

SciCorp BIOLOGIC

Industrial Products for
Organic Waste Management



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BIOLOGIC

- Manufactured by
SciCorp Systems Inc. (Barrie, ON)
- Marketing/Technical Support by
Maat Environmental Engineering Corp. (Oakville, ON)



SciCorp BIOLOGIC

Product Overview



BIOLOGIC

- ❖ Organic Decomposition Enhancement
- ❖ Odour Suppression
- ❖ Retail & Industrial Products

Industrial Products

SR₂, SRC, SRC₃, SBC, GTT



What is BIOLOGIC

- Aqueous-based liquid
- Micro-nutrient solution
- Manufactured with natural ingredients
 - *Proprietary plant extracts*
- Non-persistent, Biodegradable



History

- Developed in 1980s
- NRC and McGill University Testing
- Limited use in Ontario (1980s)
- Extensive use in Asia (1980s/90s)
- *Ownership Change*
- *North American & Global Marketing Plan*



BIOLOGIC

DOES NOT contain...

- Bacteria
- Enzymes
- Toxic Chemicals
- Masking Agents



BIOLOGIC Contents

- **Minerals**

Copper, Magnesium, Potassium, Zinc

- **Nutrients**

Sulphate, TKN

- **Amino Acids**

Ascorbic, Benzoic, Lipoic

- **Vitamins**

B-6/12, C, E, and K



How BIOLOGIC Works

Fundamentals

Microbes

- Microbial activity is fundamental to life
- Present in Air, Water and Soil
- Distinct Growth Requirements



How BIOLOGIC Works

Fundamentals

Micro-nutrients

- Control cell synthesis and growth
- Requirements differ between bacteria
- Growth limiting component
- Designed to stimulate;
Facultative Anaerobes



Facultative Anaerobes

Characteristics

- Present in all waste systems
- Thrive in Aerobic and Anaerobic conditions
- Low energy requirements
- Non-odour producing bi-products



BENEFITS

BIOLOGIC Increases

- System Capacity
- Rate of Organic Decomposition
- Settling
- Solids Conversion



BENEFITS

BIOLOGIC Suppresses

- Sulphur Reducing Bacteria (H₂S)
- Parasitic Organisms
- Coli forms (Total & Fecal)



BIOLOGIC

General Applications



- Lagoons & Ponds
- Lakes & Rivers
- WWTPs
- Aquaculture
- Biological Filters
- Holding Tanks
- Leachate Systems
- Pulp & Paper Sludge
- Septic Systems
- Cess Pools
- Dewatering Systems

Application

Wastewater Treatment Plants



Features of Application

- Continuous Addition
- No Capital Investment
- Conventional Metering Pumps
- No Special Handling/Storage
- Immediate Return on Investment



BENEFITS

- Increased Capacity
- Reduced Energy Use
- Lower O&M Costs
- Reduced Public Complaints (Odour)
- Consistent Regulatory Compliance
- Defer Capital Expenditures



Net Effect

Eliminates
Odour

- Air quality
- Public relations
- Workplace conditions

Net Effect

Improved
Performance

- Increased Capacity
- Improved Settling
- Thicker Sludge
- Solids Reduction

Net Effect

Reduces
Cost

- Energy/Power
- Maintenance
- Chemical Use
- Sludge Handling
 - *Dewatering*
 - *Transportation*
 - *Disposal*

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Bench Test
Summary of Results
Wastewater Treatment Simulation
Using BIOLOGIC SR₂

www.scicorp.net

www.luminultra.com



Objectives

General

- *Assess effectiveness of BIOLOGIC SR₂ to increase WWTP capacity*

BIOLOGIC Benefits

- ✓ Increase Microbial Growth
- ✓ Improve Sludge Quality & Settling
- ✓ Increase Cellular Metabolism



ATP - Adenosine Triphosphate

- ✓ Central Energy Carrier for all Life forms
- ✓ ATP Test Kits used for 30+ yrs in Food & Medical Hygiene

