ASPARTAME IS A LOW CALORIE SUGAR substitute marketed under brand names such as Equal and NutraSweet. It is a combination of two amino acids: L-aspartic acid and L-phenylalanine. It is available as individual packets for adding to foods and it is a component of many diet soft drinks and other reduced-calorie foods. Depending on who you listen to, it is either a safe aid to weight loss and diabetes control or it is evil incarnate, a deadly poison that is devastating the health of consumers.

A reader sent me an ad from his local newspaper that recommended using Stevia instead of aspartame, and made these startling claims about aspartame: It is derived from the excrement of genetically modified E. coli bacteria. Upon ingestion, it breaks down into aspartic acid, phenylalanine, methanol, formaldehyde, and formic acid. It accounts for over 75% of the adverse reactions to food additives reported to the FDA each year including seizures, migraines, dizziness, nausea, muscle spasms, weight gain, depression, fatigue, irritability, heart palpitations, breathing difficulties, anxiety, tinnitus, schizophrenia and death. Let's look at those claims one by one.

In some markets, aspartame manufacture takes advantage of modern genetic laboratory processes. A plasmid introduces genes into E. coli bacteria; the genes are incorporated into the bacterial DNA and they increase production of enzymes that enhance the production of phenylalanine. The bacteria produce more phenylalanine, serving as little living factories. The phenylalanine these workhorses produce for us is exactly the same as phenylalanine from any other source. It is disingenuous and inflammatory to characterize it as "derived from excrement." Genetic processes like this are widely used today. One stunning example is Humulin. Diabetics used to develop allergic reactions to the beef and pork antigens in insulin derived from cows and pigs because it was slightly different from human insulin and contained impurities. Scientists found a way to put human insulin genes into E. coli bacteria and put them to work producing true, pure human insulin. This was such a great advantage to diabetics that animal insulins are no longer even available.

Some of the things we ingest are directly absorbed and utilized unchanged, like water. But most of what we ingest is metabolized. Aspartame is metabolized. It does indeed break down into aspartic acid, phenylalanine, and methanol. Aspartic acid and phenylalanine are amino acids that we need to survive. Methanol is produced in small amounts by the metabolism of many foods; it is harmless in small amounts. A cup of tomato juice produces six times as much methanol as a cup of diet soda. Methanol is
completely metabolized by formaldehyde into formic acid; no formaldehyde remains. Lastly, the formic acid is broken down into water and carbon dioxide. Human studies show that formic acid is eliminated faster than it is formed after ingestion of aspartic acid. So yes, those compounds appear, but so what? We get much larger amounts of the same compounds from our food, and they don't hurt us.

I searched for documentation of that claim, and I couldn't find the 75% figure anywhere. What I did find was that FD&C dyes (not aspartame) are the food additives most frequently associated with adverse reactions. Anyway, a list of reported adverse reactions is meaningless by itself. People can report: any symptom they noticed after using aspartame, but they can be fooled by the post hoc, ergo propter hoc fallacy: just because a symptom occurred after ingesting aspartame, that doesn't prove aspartame caused the symptom. Controlled studies are needed to determine if the symptom occurred more often in people using aspartame than in people not using it. Many such studies have been done and have not shown a correlation of aspartame use with any of those symptoms.

Internet Hoax

So the ad amounts to scare tactics based on false and distorted information. Actually, this ad is pretty mild compared to some of the alarmist misinformation circulating on the Internet. There we are told that there is a widespread epidemic of aspartame poisoning, causing headaches, seizures, Alzheimer's, cancer, diabetes, blindness, multiple sclerosis, birth defects, even Gulf War Syndrome. We are told that "If you ... suffer from fibromyalgia symptoms, spasms, shooting pains, numbness in your legs, cramps, vertigo, dizziness, headaches, tinnitus, joint pain, depression, anxiety attacks, slurred speech, blurred vision, or memory loss-you probably have ASPARTAME DISEASE!"

