Enzyme, a substance that acts as a catalyst in living organisms, regulating the rate at which chemical reactions proceed without itself being change in the process.

The biological processes taking place in all living organisms are chemical reactions and are regulated by most enzymes. Without enzymes, most of these reactions would not occur at a detectable rate.

Enzymes also have valuable industrial and medical applications. The fermenting of wine,an bread have been practiced from earliest times, but not until the 19th century were these reactions understood to be the result of the catalytic activity of enzymes.

All known enzymes are proteins. They are high molecular weight compounds made up principally of chains of amino acids linked together by peptide bonds.

Enzymes can be denatured and precipitated with salts, solvents and other reagents. They have

molecular weights ranging from 10,000 to 2,000,000.

Many enzymes require the presence of other compounds - cofactors - before their catalytic activity can be exerted. This entire active complex is referred to as the holoenzyme; i.e.,

apoenzyme (protein portion) plus the cofactor (coenzyme, prosthetic group or metal-ion- activator) is called the holoenzyme.

Common features:

Protein structure

Colloidal solution in water

Melts in aqueous alcohol

Collapses in concentrated alcohol

Optimum activity; 35-400C

Fully decompose in a humid environment above 65 ° C

Ambient pH affects activity

Enzymes, they are often present in combination with inorganic or organic compounds which play an important role in their catalytic effect.

These organic compounds, if not protein (Coenzyme)

Inorganic ions (Fe, Cu) is (Activator)

Protein Apoenzyme (holoenzyme)

**Nomenclature of enzymes**

Many enzymes are named by adding the suffix “az" to the name of their substrates or to a word or phrase that describes their activity.

Urease, amylase, arginase, protease and lipase are those which define the substrate;

DNA polymerase, lactate dehydrogenase and adenylate cyclase are names that describe the reaction.

Classification of Enzymes

1. Oxido-Reductases (redox- catalyze reduction-oxidation reactions

Lactate, dehydrogenase ,catalase

1. Transferase

catalyze the transfer of functional groups from one molecule to another

 Aspartate transaminase

Alanine transaminase

hexokinase

Creatine kinase

1. Hydrolases

catalyze hydrolysis reactions where bonds are broken by the addition of water

lipase

1. Cholesterol esterase

Alkaline phosphatase

-Amylase

trypsin

1. Lyases

break down or form bonds by oxidation or hydrolysis

Pyruvate decarboxylase

Citrate synthase

Adenylate cyclase

1. Isomerases

catalyze changes in a molecule

Triosphosphate isomerase

Glucose-6-phosphate isomerases

1. Ligases

catalyze the binding of two molecules by hydrolysis of an energy-rich bond

DNA ligase

 **Enzymes are classified by their reaction type**

Enzyme activity depends on 4 factors.

Temperature

PH

Enzyme concetration

Substrate concentration

First isolated enzyme diastase (1833)Separates starch into α-glucose.

in Pharmacognosy

It is used for the release of the active substance from some drugs.

PEPSIN

 It is a proteolytic enzyme obtained by consuming acidic water from pig, sheep, goat or cattle rumen. Pepsin is given as a digestive aid in the stomach. Since it is a proteolytic enzyme, a dose of HCl should preferably be given after meals. Usually the dose is 500 mg and is given in combination with pancreatine.

**pancreatin**

Amylase is a mixture of lipase and protease enzymes. It is obtained from pork or cattle pancreas. Pancreatin is used as an aid in digestion and by joining foods in patient nutrition. The dose is 325 mg-1 g in the form of tablets, capsules or granules. Many preparations are used for therapeutic purposes, as well as preparations in combination with pepsin**.**

**PANKREALİPAZ**

 It is a more concentrated form of pancreatin .

It should carry stronger AMYLASE, LIPASE and PROTEASE ACTIVITIES.

Cystic fibrosis

In the preparation of semi-digested nutrients in pancreatic insufficiency

Ineffective in weak acid environment and high alkaline.

Standardized by activity control. (Active in neutral / slightly alkaline environment**)**

**Malt and Malt Extract**

Barley is the dried seeds of one or more varieties of *Hordeum vulgare* Linne (Graminae). Malt or germinated barley was artificially germinated and dried. Barley grains are moistened in stacks with water and kept in warm environments until germination begins. Then it is quickly dried. The diastase enzyme converts starch in the grains to maltose, which stimulates the growth of the embryo. When thegrains are dried, the embryo dies, carrying the peptase enzymes with 50-70% maltose, 2-15% dextrin, 8% protein and diastase.