Advantages of ATP Measurements

- **SPEED** > Feedback in minutes rather than days
- **ACCURACY** > Measures total biomass, not a fraction
- **EASE of USE** > No technical background required

Types of ATP

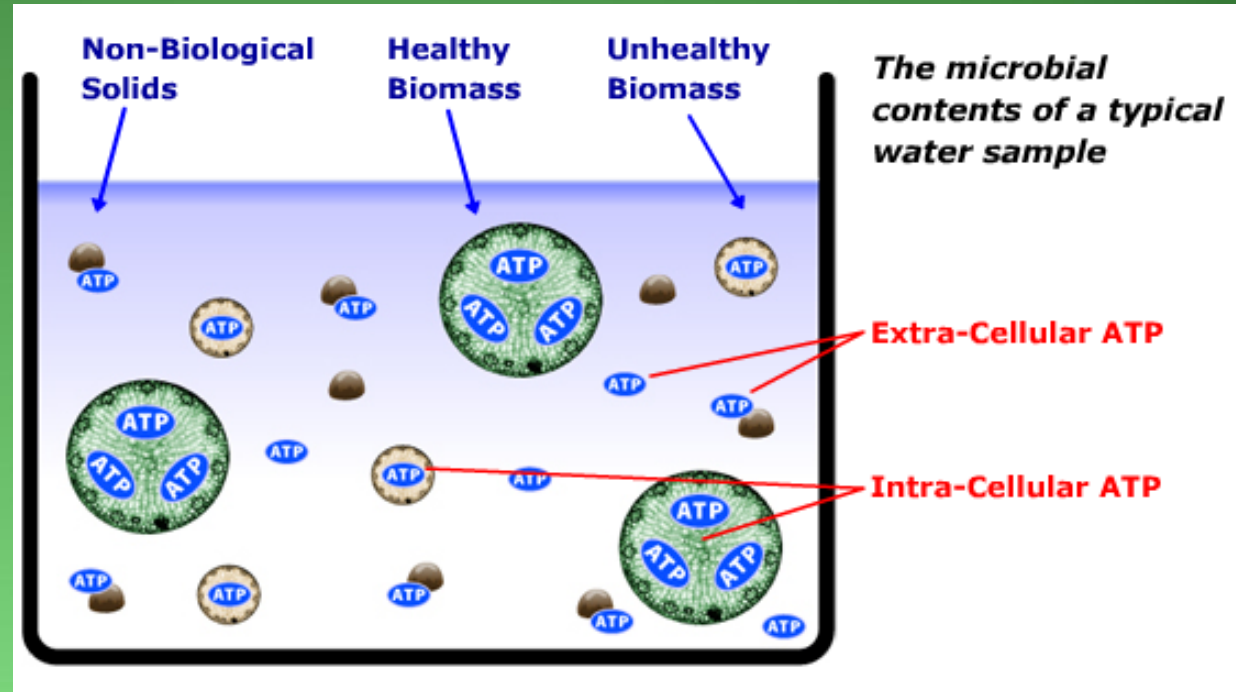
Intra-cellular
(Living)

+

Extra-cellular
(Dead/Dying)

=

TOTAL Biomass



[LuminUltra Technologies, Ltd](#) (Fredericton, NB)

