CHARACTERISTICS, NOMENCLATURE AND CLASSIFICATION OF ENZYMES

CONTENTS:

1.DEFINITION

"Enzymes can be defined as biological polymers that catalyze biochemical reactions."

- Enzymes are biological polymers which catalyse biochemical reactions.
- A protein or RNA produced by living cells that is extremely specialised and highly catalytic to its substrates is called an enzyme.
- Enzymes help organisms by carrying out chemical processes effectively and precisely even under low-stress circumstances.

2. CHARACTERISTICS OF ENZYMES

- Enzymes are catalytically active proteins that take part in several activities.
- Enzymes play a major role in the cell's metabolic activities and other chemical reactions.
- The enzymes reacting molecule is called as substrate and convert substrate into other distinct molecules, or products.
- Enzymes regulates different life processes in living organisms at cellular level.
- All enzymes have protein-based constituents, except in the case of ribozymes. The term "ribozyme" comes from the ribonucleic acid enzyme which catalyze ribonucleic acid molecules.

3. ENZYME STRUCTURE

The linear chain of amino acids that makes up an enzyme gives rise to a three-dimensional structure. The structure is determined by the amino acid sequence, which also identifies the enzyme's catalytic activity. Heat causes the enzyme's structure to change, which causes it to lose its normally temperature-dependent activity. Enzymes are often larger than their substrates, ranging in size from 62 amino acid residues to fatty acid synthase's average of 2500 residues.

4. NOMENCLATURE

For enzyme nomenclature, the IUBMB established the International Commission on Enzymes in 1956. The International Union of Biochemistry and Molecular Biology Nomenclature Committee later took its place (NC-IUBMB). The suffix "ase" is typically appended to the name of enzymes, which is taken from their substrates or the chemical reactions that they catalyse. **.** Enzymes can be indexed with letters and numbers according to International Union of Biochemistry and Molecular Biology: the letter EC plus four numbers representing four elements. The first number represents enzymes that are classified according to the mechanism of enzymatic reactions.

5. ENZYMES CLASSIFICATION

Depending on the reaction they are used to catalyse, enzymes are divided into six different classes. All enzymes are given a "EC" number by the nomenclature was established by the Enzyme Commission in 1961. Protein structure, chemical process, or amino acid sequence (i.e. homology) are not taken into account in the classification. EC numbers are four digits, for example a.b.c.d, where “a” is the class, “b” is the subclass, “c” is the sub-subclass, and “d” is the sub-sub-subclass. The “b” and “c” digits describe the reaction, while the “d” digit is used to distinguish between different enzymes of the same function based on the actual substrate in the reaction.

The macromolecules known as enzymes or biological catalysts change the rates at which chemical reactions occur. Enzymes work by changing reactant molecules, or substrates, into new molecules, known as products. Almost all of the metabolic activities in a cell include an enzyme catalytic reaction.

Depending on the type of reaction they catalyse, enzymes can be divided into seven different types. These groups include hydrolases, lyases, isomerases, ligases, translocases, oxidoreductases, transferases, and hydrolases. The most common types of enzymes are oxidoreductases, transferases, and hydrolases.

1. Oxidoreductases: These enzymes, which can also be divided into oxidase and reductase, catalyse redox processes.

2. Transferases: This group of enzymes facilitates the transfer of certain groups across substrates.

3. Hydrolases: These enzymes quicken the process by which substrates are hydrolyzed.

4. Lyases: These enzymes either catalyse the reversal reaction or encourage the removal of a group from the substrate to leave a double bond reaction.

5. Isomerase: This class of enzymes quickens the conversion of optical, geometric, or isoisomeric compounds.

6. Ligases: These enzymes catalyse the synthesis of two molecules into a single substance, releasing energy in the process.

6. EXAMPLES OF ENZYMES

• **Lipases**: This family of enzymes aids in the breakdown of lipids.

• **Amylase**: Amylase aids in the conversion of carbohydrates to sugars in the saliva.

• **Maltase**: This substance, which is also found in saliva, converts the sugar maltose into glucose.

• **Trypsin**: This enzyme converts proteins into amino acids.

• Lactase: This enzyme converts lactose, a milk sugar, into glucose and galactose.

• **Helicase**: DNA is unravelled by helicase enzymes.

• **DNA polymerase**: This enzyme produces DNA from deoxy ribonucleic acid

7. SUMMARY

Enzymes play a major in daily life to sustain plants or any living organisms. They play a crucial role in functioning several life processes. They can function at optimum PH and temperatures. Enzymes are substances that are found in little amounts in cells and have the ability to catalyse or speed up chemical reactions so that they happen quickly enough to support life by the regulation of various physiological and metabolic reactions.

8. REFERENCES

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