Most humans love things that taste sweet—chocolate candy, cake, ice cream, and so on. The problem with sweet things is they have lots of calories and tend to make us gain weight. Wouldn’t it be great to have sweets without the calories? Of course, this dream has now become reality through the magic of chemistry—artificial sweeteners, or molecules that taste sweet but do not add to the calorie count. Many molecules have a sweet taste—even sweeter than sugar. The earliest of these compounds were discovered in the late 1800s when tasting a new compound was accepted procedure. Most of the current artificial sweeteners were discovered by accident, however, when scientists were not observing proper lab hygiene.

Today the most widely used artificial sweetener is a compound called aspartame, which is formed by coupling together two amino acids naturally found in humans: aspartic acid and phenylalanine. Aspartame is 200 times sweeter than sugar and leaves no unpleasant after-taste. It is now found in most diet drinks and many other low-calorie products. One disadvantage of aspartame is that it decomposes at baking temperatures and thus cannot be used in products that are heated.

Like all artificial sweeteners, aspartame has had some critics. When this substance breaks down in the body it forms aspartic acid, phenylalanine, and methanol. The first two compounds are naturally present in the body and pose no hazard to most people. However, about one person in 15,000 suffers from a disease called phenylketonuria, which makes an individual sensitive to excess phenylalanine. People with this condition must avoid aspartame. Also, the fact that methanol is a product of the breakdown of aspartame makes some people nervous, because methanol is a toxic substance. Nevertheless, studies have shown that the small amount of methanol produced from aspartame poses no risk. In fact, a glass of natural fruit juice contains as much methanol as is produced from typical use of aspartame.

Although aspartame has been the subject of some criticism, all indications are that it is safe for virtually everyone. It continues to dominate the artificial sweetener market.