far too high for accurate characterization for most applications. For example, using steam distillation followed by titration to measure VFAs, the detection limits can only approach the 50 mg/L range. As a solution to this problem EnviroMatrix Analytical, Inc. (EMA) has developed a method for measuring and identifying VFAs in wastewater using gas chromatography with a flame ionization detector. EnviroMatrix Analytical, Inc. is able to provide sample analysis with a **Reporting Limit of 5 mg/L** and **MDL (method detection limit) below the 1 mg/L level!** EMA's VFA reporting list includes isobutric acid and isovaleric acid.

EMA uses a direct aqueous injection onto a specialized capillary column designed specifically to separate the low molecular weight fatty acids with a selective stationary phase designed for acidic compounds. By using a direct injection technique we reduce the risk of losing these VFA compounds and provide improved quantitative reproducibility and good chromatography peak shape. In addition, the capillary column used in our VFA analysis prevents excess water from building up inside the column which typically would lead to the FID flame being extinguished during sample analysis, sometimes referred to as back flash. This translates into better reproducibility, quicker sample analysis time, and less instrument down time. If you would like further information regarding VFA analysis or a price quote contact EMA at webinfo@enviromatrixinc.com or give us a call at (858) 560-7717.

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