

EB FOG GT/Drain Treatment

A blend of multiple bacterial spores, specifically selected to function in the grease trap / food processing waste water drain & collection environment

Introduction

Grease traps are often the most neglected and difficult to manage problem in commercial kitchens today. Not only are grease traps unsightly and odorous, they are inconvenient and expensive to pump and maintain. Biological products have been used for years for grease trap maintenance. These products reduced solids and odors, but did not perform well in low pH or high fat situations. Understanding these limitations, EBtech developed a product to address these concerns. After years of research, we are pleased to release this product, **EB FOG**, which is specially formulated to address the fats, oils and grease in drain systems and grease traps. The following pages will describe the development of EBtech's FOG and explain the technology behind the product.

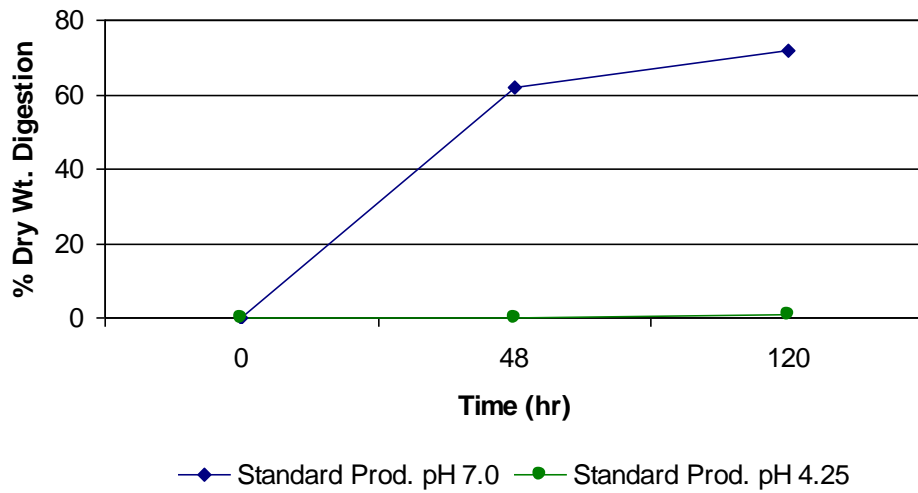
Low pH Effectiveness

One major reason for grease trap failure is the inability of standard grease trap products to function at low pH. By testing grease traps in the field, and interviewing our customers, we found the majority of grease



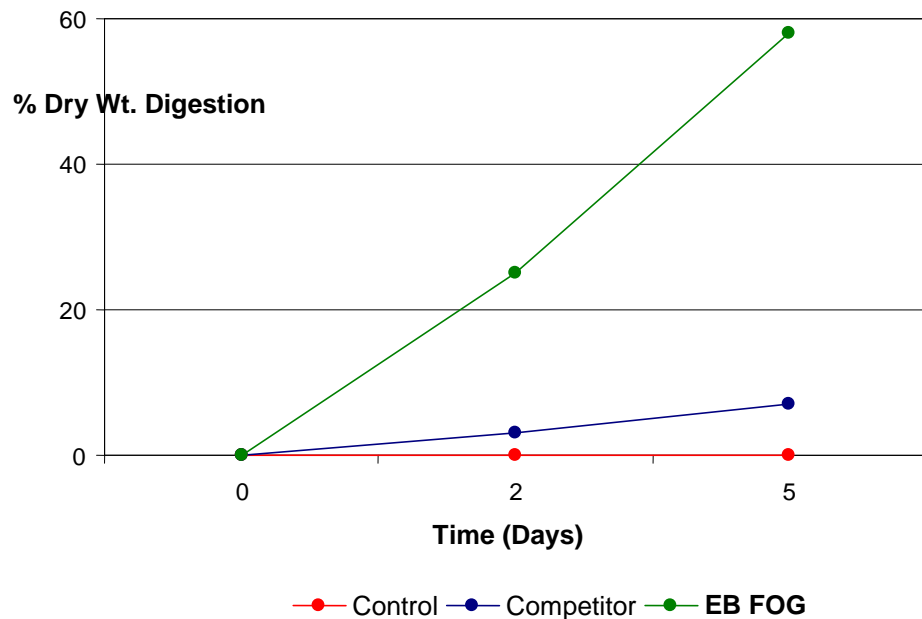
traps have a pH level of 4.5 – 6.0. With this information, we tested the ability of the bacteria in standard grease trap products to function at a worst case pH of 4.25. Not surprisingly, we found that standard products were not capable of functioning at this low pH (Figure 1).

