

Supplement Highlights

Excitement! Electricity! *Enzymes!*

Catalysts for hundreds of body functions, enzymes are increasingly seen as the key to peak performance.

According to Nancy Appleton, Ph.D., author of *Heal Yourself with Natural Foods*, “Enzymes are the catalysts that drive many of the chemical reactions that keep our bodies functioning.” She goes on to say, “There are two main classes of enzymes in our body: metabolic enzymes, which help run the body, and digestive enzymes, which help digest our food.” Both of these, when utilized as dietary supplements, can help natural products store personnel help their customers.

Appleton credits metabolic enzymes with reshaping, restructuring and reforming all the raw material we take in. “These enzymes do the special work needed to run the heart, brain, lungs, kidneys and other organs, and regulate their correct functioning,” she says. Deficiencies of these metabolic enzymes, she adds, can cause such problems as cataracts.

Appleton also reports that there are thousands of enzymes (and their reactions) that are known. But, she adds, “many more reactions have been identified for which the enzymes responsible are not yet known.” Thus, the field of enzyme study is fraught with mystery, yet alive with the promise of discovery.

What Follows the Swallow

Turning to digestive enzymes, Appleton says, “It is at the level of digestive enzymes that we start to pay the price for upsetting our body chemistry. Many of the health problems we suffer can be traced back to whether or not the body’s minerals (and therefore enzymes) are in balance so that the all-important function of food digestion and utilization of nutrients can take place properly. If our digestive enzymes are out of balance, we don’t get the full benefit from our food—and food itself can become toxic, causing allergic symptoms of all kinds.”

There is a lot at stake here, for enzymes are not mere tagalongs in the arena of human nutrition. If Susan M. Lark, M.D., and James A. Richards, M.B.A., co-authors of *The Chemistry of Success* are right, enzymes are, in fact, one of “six secrets of peak performance.” The others, they say, are acid/alkaline balance, detoxification, oxygen, the ability to manage stress, and sex hormones.

As Lark and Richards describe it, “abundant digestive-enzyme production is crucial” for four of what the authors say are “the eight traits of peak performers,” specifically: physical vitality and stamina; mental clarity and acuity;

the ability to get along with other people; and speedy recovery from illness, injury and exertion.” (The other four non-enzyme-dependent traits, they say, are: determination and perseverance in pursuing goals; the ability to remain calm under pressure; optimism and vision; and resistance to illness.)

All well and good: enzymes are important. But how do your customers know whether or not there are enough enzymes in their diet? Simple, say Lark and Richards, they employ a checklist. The authors’ checklist includes the following:

Lifestyle/environmental factors

- I have a history of excessive alcohol intake.
- I feel poorly on a diet high in fats, animal protein, and sugars.

Performance indicators

- I feel I am restricted in my ability to eat a wide variety of foods, either in business or social settings.
- I experience a low level of energy despite eating adequate amounts of food.
- I am slow to recover from injury.
- I experience excessive stiffness and/or soreness the day after heavy exercise.
- I tire easily from work or play.
- I am unable to travel without great fatigue.
- I have difficulty thinking clearly and quickly.

Physical indicators

- I often suffer from indigestion.
- I frequently have abdominal bloating and discomfort after meals, a condition unrelieved by antacids.
- I often experience intestinal cramps after eating.
- My food appears relatively undigested and greasy in the stools.
- I suffer from chronic diarrhea.
- I am frequently constipated, particularly after eating certain foods.
- I have difficulty digesting highly spiced and unfamiliar foreign foods.
- I often feel tired after a meal.

Medical history

- I have a history of chronic pancreatitis.
- I have a history of Crohn’s disease, ulcerative colitis, or irritable bowel syndrome.

- I have had gallstones.
- I suffer from rheumatoid arthritis.
- I have a history of vasculitis.
- I have a history of endometriosis.
- I have food and environmental allergies.

Armed with information from their answers to the above or similar questions, health consumers can approach store personnel with a shopping list that is tailor-made to their needs. For example, say Lark and Richards, “The foods in the standard American diet, which is high in saturated fats, sugars, and animal protein, place a great demand on the pancreas. Hard-to-digest foods force the pancreas to secrete higher levels of digestive enzymes in order to break them down into small enough units that they can be absorbed across the small-intestinal wall and used as fuel by the cells. Overworking the pancreas by eating pizza, cheeseburgers, bacon, French fries, donuts and chocolate cake can compromise pancreatic digestive-enzyme function and accelerate the aging of this organ.”

Nor is it enough to drop these pancreas-stressing foods out of the diet, say the authors. Rather, it is necessary to add plenty of enzyme-rich foods, starting with fresh produce. “All fresh fruits and vegetables contain natural digestive enzymes,” say Lark and Richards. Two of the best are pineapple, which contains bromelain, and papaya, which contains papain. Bromelain is a potent anti-inflammatory, and papain has a soothing effect on the stomach.

Other recommended foods include sprouted seeds, grains and legumes; fermented foods, such as yogurt, sauerkraut, kefir, olives, pickles, beer, wine, vinegar, cheese, cottage cheese, buttermilk and the fermented soy products—soy sauce, shoyu, tamari and tempeh; pureed foods; and blenderized drinks, such as smoothies made from enzyme-rich ingredients.

Even this may not be enough to restore digestive enzymes to an individual who has pursued a lifetime of destructive lifestyles. Lark and Richards’ book, therefore, also includes a section on digestive enzyme supplements, of which, they say, there are two major types—the aforementioned bromelain and papain.

