

AMB09 ENZYME TECHNOLOGY

UNIT-1 INTRODUCTION TO ENZYMES

What are enzymes, brief history of enzymes, nomenclature and classification of enzymes.

UNIT-2 STRUCTURAL FEATURES OF ENZYMES

Chemical nature of Enzymes: amino acids, the building blocks of protein, Levels of protein Structure: Primary, secondary, tertiary and quaternary structure.

UNIT-3 SPECIFICITY OF ENZYMES

Types of specificity, the Koshland “induced fit” hypothesis, Strain or transition - state stabilization hypothesis.

UNIT-4 ENZYME CATALYSIS AND KINETICS

Factors affecting the rate of chemical reactions, kinetics of uncatalyzed chemical reactions, kinetics of enzyme-catalyzed reaction, methods for investigating the kinetics of enzyme-catalyzed reactions, nature of enzyme catalysis, inhibition of enzyme activity.

UNIT-5 THE INVESTIGATION OF ACTIVE SITE STRUCTURE AND CHEMICAL NATURE OF ENZYME CATALYSIS

The identification of binding sites and catalytic site, three dimensional structure of active site, mechanism of catalysis, mechanism of reaction catalyzed by enzyme without cofactors, metal-activated enzyme and metalloenzyme, coenzymes in enzyme catalyzed reactions.

UNIT-6 IMMOBILIZATION OF ENZYMES

Concept, methods of immobilization, Kinetics of immobilized enzymes, effect of solute partition and diffusion on kinetics of immobilized enzymes, use of immobilized enzymes, bioreactors using immobilized enzyme.

UNIT-7 INDUSTRIAL USES OF ENZYMES

Industrial enzymes: Sales value of industrial enzymes, traditional (non-recombinant) sources of industrial enzymes, The impact of genetic engineering on enzyme production, Engineered enzymes, Extremophiles: hyperthermophiles, enzymes from hyperthermophiles, enzymes from additional extremophiles, enzymes in organic solvent

UNIT-8 INDUSTRIAL ENZYMES

Proteases and carbohydrases: Proteolytic enzymes: Carbohydrases, Lignocellulose degrading enzymes, Pectin and pectic enzymes.

UNIT-9 ADDITIONAL INDUSTRIAL ENZYMES

Lipases, Penicillin acylase, Amino acylase and amino acid production, cyclodextrins and cyclodextrin glycosyl transferase, enzymes in animal nutrition, Oxidoreductases, Enzymes in molecular biology.

UNIT-10 ENZYME ENGINEERING

Prediction of enzyme structure, design and construction of novel enzymes.

Reference Books

1. Enzymes by Palmer (2001): Horwood Publishing Series.
2. Fundamentals of Enzymology by Price and Stevens (2002): Oxford University Press.
3. Enzyme Technology by Helmut uhling (1998): John Wiley
4. Introduction to Proteins Structure by Branden and Tooze (1998): Garland Publishing Group.