We are expected to believe the unsubstantiated claim that "When they remove brain tumors, they have found high levels of aspartame in them." All this misinformation has been identified by various sources including Time.com, Snopes.com and About.com as a hoax or urban legend. Much of it hinges on a widely disseminated e-mail by a "Nancy Markle" who was accused of plagiarizing it from Betty Martini. Martini is the founder of Mission Possible World Health International, which is "committed to removing the deadly chemical aspartame from our food." She is also anti-vaccine, anti-fluoride, anti-MSG, a conspiracy theorist, and thinks she was cured of breast cancer by a herbal formula. Her website consists of misinformation, testimonials, and hysterical rants. She implores readers: "YOUR personal horror story needed NOW!" She is associated with a number of others notorious for circulating unreliable information, including the infamous Joseph Mercola. There's even a book, Sweet Poison, by Janet Hull, creator of the Aspartame Detox Program.

Scientific Studies

Aspartame has been found to be safe for human consumption by the regulatory agencies of more than ninety countries worldwide, with FDA officials describing
Aspartame Information Service

aspartame as "one of the most thoroughly tested and studied food additives the agency has ever approved" and its safety as "clear cut".

When the European Commission’s Scientific Committee on Food evaluated aspartame, they found over 500 papers on aspartame published between 1988 and 2001. It has been studied in animals, in various human populations including infants, children, women, obese adults, diabetics, and lactating women. Numerous studies have ruled out any association with headaches, seizures, behavior, cognition, mood, allergic reactions, and other conditions. It has been evaluated far more extensively than any other food additive.

When new rat studies by the Ramazzini Foundation in Italy appeared to show an association with tumors, the European Food Safety Authority examined Ramazzini’s raw data and found errors that led them to discredit the studies. Their updated opinion based on all the data available in 2009 said there was no indication of any genotoxic or carcinogenic potential of aspartame and that there was no reason to revise their previously established ADI (Acceptable Daily Intake) for aspartame of 40 mg/kg/day. Studies have shown that actual consumption is well below that limit.

People who are absolutely convinced they get adverse effects from aspartame have been proven wrong. For instance, the New England Journal of Medicine published a study of people who reported having headaches repeatedly after consuming aspartame. When they knew what they were consuming, 100% of them had headaches. In a double blind crossover trial, when they did not know what they were getting, 35% had headaches after aspartame, and 45% had headaches after placebo.

Is Stevia Safer?

Stevia comes from a plant, and the Guarani Indians of South America have been using it to sweeten their yerba mate for centuries. The "natural fallacy" and the "ancient wisdom fallacy" sway many consumers, but for those of us who are critical thinkers, who want to avoid logical fallacies and look at the scientific evidence, what does science tell us? Is stevia preferable to aspartame? We really don’t know.

Concerns have been raised about possible adverse effects such as cancer and birth defects. Stevia is banned in most European countries and in Singapore and Hong Kong because their regulatory agencies felt that there was insufficient toxicological evidence to demonstrate its safety. The U.S. banned its import in 1991 as a food additive, but the 1994 Diet Supplement Health and Education Act (DSHEA) legalized its sale as a dietary supplement. Most of the safety concerns have been dismissed, but so have the concerns about aspartame. Arguably, the concerns about stevia are more valid than those about aspartame, because there is less evidence refuting them.

The plant extract is refined using ethanol, methanol, crystallization and separation technologies to separate the various glycoside molecules. The Coca-Cola Company sells it as Truvia. Pepsi sells it as PureVia. It is a product of major corporations and is
prepared in a laboratory using "toxic" chemicals like methanol. For some reason that doesn't bother those who are promoting stevia as a natural product.

What about HFCS?

High fructose corn syrup (HFCS) is also being demonized. "High" fructose isn't really so high. HFCS is 55% fructose. Sucrose (table sugar) is 50% fructose and 50% glucose. Honey is 50% fructose. Apples have 57% fructose; pears have 64%.

Fructose has been blamed for obesity, diabetes, heart disease and a wide variety of other illnesses, but the evidence is inconclusive. Avoiding fructose would mean avoiding all sources of fructose, not just HFCS. Avoiding fruit is probably not healthy.

An International Life Sciences Institute (ILSI) Expert Panel concluded, "there is no basis for recommending increases or decreases in [fructose] use in the general food supply or in special dietary use products." HFCS is 25% sweeter than sucrose, so you can use less of it and get fewer calories. Limiting total calorie intake is healthy, and both HFCS and aspartame can contribute to that goal.

Is Aspartame Safe?

Yes! Aspartame is safe for everyone except people who have the genetic disorder phenylketonuria (PKU). They must avoid aspartame because they can't process phenylalanine, and accumulated high levels of phenylalanine can damage their brains. Science has adequately demonstrated that aspartame is safe for everyone else.

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