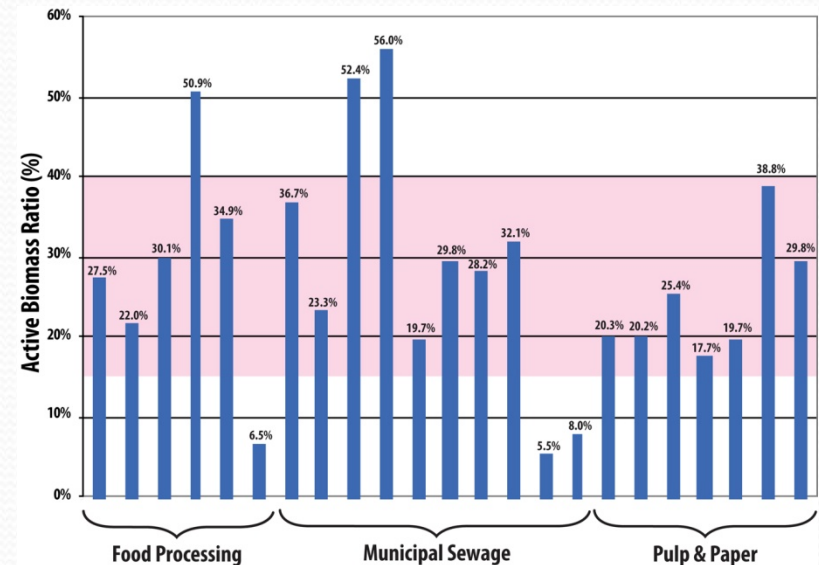
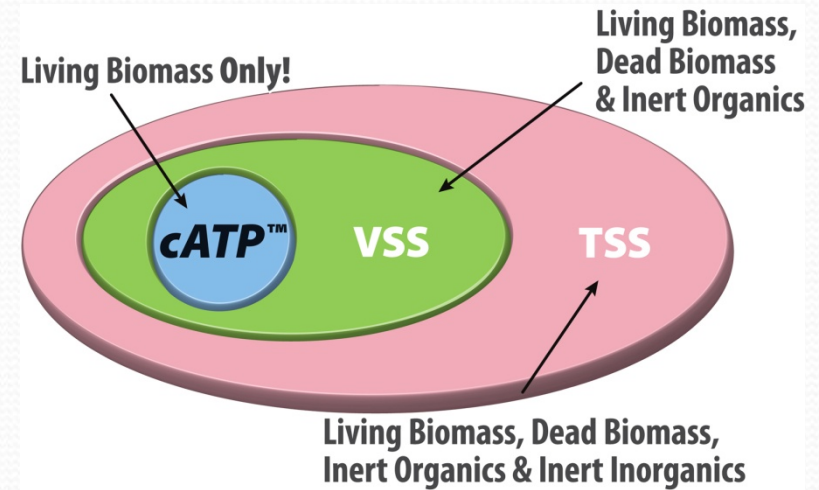
- Perfected the **ability to distinguish the two (2) different types of ATP** in any water or wastewater sample.

Value Proposition: ATP Monitoring in Wastewater

- Isolate the **LIVING biomass** population to establish cause and effect relationships with process variables (i.e. F/M, aeration, nutrient feed, etc.).
- Reveal the onset of toxicity by **assessing stress** to the population
- Advanced **problem detection**;
 - Reveal **filamentous bulking** 1-1.5 SRT's before other plant parameters show change (i.e. SVI)
 - Detect the onset of **deflocculation**

Wastewater – Measure Active Biomass Directly

- **cATP** converted to mass basis can determine % of living biomass in bioreactor solids
- Living biomass is 15 - 40 percent of total solids in bioreactors
- Increasing solids viability leads to increased process efficiency
- Selective sludge wasting



Experimental Setup

Inputs

- 500ml Raw WWTP Influent
- 88ml MLSS

Measurement

- *QuenchGone 21 Wastewater Test Kit*
from LuminUltra Technologies Ltd.



Experimental Setup

Aerobic (*Aeration Stones*)

- Control (No Dosage)
- BIOLOGIC SR₂ @ Normal Dose
- BIOLOGIC SR₂ @ ½ Normal Dose
- BIOLOGIC SR₂ @ 2x Normal Dose

Anoxic (*Lab Stirrer*)

- Control (No Dosage)
- BIOLOGIC SR₂ @ Normal dose



Daily Maintenance

- Nutrient Top-up
 - *Maintain C:N:P Ratio @ 100 : 5 : 1*
- pH Adjustment
 - *Neutral (7)*
- DO Adjustment
 - *Nominal 2.0mg/L*

