

hydrogen peroxide and the lignin, which must be largely deconstructed to be extracted. However, the solid loading variable has a significant positive influence on the solid yield, which should be considered since the solid contains fermentable sugars. Temperature influence depends on the solid loading; it slightly affects the lowest solid loading. The optimum temperature found within the operation range can be interpreted as a compromise relationship between the severity factor and the thermal decomposition reaction of hydrogen peroxide, which competes with lignin oxidation. The hydrolysis time did not significantly modify the results; however, the surface response suggested that 60 min hydrolysis would provide better delignification.

**Table 3:** ANOVA of the RSM analysis for the solid fraction yield.

<b>Response Surface Regression</b>					
<b>SF Yield (%) vs time (min), Temperature (°C) and Solid loading (g/mL)</b>					
<b>Analysis of Variance</b>					
<b>Source</b>	<b>DF</b>	<b>Adj SS</b>	<b>Adj MS</b>	<b>F-Value</b>	<b>P-Value</b>
Model	9	0.0795	0.0088	3.46	0.092
Linear	3	0.0619	0.0206	8.09	0.023 – S
time (min)	1	0.0075	0.0075	2.95	0.146
Temperature (°C)	1	0.0199	0.0199	7.79	0.038 - S
Solid loading (g/mL)	1	0.0345	0.0345	13.52	0.014 – S
Square	3	0.0127	0.0042	1.66	0.289
time (min)*time (min)	1	0.0042	0.0042	1.66	0.253
Temperature (°C)*Temperature (°C)	1	0.0001	0.0001	0.06	0.820
Solid load (g/mL)*Solid load (g/mL)	1	0.0088	0.0088	3.44	0.123
2-Way Interaction	3	0.0049	0.0016	0.64	0.619
time (min)*Temperature (°C)	1	0.00023	0.00023	0.09	0.777
time (min)*Solid loading (g/mL)	1	0.00004	0.00004	0.01	0.911
Temperature (°C)*Solid load (g/mL)	1	0.00467	0.00467	1.83	0.234
Error	5	0.01276	0.00255		
Lack-of-Fit	3	0.00662	0.00220	0.72	0.627
Pure Error	2	0.006140	0.003070		
Total	14	0.092289			
Model Summary: S = 0.0505086 R-sq = 86.18%					

Given these results, the effect of decreasing the temperature to analyze the effect on delignification and solid fraction yield was studied further. A different experiment was carried out at 60°C, which provided a good yield (70%) and a good degree of delignification (71%). Under these conditions, the decrease in solid yield is occasioned mostly by lignin removal, optimal for recovering the fermentable sugars from the solid.