

ENZYME: Definition, Properties and Nomenclature-1

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DEFINITION

Enzymes – are biocatalysts synthesized by living cells. They are protein in nature (exception-RNA acting as ribozyme), colloidal and thermolabile in character, and specific in their action.

HISTORY

Berzelius, in 1836 coined the term catalysis. In 1878, Kuhne used the word enzyme, in biological system.

PROPERTIES OF ENZYMES

Nearly all enzymes are proteins, although a few catalytically active RNA molecules have been identified.

Enzyme catalyzed reactions usually take place under relatively mild conditions (temperatures well below 100°C, atmospheric pressure and neutral pH) as compared with the corresponding chemical reactions.

Enzymes are catalysts that increase the rate of a chemical reaction without being changed themselves in the process.

Enzymes are highly specific with respect to the substrates on which they act and the products that they form.

Enzyme activity can be regulated, varying in response to the concentration of substrates or other molecules.

They function under strict conditions of temperature and pH in the body.

NOMENCLATURE

The International Union of Biochemistry (IUB) appointed an enzyme commission in 1961. This commission has decided some basic principles for the classification and nomenclature of enzymes.

Many enzymes are named by adding the suffix '-ase' to the name of their substrate.

Example. Urease is the enzyme that catalyzes the hydrolysis of urea, and fructose-1,6-bisphosphatase hydrolyzes fructose-1,6-bisphosphate.

- However, other enzymes, such as trypsin and chymotrypsin, have names that do not denote their substrate.
- Some enzymes have several alternative names.
- To rationalize enzyme names, a system of enzyme nomenclature has been internationally agreed.
- This system places all enzymes into one of six major classes based on the type of reaction catalyzed. Each enzyme is then uniquely identified with a four-digit classification number.

Example: Trypsin has the Enzyme Commission (EC) number 3.4.21.4, where

1. the first number (3) denotes that it is a hydrolase
2. the second number (4) that it is a protease that hydrolyzes peptide bonds
3. the third number (21) that it is a serine protease with a critical serine
4. residue at the active site, and
5. the fourth number (4) indicates that it was the fourth enzyme to be assigned to this class.

For comparison, chymotrypsin has the EC number 3.4.21.1, and elastase 3.4.21.36.

THANKYOU