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Helping Restaurants See Through the FOG

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With rising biofuel production and growing demand for fryer grease, collectors who once charged restaurants to haul away grease are now often paying for it. But the fats, oils and greases, or FOG, that still get into drains are causing eateries and facility managers major headaches. Now that may be changing, too.

If you're sitting at your desk eating lunch while reading this, I'd suggest you not click on the upcoming link. Let's just say it won't aid your digestion. But if you can hack it, give this video a whirl. What you'll see is a live feed from inside a grease interceptor at the Montage Laguna Beach, a luxury resort in Laguna Beach, Calif. It's not what you'd expect to see there — and don't worry, this video is pulled from deep underground. But the company behind the camera, Grease Reduction Systems sees beauty in that image, because it shows what the firm contends is a major breakthrough in eliminating a decades-old problem: the build-up of fats, oils and grease that is flushed down building drains.

The Burden of FOG

The problems that FOG can cause are significant — as food service industry professionals know. No matter how well kitchen staff follow procedures for diverting pan drippings, food scraps and other oils, fats and greases into used cooking oil containers or waste bins, some of this stuff ends up going down the drain when equipment is cleaned. Then travels through a device called a grease trap or a grease interceptor, where the FOG is captured in a series of baffles while most of the water is flushed to sewage lines, bound for municipal wastewater treatment.

In a perfect world before the grease trap is filled to capacity, a waste collector (generally the same hauler that collects fryer grease — possibly for biofuel feedstock) is periodically called to clean out the grease trap and carry the FOG away in a tanker. The frequency of these visits is determined by municipal requirements, the size of the tank and the daily output of FOG. Businesses pay the collectors anywhere from $100 per visit to many hundreds.

Of course with the world being far from perfect, grease traps are sometimes not well maintained and overflow. When that happens, restaurants and building managers pay the price in high cleanup costs and fees — and the business's reputation takes a hit, too. Like it or not, restaurants, food production facilities, cafeterias, any building that produces food-based products are ultimately responsible for the FOG they create. And each grease trap overflow has the potential to send chemicals and other pollutants inside the traps into nearby rivers, lakes or other bodies of water. In fact, beach closures due to sewage overflows are commonplace in Los Angeles, which was sued in 2001 over a rash of 800 sewage overflows due to pipes clogged with FOG. In much the same way that fat and grease clog human arteries over time, they also clog sewage arteries.

How to Find and Fight FOG

What is it? The fats, oils and greases that collect in grease traps at restaurants and food service or industrial kitchens.

What's the problem? Unlike yellow fryer grease, FOG is tough to refine into biofuel due to high water content and impurities.

So? When left on its own, FOG can cause dangerous and costly sewage overflows.

What's to be done? Food service and facility managers can employ microbes to eat away at the FOG that collects.

Bioremediation may also be an eco-friendly solution to FOG.

And a few startups are working to develop biofuel feedstock from FOG.

"We have grease traps overflowing all the time," says Paul Strand, public works inspector for the city of Monterey Park, Calif., where the downtown corridor is home to many restaurants. "And when it happens, you need haz-mat crew to come out, and the Fire Department needs to barricade the area."

The acidity of the FOG eats away at pipes over time, which leads to major failures in sewage infrastructure. This is a constant concern to municipal water districts, most of which charge restaurants thousands of dollars in cleanup costs each time grease traps overflow, in addition to fining restaurants to encourage them to regularly check and clean the traps.

Aside from the environmental hazards of a spill, having grease traps pumped is expensive and getting costlier for eateries or building managers, as collectors pass on the rising fees they pay to get rid of the FOG. And collectors often have to drive far outside urban centers to reach a wastewater treatment plant or landfill that will accept the stuff.

This is where Grease Reduction Systems (GRS) sees its market opportunity. The company introduces microscopic organisms to a grease trap and uses an air pump and specialized telemetry equipment mounted inside the tank to balance the amount and type of microbes injected into the tank. The microbes consume the FOG, in order to eliminate or at least slow the FOG accumulation inside the tank. The process is called in-situ bioremediation, says Markus Lenger, founder and chief scientific officer of GRS. He says while bioremediation is a common tool for degrading effluent at wastewater treatment plants (which is where collectors often bring the FOG pulled out of traps), it had not been successfully deployed directly within grease traps.

