

Sugar Refinery Odor Control and Solids Reduction

Background

October, 1998 – October 2000

Large Sugar refinery contacted CustomBio to research solution to wastewater treatment problems, especially odor control. Site visits, Wastewater samples and biotreatability testing was performed. Positive results allowed CustomBio to develop treatment protocol and submit a treatment proposal. Due to the very large size of 500 acres, the testing process was longer than usual.

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|-----------------|---|
| Oct 2000 | CustomBio awarded treatment contract |
| Dec 2000 | Treatment Started |
| Jan – Feb 2001 | Partial odor reduction Visible signs of solids degradation |
| Jan – Mar, 2001 | Treatment protocol was adjusted Product formulation was adjusted |
| Apr – May, 2001 | Significant Results Point source (specific area) odor reduced System wide odor reduced |
| May, 2001 | Secondary Benefits Documented, including: Scum reduction Sludge Reduction Improved water quality |
| Jun, 2001 | Odor Reduction deemed successful by client |
| Jun, 2001 | Sludge Islands reduction documented – Islands were created during dry periods – prior to treatment, the solids were piled in the middle of the large lagoons. These islands reduced treatment area and reduced natural aeration surface area. |
| Jul, 2001 | Solids and Scum on lagoon sides and edges visually reduced |
| Sep, 2001 | Sludge reduction documented Large areas of sludge reduced Reduction of one island unburied lost vehicle |
| Oct, 2001 | Water quality significantly improved, Wildlife, alligators, turtles, birds, etc returning |
| Nov, 2001 | Treatment contract renewed |
| Feb, 2002 | Sludge reduction cost benefit documented |
| Dec, 2002 | Treatment contract renewed |
| Dec, 2003 | Treatment contract renewed |
| Dec, 2004 | Treatment contract renewed |
| Dec, 2005 | Treatment contract renewed |
| Dec, 2006 | Treatment contract renewed |

Laboratory Documentation of Reduction of Solids

Procedure

A sample of solid filter cake material is taken directly from within the processing plant. A portion of the sample is analyzed for composition including water, inorganic solids and organic solids. From the remaining material, samples of approximately 100g are weighed and placed into 500mL jars. An appropriate amount of Custom FM is added to each jar and the lids are put on loosely. The samples are allowed to sit for 14 days at which time the samples are dried and weighed.

Sample Characteristics

| | | | | | |
|--------|-----|-----------|-----|---------|-----|
| Water | 77% | | | | |
| Solids | 23% | inorganic | 60% | organic | 40% |

Untreated

Solids = 23.22 g
inorganic = 13.94 g
organic = 9.28 g

Treated

Solids = 14.49 g
inorganic = 13.94 g
organic = 0.55 g

Percent Reduction

$$\text{Total} = \frac{(\text{untreated weight} - \text{treated weight})}{\text{untreated weight}} \times 100 =$$

$$\frac{(23.22 \text{ g} - 14.49 \text{ g})}{23.22 \text{ g}} \times 100 = 37.60\%$$

$$\text{Organic} = \frac{(\text{untreated org weight} - \text{treated org weight})}{\text{untreated organic weight}} \times 100 =$$

$$\frac{(9.28 \text{ g} - 0.55 \text{ g})}{9.28 \text{ g}} \times 100 = 94.07\%$$

Conclusion

Based on the experimental data, biological treatment with Custom FM resulted in a significant reduction in solids. In fourteen days of treatment, solids were reduced from 23.22 g to 14.49 g. This amount represents a 37.60% reduction in total solid waste. This equates to a 752-pound reduction per ton of solids treated.

In terms of organic solids, a reduction from 9.28 g to 0.55 g was obtained. This represents a 94.07% reduction in total organic solids.

To exemplify these numbers, we will assume the generation of 40,000 tons of solids per year and a dredging/hauling cost of \$ 5.00 / ton. In this scenario, biological treatment with Custom FM could result in the reduction of solids by 15,040 tons per year. This would result in a cost reduction of having to dredge and haul solids by \$75,200 per year.