

Enzyme and Bacterial Cleaning Chemicals

How often have you seen new products that would help improve overall cleaning operations are cost-effective and are user friendly? Enzyme digesters are gaining popularity and are viewed by some as a possible replacement for other types of formulations in certain cleaning situations. Digesters work by eating (digesting) protein matter in organic soil or waste. Their enzymes are especially effective in controlling odors caused by a buildup of organic soils in restrooms, plumbing, carpets and floor.

UNDERSTANDING ENZYMES

Enzymes are proteins created by living cells that exist in organisms such as plants, animals and bacteria and are used to digest waste. When added to organic material like dirt, grease and oil, they immediately go to work breaking down the organic material within these substances. This natural “dust to dust” process that constantly occurs in our environment keeps waste material from overrunning us. The four basic enzymatic systems are those that break down fats and greases (lipase); proteins (protease); cellulose such as wood, cotton and paper and carbohydrates and starches (amylase). Dirt has layers of fine film composed of “substrate” such as grease, oils, fats, bacteria, germs, and dust mites, non-organic material and organic microorganisms. These films are bonded to each other and to the surface by amino and fatty acids (organic acids composed of proteins, fats or fatty oils). Most cleaners emulsify some of these dirt films but may not break down the lower levels held together by amino and fatty acids. Usually the top layers of the films are removed but some of the lower levels are left to collect bacteria. As a result, re-soiling can occur much faster.

HOW THEY WORK

When activated, enzymes attack or digest the amino and fatty acids that bond the films of dirt together. They also emulsify them so they can be completely removed from the surface. Researchers believe that in the activation process, when the substrate and enzymes come in contact with each other, the enzymes physically curl and twist—in what is called a “conformational change.” This physical change initiates the contact between the enzyme and substrate, which is necessary to “catalyze” the reaction. A catalyst is a substance that speeds or slows a chemical reaction without being involved in the reaction itself. Put another way, enzymes are chemical catalysts that accelerate the natural biodegrading, or breaking down, of organic substrate, which comprises most soils. Enzymes dissolve and break down protein and organic matter, diminishing odors caused by staining agents such as urine, feces, vomit, pet odors, spoiled foods and mildew. Enzymes are derived from living organisms and are harmless to humans, animals, marine life and general ecology. They are non-toxic, non-irritating, non-gaseous, non-flammable, non-pathogenic and typically safe to use. There are thousands of different enzymes, each having specific, individual characteristics. Since an enzyme that breaks down proteins (protease) will not react on fats or oils, and effective enzymatic cleaning system must contain enough different classes and types of enzymes to assure proper catalytic reaction. In concentrated form, this greatly speed up the natural “dust to dust” process. One way to demonstrate the effectiveness of enzyme digesters is to mix warm water and the enzyme product in a small cup (per recommended dilution ratio). Then place a few pieces of dry cat food into the cup. After 10 to 15 minutes, the cat food will be totally dissolved. This breakdown of protein

