

## Supplementary data of ANOVA test

### 1- Results of ANOVA test for data presented in Figure 3.

Total methane (m<sup>3</sup>/ton of initial dry pinewood) produced from the detoxified hydrolysates obtained in pretreatment at 100 °C.

### General Linear Model

#### Factor Information

Type	Levels	Values
Fixed	9	10 min 0%, 10 min 0.25%, 10 min 0.5%, 30 min 0%, 30 min 0.25%, 30 min 0.5%, 5 min 0%, 5 min 0.25%, 5 min 0.5%

#### Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	8	2047.4	255.93	13.27	<b>0.000</b>
Error	9	173.5	19.28		
Total	17	2220.9			

#### Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
4.39097	92.19%	85.24%	68.75%

### Tukey Pairwise Comparisons: Response

Grouping Information Using the Tukey Method and 95% Confidence

Factor	N	Mean	Grouping
30 min 0.5%	2	39.8373	<b>A</b>
5 min 0.5%	2	30.7764	<b>A B</b>
10 min 0.25%	2	28.0079	<b>A B C</b>
30 min 0.25%	2	24.6450	<b>A B C</b>
10 min 0.5%	2	23.1793	<b>A B C D</b>
5 min 0.25%	2	21.6352	<b>B C D E</b>
5 min 0%	2	12.6446	<b>C D E</b>
10 min 0%	2	7.0518	<b>D E</b>
30 min 0%	2	5.4015	<b>E</b>

## 2- Results of ANOVA test for data presented in Figure 4.

Total methane (m<sup>3</sup>/ton of initial dry pinewood) produced from the detoxified hydrolysates obtained in pretreatment at 140 °C.

### General Linear Model

#### Factor Information

Type	Levels	Values
Fixed	9	10 min 0%, 10 min 0.25%, 10 min 0.5%, 30 min 0%, 30 min 0.25%, 30 min 0.5%, 5 min 0%, 5 min 0.25%, 5 min 0.5%

#### Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	8	41348	5168.5	7.30	<b>0.004</b>
Error	9	6375	708.3		
Total	17	47723			

#### Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
26.6145	86.64%	74.77%	46.57%

### Tukey Pairwise Comparisons: Response

Grouping Information Using the Tukey Method and 95% Confidence

Factor	N	Mean	Grouping
5 min 0.5%	2	162.622	<b>A</b>
10 min 0.5%	2	132.867	<b>A B</b>
10 min 0.25%	2	120.992	<b>A B C</b>
30 min 0.25%	2	112.386	<b>A B C</b>
30 min 0.5%	2	107.748	<b>A B C</b>
5 min 0.25%	2	95.112	<b>A B C</b>
30 min 0%	2	35.916	<b>B C</b>
10 min 0%	2	26.301	<b>C</b>
5 min 0%	2	20.865	<b>C</b>

### 3- Results of ANOVA test for data presented in Figure 5.

Total methane (m<sup>3</sup>/ton of initial dry pinewood) produced from the detoxified hydrolysates obtained in pretreatment at 180 °C.

#### General Linear Model for 180°C

##### Factor Information

Type	Levels	Values
Fixed	9	10 min 0%, 10 min 0.25%, 10 min 0.5%, 30 min 0%, 30 min 0.25%, 30 min 0.5%, 5 min 0%, 5 min 0.25%, 5 min 0.5%

##### Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	8	7603	950.3	5.84	<b>0.008</b>
Error	9	1465	162.8		
Total	17	9068			

##### Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
12.7596	83.84%	69.48%	35.36%

#### Tukey Pairwise Comparisons: Response

Grouping Information Using the Tukey Method and 95% Confidence

Factor	N	Mean	Grouping
5 min 0.25%	2	116.445	<b>A</b>
5 min 0%	2	99.468	<b>A B</b>
10 min 0%	2	92.740	<b>A B</b>
30 min 0%	2	89.041	<b>A B</b>
5 min 0.5%	2	73.075	<b>A B</b>
10 min 0.25%	2	70.614	<b>A B</b>
10 min 0.5%	2	63.948	<b>B</b>
30 min 0.25%	2	57.416	<b>B</b>
30 min 0.5%	2	49.119	<b>B</b>

#### 4- Results of ANOVA test for data presented in Table 2.

The concentration of total sugars and inhibitors in the pretreatment hydrolysate before and after detoxification.

