10. CHEMICAL, BACTERIAL OR ENZYME ADDITIVES (BIOREMEDIATION)

FOG molecules are composed of long chain triglycerides and some glycerol. Shorter chain fatty acids are the first conversion steps caused by bacterial/enzyme degradation; i.e., the cleaving of the glycerol apart from the triglycerides. Some of the bacteria prefer the glycerol as a food source to the fatty acids that are present. Even within these groups, particular strains are better than others at degrading oil and grease molecules. If a species of bacteria does not secrete the necessary enzyme to break down the oil and grease molecules, the bacterium cannot use the oil and grease as a food source. As the glycerol is preferred over the shorter chain fatty acids by the bacteria, fatty acid concentration (including acetic and proprionic acids) may accumulate and lower the pH to a point where the bacterium cannot survive. These shorter chain fatty acids are smaller and more water-soluble than the long chain triglycerides from which they were formed. These can be flushed out of a grease separation device lacking sufficient hydraulic retention time. When they get out into the sanitary sewer system they can recombine into insoluble molecules that can once again begin adhering to the interior walls of the sanitary sewer collection system.

Bioremediation is a technology that may have the capability to provide adequate FOG removal, provided certain conditions are present. Biological approaches to controlling FOG can be compared to a natural process being artificially applied to a grease separation device. Ultimate conversion of the oil and grease molecules to carbon dioxide and water are claims frequently made by the proponents of bioremediation. FOG degradation may occur if conditions in the grease separation device are maintained in an environment conducive to bacterial growth. This may be hard to consistently achieve. High levels of bacteria are added throughout the day to keep the enzyme (working component) concentration high. Hydraulic retention time (HRT) is one of the most important considerations that must be evaluated before attempting to utilize this approach. Free-floating oils that get retained in a grease separation device may have enough time to be degraded by bacteria/enzymes if they do not encounter conditions in the grease separation device that suppress their action. Too long of an HRT will result in anaerobic conditions within the separation device, leading to septicity. Under these conditions the bacteria begin pulling the oxygen out of available chemicals, carbohydrates, proteins and the oil itself, resulting in the formation of objectionable odors and corrosive conditions within the grease separation device. The FOG fraction that remains in the water (chemically emulsified by detergents) will be flushed out of the separation device without sufficient treatment. When this fraction

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Bioremediation may be used successfully in the interior pipes of a food service facility where blockages may be experienced. This approach may reduce blockages on a sewer service lateral feeding a grease separation device that is sited far from the source. Where excessive amounts of grease are generated, bioremediation may complement the treatment capability of an existing grease separation device, again where sufficient HRT exists. A combination of treatment options and activities that include grease separation device pumping and cleaning, enzymatic treatment and use of best management practices by the owners and operators of food service establishments will minimize the presence of FOG in the effluent.

While these products may have merit, more information must be provided by the industry. Third-party testing can provide a path to accurate and fair evaluations of products such as bioremediation. Evaluations should include testing, certification and listing by an independent, American National Standards Institute (ANSI) accredited third-party certifier. Independent evaluators test products and designs and provide data from which objective judgments about technologies can be made.

Third-party certification and product listing provide a means to make sure product manufacturers and engineers are accountable for internationally accepted standards of design, application, operation and maintenance. Without the needed industry standards and only little industry information to support claims, third-party testing on a case-by-case basis is the best method for properly evaluating these and similar products to accurately determine credibility.

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