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What follows is information; Information that will lead to a better understanding of enzymes and their function and role in our daily lives. The study of enzymes has grown by leaps and bounds and new discoveries are made almost daily. Ii is our intent to provide some of this information through this newsletter and also through our web site at www.deerland-enzymes.com
We hope you find this information useful and beneficial in some way. As time goes on, our newsletter will evolve and expand into a greater tool for your benefit. If you have suggestions, please forward them by fax or email to newsletter@deerland-enzymes.com or fax us at 770-919-1194
Enjoy!

What are enzymes?

An enzyme is known as a specialized organic substances, composed of polymers of amino acids, that act as catalysts to regulate the speed of the many chemical reactions involved in the metabolism of living organisms. The name *enzyme* was suggested in 1867 by the German physiologist Wilhelm Kühne (1837-1900); it is derived from the Greek phrase *en zymē,* meaning “in leaven.” Those enzymes identified now number more than 700.

Enzymes are classified into several broad categories, such as hydrolytic, oxidizing, and reducing, depending on the type of reaction they control. Hydrolytic enzymes accelerate reactions in which a substance is broken down into simpler compounds through reaction with water molecules. Oxidizing enzymes, known as oxidases, accelerate oxidation reactions; reducing enzymes speed up reduction reactions, in which oxygen is removed. Many other enzymes catalyze other types of reactions.

Individual enzymes are named by adding *ase* to the name of the substrate with which they react. The enzyme that controls urea decomposition is called urease; those that control protein hydrolyses are known as proteinases. Some enzymes, such as the proteinases trypsin and pepsin, retain the names used before this nomenclature was adopted.

As the Swedish chemist Jöns Jakob Berzelius suggested in 1823, enzymes are typical catalysts: They are capable of increasing the rate of reaction without being consumed in the process.
Some enzymes, such as pepsin and trypsin, which bring about the digestion of meat, control many different reactions, whereas others, such as urease, are extremely specific and may accelerate only one reaction. Still others release energy to make the heart beat and the lungs expand and contract. Many facilitate the conversion of sugar and foods into the various substances the body requires for tissue-building, the replacement of blood cells, and the release of chemical energy to move muscles.

Pepsin, trypsin, and some other enzymes possess, in addition, the peculiar property known as autocatalysis, which permits them to cause their own formation from an inert precursor called zymogen. As a consequence, these enzymes may be reproduced in a test tube.

As a class, enzymes are extraordinarily efficient. Minute quantities of an enzyme can accomplish at low temperatures what would require violent reagents and high temperatures by ordinary chemical means. About 30 g (about 1 oz) of pure crystalline pepsin, for example, would be capable of digesting nearly 2 metric tons of egg white in a few hours.

The kinetics of enzyme reactions differ somewhat from those of simple inorganic reactions. Each enzyme is selectively specific for the substance in which it causes a reaction and is most effective at a temperature peculiar to it. Although an increase in temperature may accelerate a reaction, enzymes are unstable when heated. The catalytic activity of an enzyme is determined primarily by the enzyme's amino-acid sequence and by the tertiary structure—that is, the three-dimensional folded structure—of the macromolecule. Many enzymes require the presence of another ion or a molecule, called a cofactor, in order to function.
As a rule, enzymes do not attack living cells. As soon as a cell dies, however, it is rapidly digested by enzymes that break down protein. The resistance of the living cell is due to the enzyme's inability to pass through the membrane of the cell as long as the cell lives. When the cell dies, its membrane becomes permeable, and the enzyme can then enter the cell and destroy the protein within it. Some cells also contain enzyme inhibitors, known as antienzymes, which prevent the action of an enzyme upon a substrate.

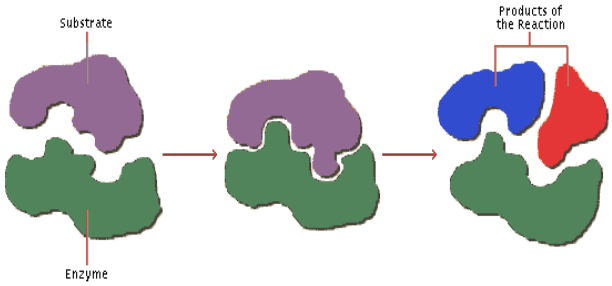

Image of an enzyme reacting with a substrate

Who is Deerland Enzymes?

Founded in 1990 as an enzyme consulting company, Deerland Enzymes has evolved into an international trading and enzyme manufacturing organization. Deerland Enzymes is the leader in nutritional enzyme technology. From research and development to marketing support, Deerland provides manufacturers and distributors worldwide with a comprehensive nutritional enzyme package. Deerland Enzymes prides itself on being one of the few manufacturers in the world that produces a full spectrum of industrial enzymes derived from all four natural origins: plant, animal, fungus and bacteria. We use both solid state and submerge culture techniques of fermentation.

Deerland manufactures and distributes enzymes for the hundreds of applications involving enzymes. We provide enzymes in liquid, granular, and spray-dried form for a wide variety of commercial applications including textile processing, cleaning, silver recovery, foods, pharmaceuticals and nutritional supplements.

Deerland is able to supply many enzymes in new forms, such as crystalline enzyme and multifunction co-granulates. All of our food enzymes and enzyme blends are strictly non-GMO and most are Kosher certified.

We produce Enzyme containing formulations, encapsulated and tableted, bottled and packaged products meeting the demands of the nutritional supplement market from raw materials to finished product. We provide exclusive and proprietary blends of microbial and plant based enzymes to manufacturers, marketers, and distributors worldwide.

Enzymes used on a regular basis …

Alpha-Galactosidase
Alpha-Glucosidase (Maltase)
Amylase (Carbohydrase)
Beta-glucanase
Bromelain
Carbohydrase (Amylase)
Catalase
Cellulase
Chymotrypsin
Diastase
Galactomannanase
Glucoamylase
Hemicellulase
Invertase (Sucrase)
Lactase
Lipase
Lysozyme
Maltase
NattoKinase
Pancreatin
Papain
Pectinase
Pepsin
Peptidase
Protease
Phytase
Saccharase (Invertase)
Serrapeptidase
Sucrase (Invertase)
Superoxide Dismutase (SOD)
Trypsin
Xylanase

You recently also received information on the differences between Nattokinase NSK-SD and other variations of Nattokinase. If you did not receive this, please let us know and we will be happy to provide you with a copy.

Some of the topics we will be covering for you in future issues will be:
Are high protein diets safe?
Why do we need enzymes?
How does enzyme supplementations help us?
Your enzymes and your weight.

If you have topics you would like to see covered, again, please make the suggestion and we will do our best.

Call us for a price quotation or assistance on formulations. We will be happy to assist you.

See you at EXPO West in Anaheim March 18-20.