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Grease Trap Waste to Feedstock to Fuel

GTW → Feedstock → Fuel

Every commercial kitchen has a grease trap that allows the food waste and fats, oils and grease (FOG) from the food preparation to be separated from the water effluent that is then discharged to the sewer. In recent years, more attention has been focused by local wastewater system operators on the problems associated with having FOG solidify in the public sewer piping causing blockage and significant overflows.

Grease Trap Waste (GTW) is the waste that is in the trap, this term includes all the water, solids, oils and grease. Waste Trap Grease (WTG) or simply "trap grease", usually only refers to the grease portion of the total mass in the trap. GTW is difficult to sample, and difficult to characterize due to its variability. Usually, it is mostly water. The oil content can vary from as low as indistinguishable to at times be as high as half and half water/solids and oil.

Feedstock Characterization

The most important area of focus for converting waste to fuel is the feedstock. The variability in the physical and chemical properties of the waste material requires a front end process that is able to stabilize the characteristics of the feedstock for successful conversion. Biodiesel production can be accomplished by various methods once the oil is free of solids and moisture. The first step is to sample and analyze the feedstock:

1. Daily samples using methods insuring uniformity and rigorous analysis aliquots
2. The critical measures are: moisture, insoluables, solid particle size, FFA and sulfur
3. If polymers are used in dewatering, they could be a source of difficulty
4. Melt point indicates the triglyceride and free fatty acid mix. Details require a GC-MS analysis.

Progressive Separations

The material is physically separated progressively using screens, heat and g-force devices. Collected GTW traditionally is dewatered using chemistry and filter boxes. The material interception point will guide the proper feedstock processing methods. Settling tanks can be used to minimize capital for low volume operations. The following steps produce an oil ready as feedstock for multiple types of conversion processes.

Heat •gross screen •settle time → Decant •temperature •hold up → Centrifuge •temperature •g force

Conversion to Fuel

Traditional base catalyzed transesterification requires low FFA feedstock. Prepared and separated WTG is usually higher in FFA than allowed for this conversion technology. High FFA WTG can be acid esterified followed by a base catalyzed transesterification to produce biodiesel. These can be accomplished with either homogeneous or heterogeneous catalysts. Removal of the water formed during the acid catalyzed reaction is the critical control element for overall success. High FFA feedstocks have been successfully converted using the supercritical process. The choice of conversion technology to apply goes back to the feedstock characterization. Low percentage blending with higher quality feedsotcks has also had economic success depending upon the details of the feedstock characterizations involved.

Blend	Acid/Base	Supercritical
•5% FFA •traditional	•25% FFA •water removal	•97% FFA •no catalyst

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