

SOD ASSAY
Based on the inhibition of the oxidation of epinephrine

Summary of equations for data analysis

$$\% I = \% \text{ INHIBITION}$$

$$(V_o - V_{\text{SOD}}) * 100 / V_o =$$

$$1 - (V_{\text{SOD}} / V_o)$$

For every assay

find SOD_{50} and -->

SAMPLE SPREADSHEET

1. Print spreadsheet on one page with SOD_{50} calculated.
2. Print both the Inhibition plot and the double reciprocal plot with the theoretical lines indicated.

HYPERBOLIC PLOT

INVERSE PLOT

DATA FOR PERCENT INHIBITION PLOT FOR STANDARD SOD							DATA FOR THE INVERSE PLOT (double reciprocal plot)				
	SOD 10 ⁻⁹ M (or nM) X	V	% OF V _o calc	% OF V _o calc	(V _{SOD} /V _o) * 100 = % I Y _{obs}	% I calc'd for theor. line Y _{calc}	INVERSE SOD X	INVERSE % I Y _{obs}	INVERSE % I calc'd for theor. line Y _{calc}		
V _o [*]	0.0000	0.010700	100.0	100.0	0.00	0.00					
V _{sod}	0.1950	0.008810	82.3	82.5	17.7	17.5	5.13	0.0566	0.0571		
"	0.3900	0.007560	70.7	69.6	29.3	30.4	2.56	0.0341	0.0329		
"	0.7780	0.005570	52.1	51.9	47.9	48.1	1.29	0.0209	0.0208		
"	1.1700	0.004200	39.3	40.2	60.7	59.8	0.855	0.0165	0.0167		
"	1.5500	0.003110	29.1	32.1	70.9	67.9	0.645	0.0141	0.0147		
"	1.9300	0.002630	24.6	26.1	75.4	73.9	0.518	0.0133	0.0135		
"	2.9800	0.001720	16.1	15.3	83.9	84.7	0.336	0.0119	0.0118		
"	4.7600	0.000870	8.13	5.85	91.9	94.1	0.210	0.0109	0.0106		
							0.00		0.0086		
Calculated for demonstration only Skip in routine analyses							for inverse plot				
* Show all V _o values for runs in spreadsheet; use average for calculations of %I							Y _{calc} = $\frac{m}{[\text{SOD}]} + b$				
							Y _{calc} = $mx + b$ where $x = 1/\text{SOD}$				
At low SOD, b*[SOD] << m, so Y = (1/m)*SOD At high SOD, b*[SOD] >> m, so Y = (1/b)											
SOD ₅₀ = 50 * m / (1 - 50* b)							Summary Output Inverse Plot of Y _{obs} vs X				
use m and b from the slope and y-intercept of the inverse plot							Regression Statistics				
For the data above:							Multiple R		0.9993	Find these % errors ↓	
							R Square		0.9987		
							Adj R ²		0.9984		
							Std Error		0.000623		
							Obsns		8		
							Coefficients		Std Error	%	
							Int = b		0.00864	0.00030	3.5
							X var 1 = m		0.00945	0.00014	1.5
							↑ 0.00945 x 10 ⁻⁹ M				
SOD ₅₀ ' = m / b = 1.09 x 10 ⁻⁹ M							Max % Inhibition = 1/b = 116				
If the maximum percent inhibiton is less than 90%, use this definition of a unit of SOD activity							This is higher than the 90 - 100 % expected				