

## Microbial and Enzyme Kinetics

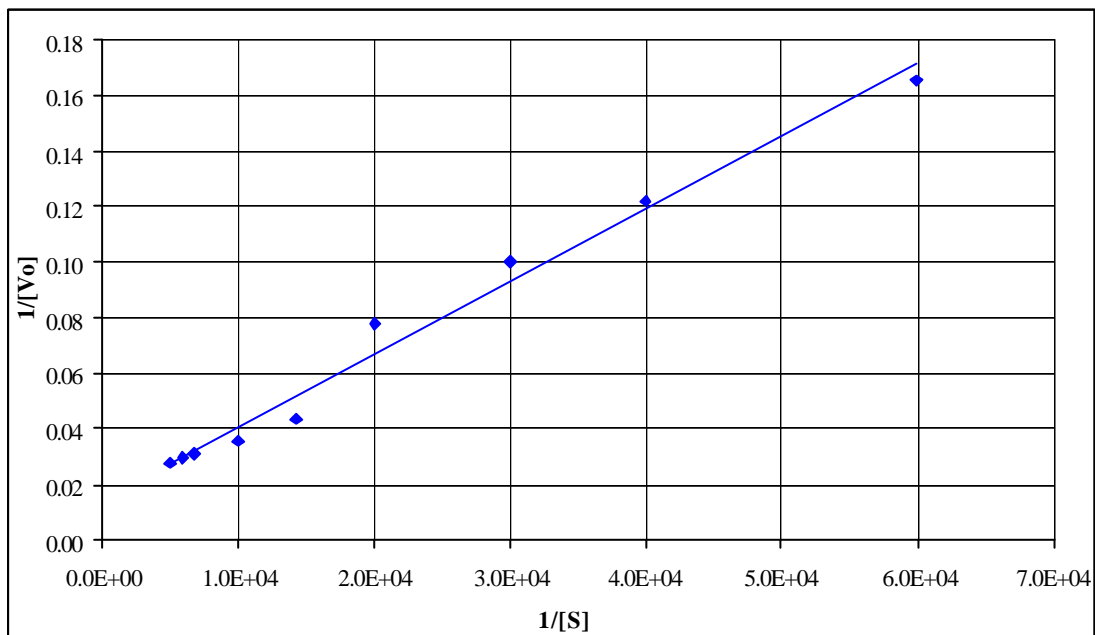
### Tutorial 3a

An experiment was carried out using a food enzyme and gave the following results.

[S]/10 <sup>-5</sup> M	1.67	2.5	3.33	5	7	10	15	16.7	20
V <sub>0</sub> /μmol min <sup>-1</sup>	6.05	8.2	9.98	12.86	23	28	32.6	33.8	36

A Lineweaver-Burke plot for the data is reproduced below.

1. Replot the data using either the Eadie-Hofstee or the Hanes plot.
2. Comment on the resulting graphs
3. Estimate values of V<sub>max</sub> and K<sub>m</sub> for this data.



### Rearrangement of Eadie-Hofstee and Hanes plots.

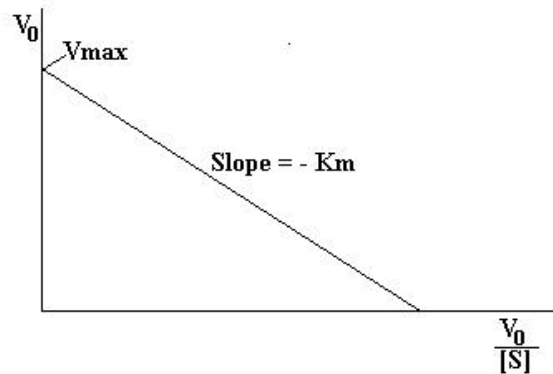
The Eadie-Hofstee and Hanes plots may be rewritten to simplify them

**a. Eadie-Hofstee equation;**

$$\frac{V_0}{[S]} = \frac{V_{\max}}{K_m} - \frac{V_0}{K_m}$$

can be rearranged to give

$$V_0 = V_{\max} - \frac{K_m V_0}{[S]}$$



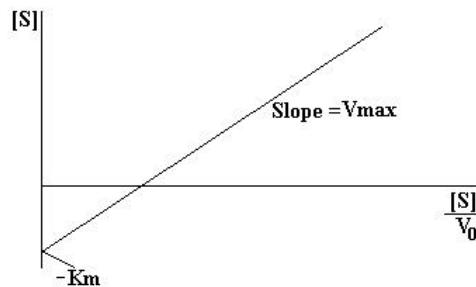
A graph of \$V\_0\$ (y-axis) vs \$V\_0/[S]\$ gives a straight line slope \$-K\_m\$, intercept \$V\_0\$.

**b. Hanes equation;**

$$\frac{[S]}{V_0} = \frac{[S]}{V_{\max}} + \frac{K_m}{V_{\max}}$$

can be rearranged to give

$$[S] = \frac{V_{\max} [S]}{V_0} - K_m$$



A graph of \$[S]\$ (y-axis) vs. \$[S]/V\_0\$ gives a straight line slope, \$V\_{\max}\$, intercept \$-K\_m\$.