

Quadrant II- Transcript and Related Materials

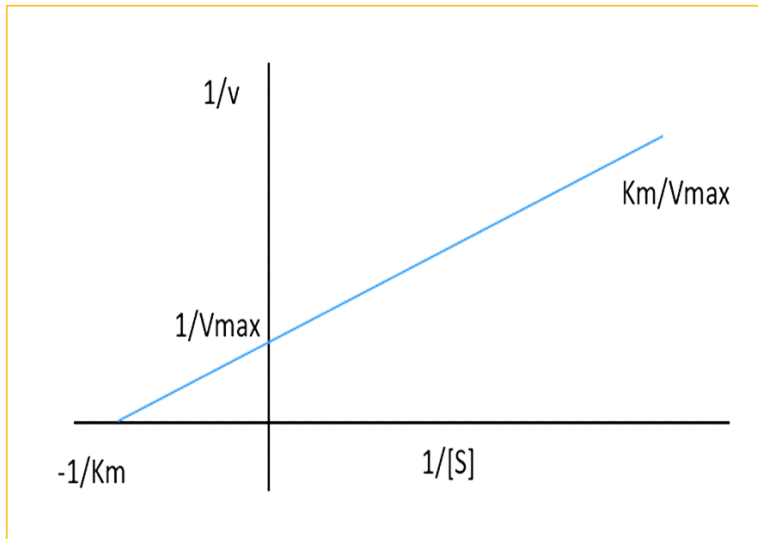
Programme	: Bachelor of Science (Second Year)
Subject	: Zoology
Semester	: IV
Course Code	: ZOC 104
Course Title	: Animal Physiology and Biochemistry
Unit	: 10- Enzymes
Module Name	: Lineweaver-Burk Plot
Name of the Presenter	: Dr. K.K.Therisa

Notes:

Lineweaver-Burk plot-----the inverse of the reaction rate is plotted against the inverse of substrate concentration. It is the commonly used plot in examining Enzyme kinetics. It is also called Double reciprocal plot. Described by Hans Lineweaver and Dean Burk in 1934. A method of graphical representation of Lineweaver-Burk Equation of Enzyme kinetics. The plot provides a method of analysis of the Michaelis-Menten Equation. It is usually difficult to determine the V_{max} of enzyme-catalyzed reaction accurately. The interpretation of the data to calculate the values of K_m and V_{max} by plotting a graph of ' v ' versus $[S]$ is difficult, as exact values cannot be obtained from the hyperbola. Because of this difficulty, the Michaelis-Menten equation was transformed into an equation for a straight line by Lineweaver and Burk. This led to more accurate determination of the K_m and V_{max} values. This plot is the derivation of Michaelis Menten equation and is represented as Lineweaver-Burk Equation.

$$\frac{1}{V} = \frac{K_m + [S]}{V_{max}[S]} = \frac{K_m}{V_{max}[S]} + \frac{1}{V_{max}}$$

Lineweaver-Burk plot was widely used to determine K_m and V_{max} . The Y-intercept of a graph is equivalent to the inverse of V_{max} or $1/V_{max}$. The x-intercept of graph represents $-1/K_m$ (as shown in the graph below).



Applications of Lineweaver Burk plot:

- It provides a information of enzyme inhibition, quickly by visual impression of the plot.
- When used for determining the type of Enzyme inhibition, Lineweaver Burk plot can distinguish:
 - 1) Competitive inhibitors
 - 2) Non-competitive inhibition
 - 3) Uncompetitive Inhibition
- Used to determine important terms in enzyme kinetics, such as K_m and V_{max} , before the wide availability of powerful computers and non-linear regression software.