

Pretreatment Experimental Data Sheet

Date: _____

Name: _____

Purpose of experiment:

	Std. Process	Batch # _____	
Pre-steam Bin			
level	80 %		Retention time will depend on the level setting
temperature	180 °F		Controlled using 30 psi steam
speed of pre-steam bin	100 %		Will determine the flow-rate of the system
Pretreatment			
temperature	374 °F		Controlled indirectly using pressure readings
pressure	170 psi		The pressure of the pretreatment dictates the temperature
residence time	7.5 min		Controlled by the speed of digester screw
speed of digester	100 %		100% speed = 7.4 min
DW of Hz	10 %		
Sample interval (blow tank)	12 h		
DW	30 %		
WIS	70 %		
Hz			To be measured: sugars, inhibitors, %DW, pH, and conductivity
Target Sugar Conc.	50-60 g/L		
Screw press speed	5 RPM		The screw press speed will determine the Hz squeezed from the pretreated biomas
Pressed cake dry weight	45 %		

Liquefaction Experimental Data Sheet

Date: _____

Name: _____

Purpose of experiment:

	Std. Process	Batch # _____	
Liquefaction			
solids concentration	15% DW/v		Will be controlled by the addition of water during liquefaction
enzyme flow rate	5% v/DW		Will dictate the concentration of enzyme used
temperature	122 °F		Controlled automatically using jacketed tank
pH	5.0		Controlled using ammonium hydroxide (19%; 10.4 N)
level	%		Determined by flow rate of biomass
UV water flow rate	GPM		Determined by the dry weight and flow rate of the biomass
Sample interval	6 h		
DW	%		by moisture balance and oven loss on drying
Sugars and Inhibitors			
pH			
Plate Counts			as needed
pH Adjustment Tank			
solids concentration	15% DW/v		Will be controlled by the addition of water during liquefaction
temperature	98.6 °F		Controlled automatically using jacketed tank
pH	6.3		Controlled using ammonium hydroxide (19%; 10.4 N)
level	40.0 %		
Sample interval	12 h		
DW	%		
pH			

Seed Flask Experimental Data Sheet

Date: _____

Name: _____

Purpose of experiment:

	Std. Process	Batch # _____	
Seed Flask			
Total volume	4.5 L		
Inoculum	8 mL/L		For every liter of broth, add 8 mL of frozen stock
Hz conc	30% v/v		
24 h ethanol	1.50 g/L		
Agitation	200 RPM		Using orbital shaker/incubator
SMB concentration	1.0 mM		
HZ Conditioning	8 pH		pH adjusted day before using 5 N ammonium hydroxide the day before
Sample Interval	24 h		
Ethanol			
Sugars			
Inhibitors			
Viable Plate Counts			
Differential Plating			

Primary Propagation Experimental Data Sheet

Date: _____

Name: _____

Purpose of experiment:

	Std. Process	Batch # _____	
Primary Propagation			
Hz Concentration	50 %		
Hz pH conditioning	8.0 pH		pH adjusted day before using 19% (10.4 N) ammonium hydroxide the day before
magnesium sulfate + SMB	150 mL		1:1000 dilution of 1000X stock (SMB + Mg 1.5 M stock)
trace metals	150 mL		1:1000 dilution of 1000X stock
temperature	98.6 °F		
Inoculum	4.5 L		Inoculated from frozen stock (0.1% inoculum)
Volume	40 Gal		
Air Flow Rate	0.05 ft ³ /min		0.01 vvm air
Agitation	100 %		
pH	6.30 pH		ammonium hydroxide
24 h EtOH	2 - 3 g/L		
Added Glucose	5 g/L		added before inoculation
Sample Intervals	12 h		
Ethanol			
Sugars			
Inhibitors			
Viable Plate Counts			
Differential Plating			

Secondary Propagation Experimental Data Sheet

Date: _____

Name: _____

Purpose of experiment:

	Std. Process	Batch # _____	
Secondary Propagation			
Hz pH conditioning	8.0		pH adjusted day before using 19% (10.4 N) ammonium hydroxide the day before
magnesium sulfate + SMB	1.5 L		1:1000 dilution of 1000X stock (SMB + Mg 1.5 M stock)
trace metals	1.5 L		1:1000 dilution of 1000X stock
temperature	98.6 °F		
Total volume	400 gal		
Hz conc	50% v/v		
inoculum	40 Gal		
24 h EtOH	5 - 6 g/L		
agitation	100%		
pH	6.3		
air flow rate	0.51 ft ³ /min		Use 0.01 vvm of air
Added Glucose	5 g/L		added before inoculation
Sample Intervals	8 h		
Ethanol			
Sugars			
Inhibitors			
Viable Plate Counts			
Differential Plating			

Fermentation Experimental Data Sheet

Date: _____

Name: _____

Purpose of experiment:

	Std. Process	Batch # _____	
Fermentation			
total final volume	4000 gal		
temperature	98.6 °F		Controlled automatically using jacketed tank
pH	6.3		Controlled using ammonium hydroxide (10.4 N, 19% w/w)
magnesium sulfate + SMB	15.0 L		1:1000 dilution of 1000X stock (SMB + Mg 1.5 M stock)
trace metals	15.0 L		1:1000 dilution of 1000X stock
inoculum	10% v/v		Inoculated from secondary propagator
agitation speed	100%		
slurry flow rate			Dependent upon flow rate of biomass
solids loading	13.5%		
air flow rate	5.4 ft ³ /min		Use 0.01 vvm of air
sample intervals	6 h		
Ethanol			
Sugars			
Inhibitors			
Viable Plate Counts			
Differential Plating			
DW			