

# ANNEXES

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## ANNEX A

### **Simone's Medium Preparation**

To prepare 1 L of stock solution, dilute the following in 998 mL of water:

- $\text{NaHCO}_3$ : 0.241 g
- $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ : 0.2117 g
- $\text{CaCl}_2$ : 0.2311 g
- $\text{KCl}$ : 0.1198 g
- Solution Micro 1: 10 mL
- Solution Micro 2: 1 mL

#### Micro Solution 1

To prepare 1 L of Micro Solution 1, dissolve:

- $\text{AlCl}_3$ : 0.394 g
- $\text{FeSO}_4$ : 0.08 g

#### Micro Solution 2

To prepare 0.5 L of Micro Solution 2, dissolve:

- $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$ : 0.061 g
- $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ : 0.013 g
- $\text{CuSO}_4$ : 0.079 g
- $\text{ZnSO}_4 \cdot \text{H}_2\text{O}$ : 0.352 g

## ANNEX B

### PSEUDO-FIRST ORDER KINETICS

#### PARAMETERS

<b>Parameter</b>	<b>Value</b>	<b>Standard Error</b>	<b>Adj. R-Square</b>
Intercept	0.64423	0.57762	0.37006
Slope	-0.07045	0.03312	

#### STATISTICS

<b>Statistic</b>	<b>Value</b>
<b>Number of Points</b>	7
<b>Degrees of Freedom</b>	5
<b>Residual Sum of Squares</b>	6.97178
<b>Pearson's r</b>	-0.68924
<b>R-Square (COD)</b>	0.47505
<b>Adj. R-Square</b>	0.37006

#### ANOVA

	<b>DF</b>	<b>Sum of Squares</b>	<b>Mean Square</b>	<b>F Value</b>	<b>Prob&gt;F</b>
<b>Model</b>	1	6.30907	6.30907	4.52472	0.08672
<b>Error</b>	5	6.97178	1.39436		
<b>Total</b>	6	13.28085			

PSEUDO-SECOND ORDER KINETICS

PARAMETERS

<b>Parameter</b>	<b>Value</b>	<b>Standard Error</b>	<b>Adj. R-Square</b>
Intercept	0.08299	0.03698	0.99864
Slope	0.14092	0.00212	

STATISTICS

<b>Statistic</b>	<b>Value</b>
<b>Number of Points</b>	7
<b>Degrees of Freedom</b>	5
<b>Residual Sum of Squares</b>	0.02857
<b>Pearson's r</b>	0.99943
<b>R-Square (COD)</b>	0.99887
<b>Adj. R-Square</b>	0.99864

ANOVA

	<b>DF</b>	<b>Sum of Squares</b>	<b>Mean Square</b>	<b>F Value</b>	<b>Prob&gt;F</b>
<b>Model</b>	1	25.2432	25.2432	4417.36268	<0.0001
<b>Error</b>	5	0.02857	0.00571		
<b>Total</b>	6	25.27177			

## ANNEX C

### LANGMUIR ISOTHERM MODEL NON-LINEAR VALUES

#### PARAMETERS

	<b>Parameter</b>	<b>Value</b>	<b>Standard Error</b>	<b>t-Value</b>	<b>Prob&gt; t </b>	<b>Dependency</b>
<b>q<sub>e</sub></b>	<b>q<sub>max</sub></b>	23.32598	1.81245	12.86983	0.00101	0.37251
	<b>K<sub>L</sub></b>	0.14615	0.07465	1.95772	0.14518	0.37251

#### STATISTICS

<b>Statistic</b>	<b>Value</b>
<b>Number of Points</b>	5
<b>Degrees of Freedom</b>	3
<b>Reduced Chi-Sqr</b>	5.27925
<b>Residual Sum of Squares</b>	15.83776
<b>R-Square (COD)</b>	0.95998
<b>Adj. R-Square</b>	0.94664

#### ANOVA

	<b>DF</b>	<b>Sum of Squares</b>	<b>Mean Square</b>	<b>F Value</b>	<b>Prob&gt;F</b>	
<b>q<sub>e</sub></b>	<b>Regression</b>	2	1393.51813	696.75906	131.9806	0.00119
	<b>Residual</b>	3	15.83776	5.27925		
	<b>Uncorrected Total</b>	5	1409.35589			
	<b>Corrected Total</b>	4	395.74512			

LANGMUIR ISOTHERM MODEL LINEAR VALUES

PARAMETERS

Parameter	Value	Standard Error	t-Value	Prob> t
<b>Intercept</b>	0.05244	0.00671	7.81994	0.00435
<b>Slope</b>	0.13475	0.0018	74.82104	5.26163E-6