ATP Measurements

Measured Parameters

- Total (*tATP*)
- Dissolved (*dATP*)

Calculated Parameters

- Cellular ATP (*cATP*)
- Biomass Stress Index (*BSI*)
- Active Biomass Ratio (*ABR*)

RESULTS

Biomass Growth Trends

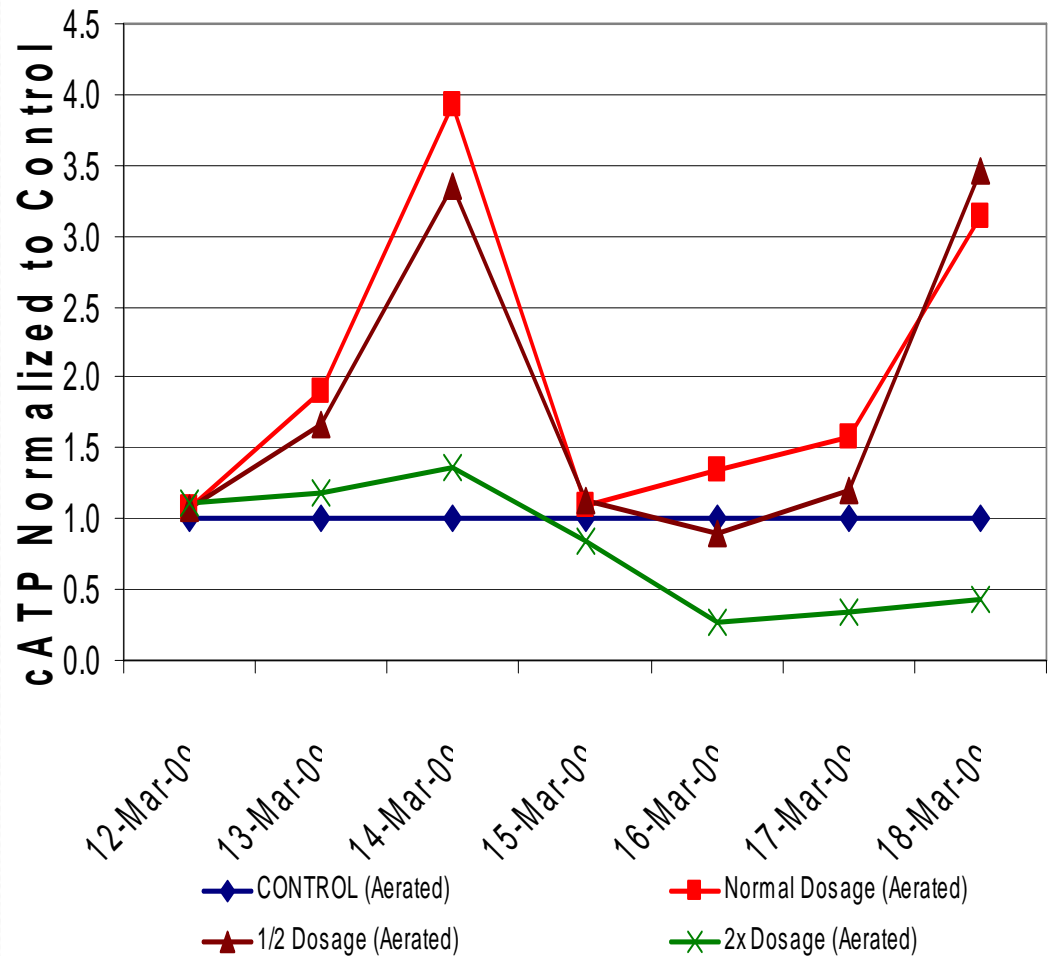
- Significant Early Growth @ Normal, 1/2
- 4 Times Biomass Increase
- Positive Affect on Pop. in Anoxic
- Adverse Affect at 2 times Dose



