

"Discovery Into Use"

A Biotechnology Company founded in 1996 to study, develop and market a unique protein/surfactant combination.

Seven years of Protein/Surfactant Research at The University of California, Irvine



Managing and reducing Interfacial Tension (IFT)

 Science is based on a low molecular weight protein-structure function and surface chemistry

Significantly accelerates the rate of bioconversion at the molecular level

 Molecular Kinetics[™] crosses a wide spectrum of organic chemistry Good for a tough Wastewater Treatment Plant and the elimination of the worst odors, yet mild enough like a Baby's Shampoo

Currently shipping product to:

 Israel Chile Mexico Canada Singapore Europe Peru • Nationally in US through partnership with US Filter prior to last buyout. Now selling direct Using Accel/[™] from Advanced BioCatalytics can eliminate the need for more infrastructure THE USE OF ACCELL-3[®] IN WASTEWATER TREATMENT PLANTS AT AN AVERAGE CONCENTRATION OF 2 PPM PROVIDES THE FOLLOWING BENEFITS:

Savings

Reduction in treatment costs

30% to 50%

Reduction in Aeration Power Costs

25% to 50%

Increased Aeration Tank Throughput

20% to 40%

Reduction of Sludge Volume Index (SVI) 30% to 45%

HOW IT WORKS ?

Bacterial metabolism is altered so as to affect a significant increase in respiration, or uptake of nutrient, and converting much of this energy to carbon dioxide, as opposed to more biomass.

What happens to the Sludge Without Advanced BioCatalytics?

Influent

BioMass 75%



Carbon Dioxide 25%

What happens to the Sludge With Advanced BioCatalytics?



Uncoupling Process – Less BioMass More CO₂ Short Circuits Reproductive System of Bacteria and increases the Respiration of Bacteria

BioMass 25% Carbon Dioxide 75%

CARBON MASS BALANCE STUDY FOUR HOUR BENCH TEST



Of 175.3 mg/L Carbon Consumed, 74% went to form Biomass and 26% to form CO2



Of 328.6 mg/L Carbon Consumed, 23% went to form Biomass and 77% to form CO2

023007 - RD102

MASS BALANCE RESPIRATION STUDY



042806 - RD101





DISSOLVED OXYGEN (DO) VS BIOLOGICAL OXYGEN DEMAND (BOD)



SOYBEAN PROCESSOR % DAYS/MONTH NON-COMPLIANCE BOD



Percentage of days the wastewater discharge exceeds the limits of compliance on a monthly basis. Prior the addition of *Accell*[®] between 10%-60% of the daily BOD discharge was non-compliant. Following the initiation of the *Accell*[®] treatment, the percentage of daily BOD values per month above the maximum limit decreased significantly, and never exceeded 10% again.

Additional benefits

\$28,000 in cleaning cost
\$150,000 in sewer surcharges

Camp Pendleton Marine Base California, lift station





After Accell®



590' downstream



Video Taken 4/16/1998

Video Taken 8/16/1998



Buckeye Sludge Reduction Gallons/Pounds



Buckeye Sludge Volume Index (SVI)



JAX HEIGHTS, FLORIDA

One MGD influent was split evenly into two separate units.

 Both units were aerated at a constant rate throughout the trial, but Unit #1 received 40% to 45% less air than Unit #2.

During Phase 1, Unit #1 was treated with *Accell*[®] (3-6 ppm) and Unit #2 was operated as control.

During Phase 2, the treatment was switched (crossover);
 Unit #1 was the control and Unit #2 treated with Accell[®].



Air flow applied to Unit #1 and Unit #2 of Jax Heights Wastewater Treatment Plant Unit #1 (*Accell*[®]- treated) received approximately 45% less air than Unit #2 (control).



Distribution of D.O. data during Phase 1 of the Accell[®] treatment study.

More than 66% of all D.O. readings of the *Accell*[®]-treated Unit #1 were within the optimum operating range of 2-4 ppm vs 31% of the Unit #2 (control) D.O.



Air flow applied to Unit #1 and Unit #2 during Phase 2 (crossover).

Applied air was not readjusted after crossover so as to observe effect of crossover. Therefore, Unit #1 (control) received approximately 40% less air than Unit #2 (treated with *Accell*[®]).



Distribution of D.O. data during Phase 2 (after crossover)

More than 73% of all D.O. readings of the *Accell*[®]-treated Unit #2 were above the 4 ppm upper limit. Only 38% of the D.O. readings of Unit 1 were within the 2-4 ppm optimum range vs 66% in phase 1)



Benefits for Membrane Systems

• Significantly reduce biofouling of the membranes Extend the life of existing and/or new membranes Extend the time between chemical cleaning In some cases eliminate chemical cleaning Increase the throughput of existing membrane systems by 20%. Reduce operating costs and energy costs by reducing the operating pressure Breaks down the existing biofilm formed on the membrane Reduces formation of new biofilm in the channels of the membrane Higher dose rates of Accell[®] can be used to clean fouled membrane systems without removing the system from service.



SAN PASQUAL, CA



Ultra Filtration Membrane Permeability

QUESTIONS