The ideal GRS result: a tank that never overflows and never needs to be pumped clean. But while Lenger says that's not something he guarantees facility managers, he says his system will greatly reduce the amount of pumping and cleaning a grease trap needs. " "Maybe one cleaning every couple of years," he says, "versus one every few months." Plus, he says, his is a greener solution than pumping, because it benignly reduces waste at its point of generation, rather than trucking the FOG out and passing the problem along the waste stream. He says the GRS system can earn a facility up to 10 LEED credits. And once the lower hauling fees are factored in, the GRS system should cost 25 percent less per month than using traditional trap cleaning services.

According to the U.S. Department of Energy's National Renewable Energy Laboratory, the total FOG that is collected in grease traps amounts to up to 16,000 pounds per restaurant per year in urban areas. So even where a grease trap is cleaned regularly to prevent overflows, there is a significant amount of waste materials being generated at eateries and food production facilities. Plus, the bacteria inside FOG create a strong odor that can permeate the tank. The aerobic activity inside a tank outfitted with GRS eliminates this odor, which is one of the main benefits that the Montage resort sought from the system, since its main grease trap is located not far from its pool and the facility must prevent any odors from forming. But an even greater concern was preventing trap overflows, given that the resort is located directly above the Pacific coastline.

Sierra Madre Foods, a Monterey Park manufacturer of prepared Mexican foods such as frozen burritos has been a GRS customer since February of this year, but before then was one of the biggest culprits in sewage overflow problems in town, says Paul Strand, the public works inspector. Within a week of the installation of the system, however, the FOG was significantly reduced inside the company's 1,500 gallon grease trap.

Strand says he was perplexed when he heard that the Sierra Madre said it had fixed its overflow problem, but it was still using the same grease trap instead of a larger one. "They told me they didn't need (a new tank)," he says. "And it looks like they just might be able to solve this (grease trap) problem."

FOG's Potential Benefits

Bioremediation might be a sustainable solution for eliminating FOG, but just as fryer grease, or yellow grease, has transitioned from an expensive waste problem for restaurants and food producers to a valuable feedstock for biofuels (and, as competition for it grows, even a new revenue source) the FOG that collects in traps is also beginning to emerge as an energy source. In fact, some biofuel startups would argue that there's gold in the FOG.

One such firm is Philadelphia's Fry-o-Diesel, which has a proprietary process for extracting water and impurities from FOG and converting it into biofuel. Its CEO Emily Bockian Landsburg says that while restaurant grease trap FOG is the main feedstock for its biofuel, volumes are still low, and the grease trap cleaners with whom her company contracts to collect the FOG are still having to pay to unload the FOG, so the use of FOG for fuel won't help restaurants' or food facilities' bottom lines any time soon.

Silicon Valley startup Biofuelbox says it also has the know-how to convert FOG into biofuel, and is working with FOG pumpers to collect the material from eateries. Volumes of feedstock are is still too low, however, to lower the fees that collectors charge.

Also in the San Francisco Bay Area, a Public Utility Commission program called Greasecycle SF has launched a demonstration program aimed at showing that deriving road-worthy biofuel from brown grease is not only possible, but also economically viable and a means for municipalities to help reduce grease trap overflows and form partnerships with biofuel producers.

Unlike yellow grease, there has never before been a positive market value for grease trap FOG, says program coordinator Karri Ving. "Plus, FOG is a real headache for restaurants (and food production facilities)."

Ving says the program will involve collecting FOG from area restaurant grease traps and bringing it to San Francisco's wastewater treatment facility, where existing resources will be used in refining it. "It costs money to bring something so thick and yucky (FOG) to something that is fuel feedstock, and this is an arduous process that cuts into the bottom line. But we could use the existing infrastructure of the plant's latent heat, water loops, transportation corridors to offset those costs."

She says ideally, the demonstration project will produce a repeatable framework for other municipalities to copy. When asked if she envisions a day when restaurants are actually paid by haulers who want to collect the grease trap FOG for fuel, as some are beginning to with yellow grease, Ving says "Yes, absolutely."

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