Biomass Growth

AERATED

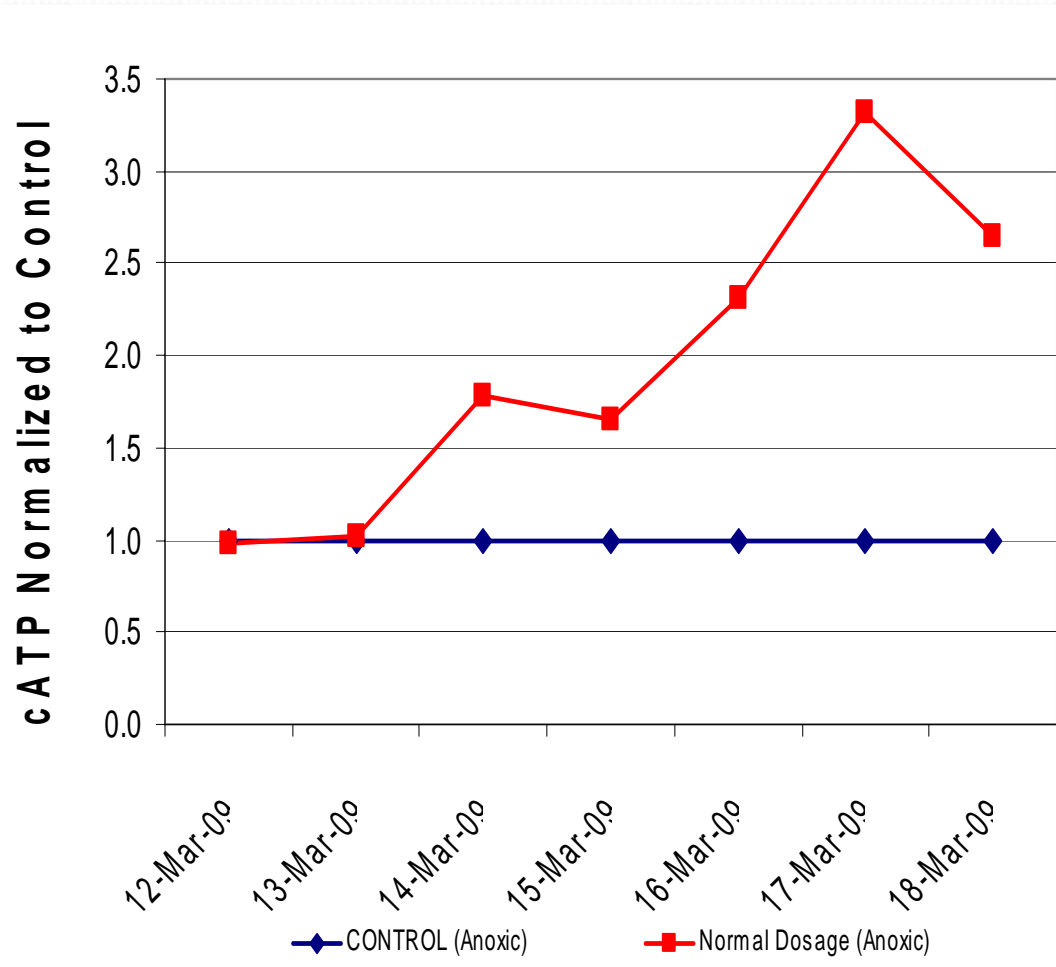
- Increased Early Growth
- 4 Times Biomass
- Typical “Crash”