It is used in the preparation of malt-fermented drinks and in the alcohol industry. Malt extract is prepared by infusing the malt with water at 60 ° C. The aqueous portion is concentrated by filtration under vacuum at a temperature not exceeding 60 ° C. Malt extract is mixed with 10% by weight of glycerin. This product contains dextrin, maltose, small amounts of glucose and amylolytic enzymes.

constipation

irritable colon

Usage and dosage: Malt extract is used as a digestive agent and especially as an aid in the digestion of starch. The dose is 15 grams. ® Powder is given as an adjunct to patients who have difficulty digesting milk and dairy products.

**Papain**

Carica papaya

FAM. Caricaceae

Plant part :- Latex of unripe fruit

Uses :- Anti-inflammatory, clarification of beverages,

It is used as an anti-inflammatory agent. It has shown relieving symptoms of episiotomy.

Biological source Carica papaya. Caricaceae. The different proteolytic enzymes present in papain are the mixture of papain and chymopapain, proteolytic enzymes act on polypeptides and amides.

**Bromelain**

Bromelain

Ananas comosus

FAM. Bromeliaceae

Plant part :- Stem of Pineapple

Bromelain

Ananas, Ananas sativus,

Bromelain is found in pineapple juice and in the pineapple stem. People use it for medicine.

Bromelain is used for reducing pain and swelling, especially of the nose and sinuses, dental gums, and other body parts after surgery or injury.

It is also used for [hay fever](https://www.rxlist.com/script/main/art.asp?articlekey=3656), treating a [bowel](https://www.rxlist.com/script/main/art.asp?articlekey=2508) [condition](https://www.rxlist.com/script/main/art.asp?articlekey=10778) that includes swelling and ulcers ([ulcerative colitis](https://www.rxlist.com/script/main/art.asp?articlekey=7370)), removing dead and damaged [tissue](https://www.rxlist.com/script/main/art.asp?articlekey=5800) after a [burn](https://www.rxlist.com/script/main/art.asp?articlekey=31816) ([debridement](https://www.rxlist.com/script/main/art.asp?articlekey=40483)), preventing the collection of [water](https://www.rxlist.com/script/main/art.asp?articlekey=39940) in the lung ([pulmonary edema](https://www.rxlist.com/script/main/art.asp?articlekey=5124)), [rheumatoid arthritis](https://www.rxlist.com/rheumatoid_arthritis_ra_medications/drugs-condition.htm), a [skin](https://www.rxlist.com/script/main/art.asp?articlekey=7901) condition called pityriasis lichenoides chronica, relaxing muscles, [tendon](https://www.rxlist.com/script/main/art.asp?articlekey=5732) injuries (tendinopathy), [knee](https://www.rxlist.com/script/main/art.asp?articlekey=4114) pain, stimulating [muscle](https://www.rxlist.com/script/main/art.asp?articlekey=4464) contractions, slowing clotting, improving the [absorption](https://www.rxlist.com/script/main/art.asp?articlekey=2101) of antibiotics, preventing [cancer](https://www.rxlist.com/script/main/art.asp?articlekey=2580), shortening [labor](https://www.rxlist.com/script/main/art.asp?articlekey=6194), preventing [urinary tract](https://www.rxlist.com/script/main/art.asp?articlekey=5913) infections, and helping the body get rid of [fat](https://www.rxlist.com/script/main/art.asp?articlekey=3394).

It is also used for preventing muscle soreness after intense exercise.

Bromelain is POSSIBLY SAFE for most people when taken by mouth or applied to the skin in appropriate amounts. Bromelain may cause some [side effects](https://www.rxlist.com/script/main/art.asp?articlekey=5489), such as [diarrhea](https://www.rxlist.com/script/main/art.asp?articlekey=2985) and [stomach](https://www.rxlist.com/script/main/art.asp?articlekey=5560) and intestinal discomfort. Bromelain may also cause allergic reactions, especially in people who have other allergies

Pregnancy and breast-feeding: not use

Uses:- Treatment in soft tissue inflammation and oedema

**Trypsin** 

Trypsin functions in the digestion of proteins (proteases) 

Produced in pancreas 

Trypsin divides the polypeptide chain after lysine or arginine amino acids.

Trypsin is a member of hydrolases (serine protease) Trypsin does not have any

requirement for a cofactor or coenzyme. Trypsin needs to be activated by

another enzyme called enterokinase

**Gelatine** ,

Gel foam , Puragel Biological Source Gelatine is a protein extracted by partial hydrolysis of animal collagenous tissue like skins, tendons, ligaments and bones with boiling water.

Uses 1. In the manufacture of hard and flexible capsules shells.

 2. In the preparing, pastes and suppositories

3. Gelatine in the form of absorbable gelatine sponge is used as haemostatic.