Figure 1 - Waste Digestion Effectiveness



To develop a product that functions in the low pH of a grease trap, bacteria were isolated from low pH environments such as pine forests and cranberry bogs, where nature has already selected strains that are capable of functioning at low pH. The result was the isolation, selection, and development of two *Bacillus* strains that grow, degrade waste, and reduce odors at pH 4.25. These strains are included in EB FOG. As shown in Figure 2, these strains significantly improve the efficacy of EBtech's products over the competition.

**Figure 2 - Waste Digestion Effectiveness
pH 4.25**



Superior Fat Digestion

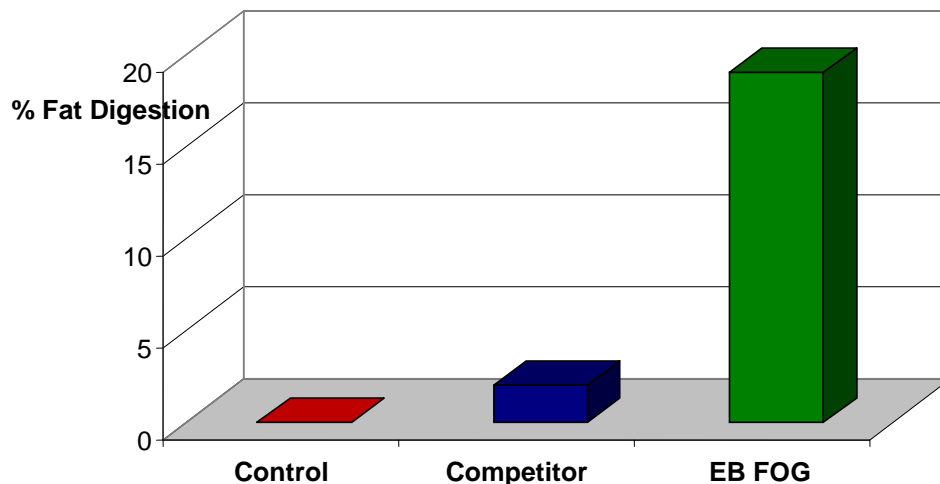
Using a similar bacterial selection system, new bacterial strains capable of digesting high levels of Fats, Oils, and Grease (FOG) were isolated. These superior lipase producers not only degrade short chain fat molecules commonly degraded by the bacteria in most grease trap products, but also the more difficult to digest long chain fat molecules that are major contributors to FOG accumulation in the trap. Further testing of these new strains revealed the production of a biosurfactant which helps to increase the bioavailability of the FOG as a microbial food source. These activities are shown in the pictures below (Figures 3&4).



Figures 3 & 4 - Fat Degradation capabilities of two EBtech isolates compared to a commercially available grease trap product

The isolation of these superior fat degrading strains prompted a study to investigate the ability of the bacteria in EBtech's FOG to degrade Crisco (vegetable shortening). The study was performed utilizing a minimal medium with Crisco as the carbon source. The study was performed at pH 4.3 to mimic the conditions in a grease trap. Two fully formulated products (surfactant containing) commercially available grease trap products were included in the study for comparison. The EBtech FOG treatment did not contain surfactant. As demonstrated in Figure 4, EBtech's FOG showed a significant improvement over the competitor's commercially available grease trap products, even without the addition of surfactant.

Figure 4 - Crisco Digestion - pH 4.3



Odor Reduction

Having addressed low pH activity and FOG degradation, the next task was odor reduction. The odors associated with grease traps are often caused by volatile fatty acids (VFAs). As shown in Table 1, the seven strain blend in EBtech's FOG GT has the ability to degrade all grease trap associated VFAs that were tested. This includes the difficult to degrade branched VFAs, isobutyric and isovaleric acid.