Biomass Growth

ANOXIC

- Decreased rate of population decline
- Increased DO



RESULTS

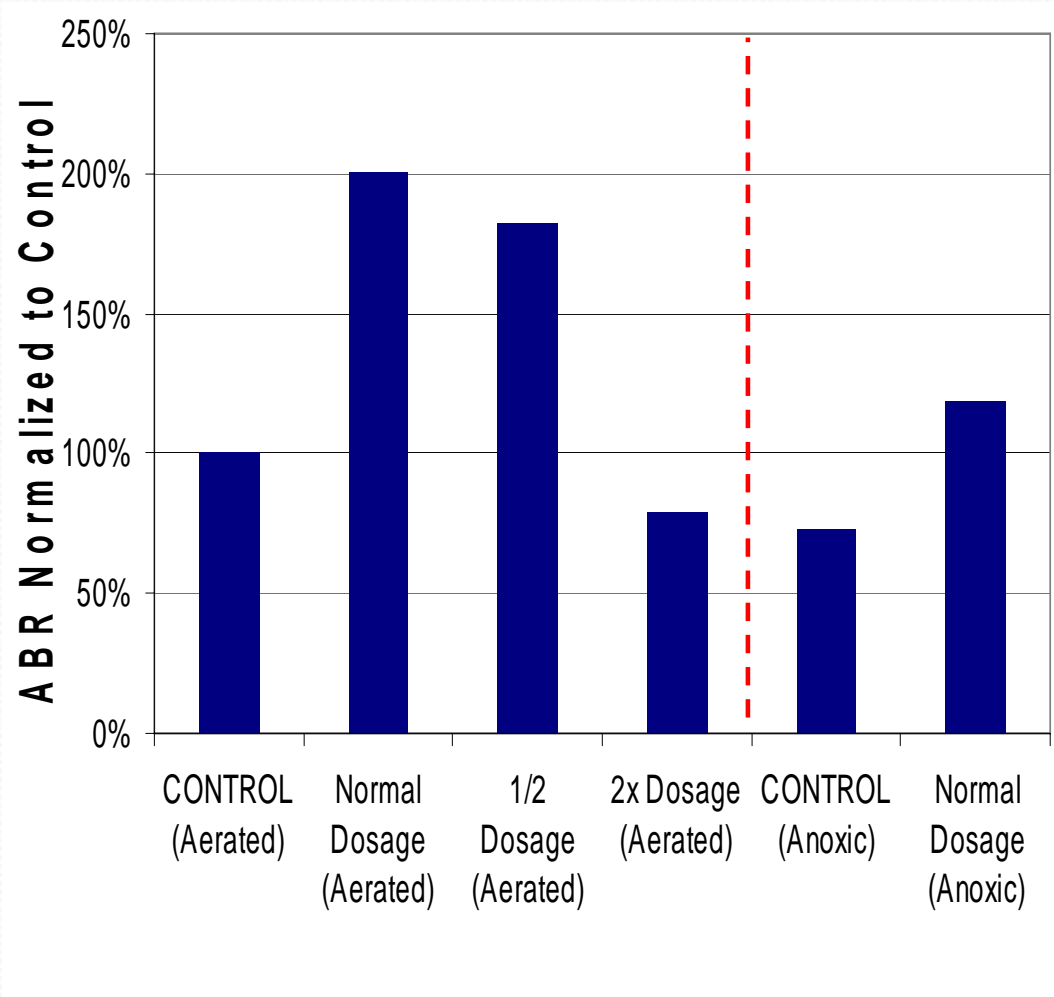
Solids Viability

- cATP and TSS used to determine Active Biomass Ratio (ABR)
- ABR Shows Increase in Living Biomass
- Assists with Selective Sludge Wasting
- Increased Capacity / Reduced Costs



Solids Viability

- Significant Increase in ABR or Living Biomass
- Adverse Effect at 2x Normal Dose
- Enables Selective Sludge Wasting to;
 - *Increase Capacity*
 - *Reduce Costs*