#### General Linear Model for 100°C

##### Factor Information

Type	Levels	Values
Fixed	10	10 min 0%, 10 min 0.25%, 10 min 0.5%, 30 min 0%, 30 min 0.25%, 30 min 0.5%, 5 min 0%, 5 min 0.25%, 5 min 0.5%, untreat

##### Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	9	1.468	0.1631	0.98	<b>0.510</b>
Error	10	1.672	0.1672		
Total	19	3.140			

##### Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.408867	46.76%	0.00%	0.00%

#### Tukey Pairwise Comparisons: Response for 100°C

Grouping Information Using the Tukey Method and 95% Confidence

Factor	N	Mean	Grouping
30 min 0%	2	4.02294	A
5 min 0%	2	3.61595	A
10 min 0%	2	3.51420	A
5 min 0.5%	2	3.49855	A
10 min 0.5%	2	3.44376	A
untreat	2	3.42811	A
10 min 0.25%	2	3.36549	A
30 min 0.25%	2	3.32636	A
30 min 0.5%	2	3.15417	A
5 min 0.25%	2	2.93502	A

## General Linear Model for 140°C

### Factor Information

Type	Levels	Values
Fixed	10	10 min 0%, 10 min 0.25%, 10 min 0.5%, 30 min 0%, 30 min 0.25%, 30 min 0.5%, 5 min 0%, 5 min 0.25%, 5 min 0.5%, untreated

### Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	9	2.157	0.2397	1.48	<b>0.275</b>
Error	10	1.621	0.1621		
Total	19	3.778			

### Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.402571	57.10%	18.49%	0.00%

### Tukey Pairwise Comparisons: Response for 140°C

Grouping Information Using the Tukey Method and 95% Confidence

Factor	N	Mean	Grouping
30 min 0%	2	4.18730	A
5 min 0%	2	4.15599	A
10 min 0.25%	2	3.85858	A
30 min 0.25%	2	3.61595	A
10 min 0%	2	3.54551	A
5 min 0.5%	2	3.49855	A
untreat	2	3.42811	A
30 min 0.5%	2	3.34201	A
10 min 0.5%	2	3.27940	A
5 min 0.25%	2	3.21679	A

## General Linear Model for 180°C

### Factor Information

Type	Levels	Values
Fixed	10	10 min 0%, 10 min 0.25%, 10 min 0.5%, 30 min 0%, 30 min 0.25%, 30 min 0.5%, 5 min 0%, 5 min 0.25%, 5 min 0.5%, untreated

### Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	9	97.105	10.7895	23.69	<b>0.000</b>
Error	10	4.554	0.4554		
Total	19	101.659			

### Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.674799	95.52%	91.49%	82.08%

## Tukey Pairwise Comparisons: Response for 180°C

Grouping Information Using the Tukey Method and 95% Confidence

Factor	N	Mean	Grouping
30 min 0.5%	2	11.6775	<b>A</b>
10 min 0.5%	2	6.9971	<b>B</b>
30 min 0.25%	2	6.2223	<b>B C</b>
5 min 0.5	2	5.9796	<b>B C D</b>
10 min 0%	2	5.7840	<b>B C D</b>
10 min 0.25%	2	5.1030	<b>B C D</b>
30 min 0%	2	5.0091	<b>B C D</b>
5 min 0%	2	4.9230	<b>B C D</b>
5 min 0.25%	2	3.5846	<b>C D</b>
untreat	2	3.4281	<b>D</b>

### 5- Results of ANOVA test for data presented in Table 3.

Ethanol yield from untreated and pretreated pinewood.

#### Factor Information

Type	Levels	Values
Fixed	8	100 °C 0% 5min, 140 °C 0% 5min, 140 °C 0.5% 5min, 180 °C 0% 5min, 180 °C 0.5% 10min, 180 °C 0.5% 30min, 180 °C 0.5% 5min, untreated

#### Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	7	4425.21	603.601	4946.36	<b>0.000</b>
Error	8	0.98	0.122		
Total	15	4226.18			

#### Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.34932	99.96%	99.98%	99.91%

#### Tukey Pairwise Comparisons: Response

Grouping Information Using the Tukey Method and 95% Confidence

Factor	N	Mean	Grouping
180 °C 0.5% 30min	2	53.09	<b>A</b>
180 °C 0.5% 10min	2	48.04	<b>B</b>
180 °C 0.5% 5min	2	40.73	<b>C</b>
140 °C 0.5% 5min	2	30.34	<b>D</b>
180 °C 0% 5min	2	26.84	<b>E</b>
140 °C 0% 5min	2	15.15	<b>F</b>
100 °C 0% 5min	2	10.96	<b>G</b>
untreated	2	6.43	<b>H</b>