STATISTICS

Statistic	Value
<b>Number of Points</b>	5
<b>Degrees of Freedom</b>	3
<b>Residual Sum of Squares</b>	5.22897E-4
<b>Pearson's r</b>	0.99973
<b>R-Square (COD)</b>	0.99946
<b>Adj. R-Square</b>	0.99929

ANOVA

	DF	Sum of Squares	Mean Square	F Value	Prob>F
<b>Model</b>	1	0.97576	0.97576	5598.18843	<0.0001
<b>Error</b>	3	5.22897E-4	1.74299E-4		
<b>Total</b>	4	0.97628			

FREUNDLICH ISOTHERM MODEL NON-LINEAR VALUES

PARAMETERS

	Parameter	Value	Standard Error	t-Value	Prob> t	Dependency
<b>q<sub>e</sub></b>	<b>K<sub>F</sub></b>	6.25421	1.62859	3.84027	0.03114	0.92765
	<b>n</b>	3.95828	0.83888	4.71851	0.01803	0.92765

STATISTICS

Statistic	Value
Number of Points	5
Degrees of Freedom	3
Reduced Chi-Sqr	6.81363
Residual Sum of Squares	20.44089
R-Square (COD)	0.94835
Adj. R-Square	0.93113

ANOVA

		DF	Sum of Squares	Mean Square	F Value	Prob>F
	<b>Regression</b>	2	1388.915	694.4575	101.92183	0.00175
	<b>Residual</b>	3	20.44089	6.81363		
<b>q<sub>e</sub></b>	<b>Uncorrected Total</b>	5	1409.35589			
	<b>Corrected Total</b>	4	395.74512			

FREUNDLICH ISOTHERM MODEL LINEAR VALUES

PARAMETERS

Parameter	Value	Standard Error	t-Value	Prob> t
<b>Intercept</b>	0.49656	0.11977	4.14599	0.02549
<b>Slope</b>	0,42094	0,07328	5,74388	0,01048

STATISTICS

Statistic	Value
<b>Number of Points</b>	5
<b>Degrees of Freedom</b>	3
<b>Residual Sum of Squares</b>	0.1216
<b>Pearson's r</b>	0.95742
<b>R-Square (COD)</b>	0.91665
<b>Adj. R-Square</b>	0.88886

ANOVA

	DF	Sum of Squares	Mean Square	F Value	Prob>F
<b>Model</b>	1	1.33733	1.33733	32.99211	0.01048
<b>Error</b>	3	0.1216	0.04053		
<b>Total</b>	4	1.45893			

TEMKIN ISOTHERM MODEL NON-LINEAR VALUES

PARAMETERS

	Parameter	Value	Standard Error	t-Value	Prob> t	Dependency
<b>q<sub>e</sub></b>	<b>A</b>	8.11047	3.65378	2.21975	0.11307	0.72337
	<b>B</b>	3.11237	0.26003	11.96924	0.00125	0.72337

STATISTICS

Statistic	Value
<b>Number of Points</b>	5
<b>Degrees of Freedom</b>	3
<b>Reduced Chi-Sqr</b>	2.70571
<b>Residual Sum of Squares</b>	8.11714
<b>R-Square (COD)</b>	0.97949
<b>Adj. R-Square</b>	0.97265

ANOVA

		DF	Sum of Squares	Mean Square	F Value	Prob>F
<b>q<sub>e</sub></b>	<b>Regression</b>	1	387.62798	387.62798	143.26275	0.00125
	<b>Residual</b>	3	8.11714	2.70571		
	<b>Uncorrected Total</b>	5	1409.35589			
	<b>Corrected Total</b>	4	395.74512			

TEMPKIN ISOTHERM MODEL LINEAR VALUES

PARAMETERS

Parameter	Value	Standard Error	t-Value	Prob> t
<b>Intercept</b>	6.51468	0.97853	6.65765	0.00691
<b>Slope</b>	3.11237	0.26003	11.96926	0.00125

STATISTICS

Statistic	Value
<b>Number of Points</b>	5
<b>Degrees of Freedom</b>	3
<b>Residual Sum of Squares</b>	8.11712
<b>Pearson's r</b>	0.98969
<b>R-Square (COD)</b>	0.97949
<b>Adj. R-Square</b>	0.97265

ANOVA

	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	1	387.62794	387.62794	143.26316	0.00125
Error	3	8.11712	2.70571		
Total	4	395.74506	Total		