“As a digestive aid,” say the authors, “bromelain can help to break down protein-rich foods such as red meat, poultry, dairy products, and wheat.” Most effective when it is taken with meals, bromelain has a suggested dosage

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of 500 to 1,000 mg for digestive purposes. In addition, suggest Lark and Richards, this enzyme may be used as a supplement to help ease inflammation, to help relieve individuals who have sports-related injuries or other physical traumas, and to help speed healing from surgical wounds. It also may be useful in relieving respiratory-tract infections and may even benefit heart disease patients by helping to reduce platelet aggregation or clumping.

"Papain," say Lark and Richards, "has been found to be helpful for digestive problems such as gluten intolerance." When used for this purpose, the recommended dosage is 200 to 300 mg with or immediately following meals, upon rising, and before bedtime. The authors also list these other applications for papain: traumatic injuries; inflammatory conditions; minor surgery and dental procedures.

Besides bromelain and papain, which Lark and Richards view as the most important plant-based enzymes, there also are some pancreatic enzymes derived from animal sources that are being sold today. What is unique about these products, the authors agree, is that "they are able to break down all three basic food substances found in our diets: carbohydrates, proteins, and fats. In other words, they contain protein-digesting (proteolytic), fat-digesting (lipolytic), and starch- and sugar-digesting (glycolytic) capability."

Lark and Richards report that, in addition to helping with digestive problems, traumatic injuries, repetitive-stress injuries, autoimmune disease, surgery, childbirth and pancreatitis, "pancreatic enzymes have also been used in the treatment of cancer." They say that John Beard, working at the University of Edinburgh Medical School in the late 1800s and early 1900s, "injected pancreatic extracts containing high levels of enzymes directly into malignant tumors, treating a total of 170 cancer patients in this manner. Using the enzyme-rich pancreatic digestive juices of newborn lambs, pigs and calves, Beard found that more than half the patients with advanced cancer survived longer than expected, and in some individuals, cancers disappeared completely."

Beyond Beard

As impressive as his results were, Beard's findings are today honored more in the breach than the observance. But research goes on. Of particular note is a 2004 study conducted by

TNO Nutrition and Food Research, a Netherlands-based organization working on behalf of the National Enzyme Company (NEC), located in Forsyth, MO. As noted by NEC, this is "the first quantitative evidence proving the efficacy of supplemental enzymes."

According to a brief summary of the findings, TNO, utilizing a patented, computer-controlled, dynamic gastrointestinal model called TIM, was able to simulate the conditions of the human stomach and the small intestine, including typical gastric and intestinal secretions. Then, sampling at various times during the digestive process, the researchers were able, in *real time*, to examine the extent of digestion and absorption of food under various conditions.

For purposes of the experiment, NEC formulated a generic, yet effective, mixture of fungal digestive enzymes. This basic blend of proteases, carbohydrases (amylases) and lipases was tested under two sets of conditions—perfect human digestion and impaired human digestion. In each case, the TIM system was fed a meal with and without digestive enzymes. The extent of digestion was monitored by sampling nutrients (glucose and nitrogen) at various times and in different points in the GI tract.

Throughout the test, pH was monitored at physiological conditions, and peristalsis was mechanically simulated. Finally, gastric emptying and intestinal passage time were mimicked as per human conditions.

For each of the four meals—perfect digestive conditions with and without enzymes, and impaired digestive conditions, with and without enzymes—samples were collected over a five-hour span at two points: the jejunum (upper small intestine) and ileum (lower small intestine).

Analysis of these samples showed that, regardless of whether digestive conditions were perfect or impaired, there was a substantial increase in the level of digestion of carbohydrates in the lumen of the small intestine when enzymes were present. This was true at both locations—the jejunum and the ileum. According to the study, enzymes increased the total digestion of carbohydrates nearly fourfold when digestive conditions were perfect and nearly sevenfold when conditions were impaired.

The presence of enzymes also increased digestion of protein in the small intestine. But here the results were less dramatic and less universal. When digestive conditions were im-

paired, there was almost a doubling of digestive effectiveness in the jejunum and only a slight increase in the ileum. When digestive conditions were perfect, enzymes accounted for a doubling of protein digested in the ileum. Meanwhile, in the jejunum, samples without enzymes actually edged out those with enzymes in the digestion of protein, although the margin was very slim.

Milking the Situation

At least one other enzyme deserves attention in this discussion. As pointed out in a communication contributed by Deerland Enzymes of Kennesaw, GA, there are currently about 70 million Americans and about 150 million people worldwide suffering from lactose intolerance. Defined as the inability to digest lactose, the sugar in milk, this condition is marked by symptoms such as gas, cramps and diarrhea.

There appear to be two age groups where clusters of diagnoses occur—from 7 to 10 years old, and again from 35 to 45 years old. Age is not the only trigger, however: Lactose intolerance can also be brought on by infections, chemotherapy, reactions to penicillin and avoidance of dairy products for a prolonged period of time.

Additionally, specific ethnicities are more likely to suffer from lactose intolerance. Asian-Americans and African-Americans tend to be most susceptible to this condition. Native-Americans and Hispanic-Americans also are frequently affected. Caucasians, as a group, appear to have the least trouble with dairy products.

The culprit in almost all cases of lactose intolerance is a shortage of the enzyme lactase, which is normally produced in the small intestine. Lactase breaks down the milk sugar, so the body can easily digest it. When there is not enough lactase to digest the amount of lactose consumed, the results, as noted, may be very unsettling. **WF**

References:

Heal Yourself with Natural Foods by Nancy Appleton, Ph.D.

The Chemistry of Success by Susan M. Lark, M.D., and James A. Richards, M.B.A.

Material provided by National Enzyme Company (NEC)

Material provided by Deerland Enzymes