SNS COLLEGE OF TECHNOLOGY

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COIMBATORE-641 035, TAMIL NADU

DEPARTMENT OF FOOD TECHNOLOGY

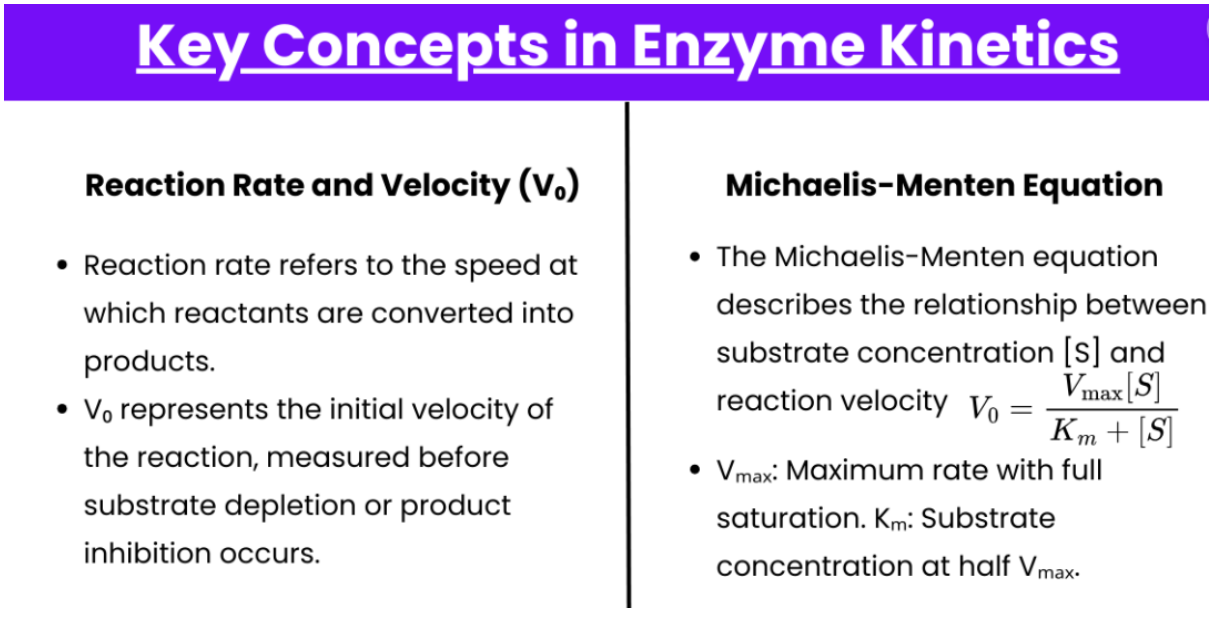
23FTT204- BIOCHEMISTRY & NUTRITION

UNIT V – ENZYMES

Enzyme kinetics – Michelis - Menten equation

- Kinetics in biochemistry focuses on the rate at which biochemical reactions occur and how factors such as enzymes, substrate concentration, and inhibitors influence these rates. Enzyme kinetics is essential in understanding how enzymes catalyze reactions and the conditions that affect reaction velocity. These principles are critical for mastering MCAT concepts in biochemistry, molecular biology, and physiology.

Key Concepts in Enzyme Kinetics



Reaction Rate and Velocity (V_0):

- Reaction rate refers to the speed at which reactants are converted into products.

- V_0 represents the initial velocity of the reaction, measured before substrate depletion or product inhibition occurs.

Michaelis-Menten Equation:

The Michaelis-Menten equation describes the relationship between substrate concentration [S] and reaction velocity V_0: $V_0 = \frac{V_{max}[S]}{K_m+[S]}$

- **V_{max}** : The maximum reaction rate when all enzyme active sites are saturated with substrate.
- **K_m** : The substrate concentration at which the reaction rate is half of V_{max}. It reflects the enzyme's affinity for the substrate—a lower K_m indicates higher affinity.

Lineweaver-Burk Plot (Double-Reciprocal Plot)

The Lineweaver-Burk plot is a graphical method to determine V_{max} and K_m using the inverse of the Michaelis-Menten equation:

$$\frac{1}{V_0} = \frac{K_m}{V_{max}[S]} + \frac{1}{V_{max}}$$

The y-intercept represents $1/V_{max}$, and the x-intercept represents $-1/K_m$.

It helps differentiate between various types of enzyme inhibition.