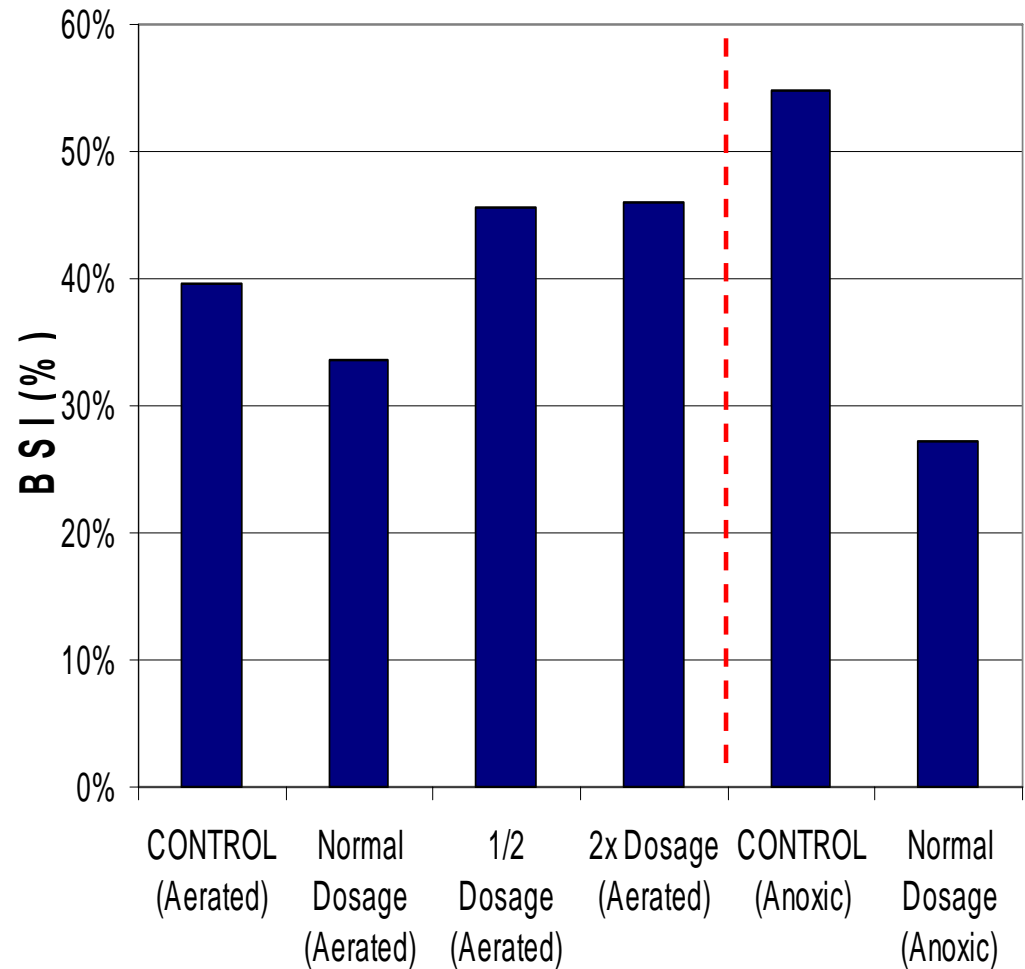
RESULTS

Stress Assessment

- Limited Affect in Aerated Conditions
- Reduced Stress Levels in Anoxic
- Indicative of Biological System Shift to Facultative Anaerobes

Stress Assessment

- Slight Stress Reduction in Aerated Conditions
- Significant Stress Reduction under Anoxic Conditions
- Indicative of Shift towards Facultative Anaerobes



RESULTS

Assessment of Floc Physiology

- Thickening of Sludge
- Reduction of Small Floc Particles
- Improved Settling



CONCLUSIONS

- ❖ Increased Metabolic Activity
- ❖ 400% Increase in Living Biomass (Capacity)
- ❖ Reduced Stress in Anoxic Conditions
(Facultative Anaerobes)
- ❖ Improved Settling, Reduced Bulking,
Thicker Sludge



BIOLOGIC *BENEFITS*

Improved
Performance

Increased

- Living Biomass
- Capacity
- Settling

Actions

- ✓ Selective Sludge Wasting

BIOLOGIC *BENEFITS*

Reduced
Costs

Reduced

- Aeration Energy
- Maintenance
- Chemical Use
- Sludge Handling

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