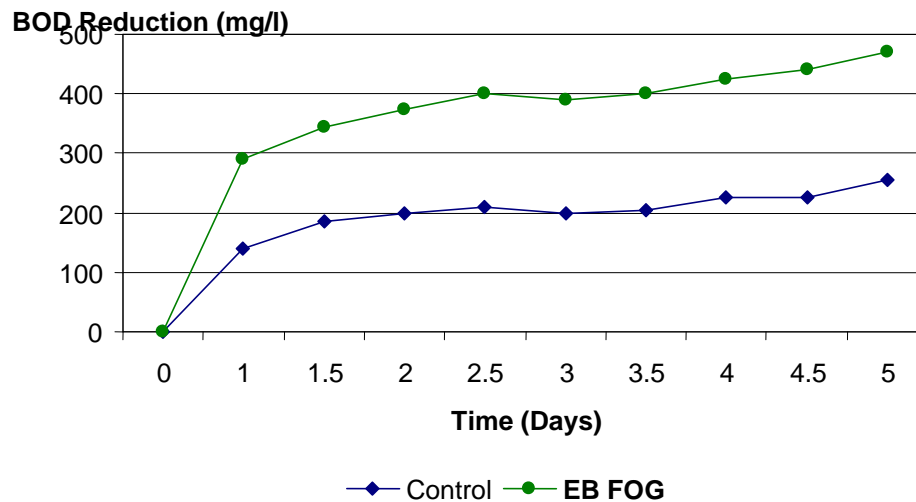
Table 1 – VFA Degradation Analysis of 7 Strains in EB FOG

Strain #	Acetic	Propionic	Lactic	Butyric	Isobutyric	Isovaleric
1	+	-	+	-	+	+
2	+	-	+	-	+	+
3	+	+	+	+	-	+
4	+	-	+	+	-	+
5	+	-	+	+	-	-
6	+	-	-	-	-	+
7	+	-	+	+	-	+

BOD Reduction

The final step in the product development process was to test the ability of EBtech's FOG to reduce Biochemical Oxygen Demand (BOD) in actual grease trap waste. To perform this study, waste was collected from a grease trap and divided into two sub-samples. One sub-sample was treated with EBtech's FOG and the other sample was left untreated. These two sub-samples were then monitored over a five day period for changes in BOD. As demonstrated in Figure 5, EBtech's FOG showed a significant reduction in BOD during the five day study.

Figure 5 - BOD Reduction in Grease Trap Material



Summary

This Product Information Bulletin describes the development of EBtech's FOG. The synergistic blend of seven bacterial strains in EB FOG was selected for the following complimentary abilities: superior lipase production, the ability to function under low pH, biosurfactant production, organic waste degradation, and odor reduction (specifically volatile fatty acids). This Production Information Bulletin also describes the methodology and thought process used at EBtech to develop efficacious products that solve real world problems. By understanding the issues associated with an application, and dealing with each issue using a systematic, scientific approach, EBtech continues to develop unique biological products that work.

EB FOG – Product Specifications

Guaranteed Minimum Bacterial Concentration...2 Billion CFU/ml

PRODUCT PROFILE

Applications

- Grease traps / Interceptors
- Drain maintenance
- Lift Stations
- Collection Systems

Multiple *Bacillus* Species

- Naturally occurring, non-engineered
- Aerobes and facultative anaerobes
- Highly motile
- Positive chemotaxis
- 100% stabilized bacterial spores

Bacterial Enzyme Production

Amylase, Protease, Lipase, Esterase, Urease, Cellulase, Xylanase

Appearance

Blue Liquid or Green Slow Dissolve Block

Effective pH Range

4.25 – 10.0

Effective Temperature Range

5°C – 55°C (40°F – 130°F)

Shelf Life

One year at 21°C (70°F)

STANDARD PACKAGING

Available RTU Liquid or BioBlocks:

- 1.5 Gallon Bio-in-Box
- 2.5 Gallon Jugs & Bio-In-Box
- 5 Gallon Pail
- 55 Gallon Drum
- 1, 2, 5, & 10 lb Slow Dissolve BioBlocks

STORAGE AND HANDLING

Store in a cool, dry location.

Do not freeze

Wash thoroughly with water if exposed to skin or eyes

FORMULATION GUIDELINES (Liquid)

Mix thoroughly prior to dosing. For optimum performance, use EBtech's FOG GT with an automatic metered dosing system.

Recommended Liquid Dosage & Block Size

Grease Trap Capacity/Daily Dose or Block
15-100 Gallons / 10-15 ounces, 1-lb block
100-500 Gallons / 15-25 ounces, 2-lb block
500-1000 Gallons / 25-30 ounces, 5-lb block
1000+ Gallons / 30+ ounces, 10-lb block

For more information, please contact:

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