The History of Bread

For more than three thousand years, the ingredient used to make bread rise—yeast—did not change substantially. That is, until the 1830s, when bakers began adding sodium bicarbonate (baking soda) and sour milk to their dough. The lactic acid in the sour milk reacts with the baking soda to produce carbon dioxide gas. As the gas is released, it becomes trapped in the dough and produces the desired lightness of the baked bread. This method marked a significant advance for bakers, proving especially useful in the baking of cakes, biscuits and quick breads.

The use of sour milk presented a new problem: It was unreliable, because it was difficult to tell how much acidity the milk contained. The replacement of sour milk with potassium hydrogen tartrate (cream of tartar), a by-product of wine fermentation, solved this problem. Cream of tartar greatly improved the baking process because the reaction was now much more predictable.

The mixing of baking soda and cream of tartar marked the introduction of baking powder. But the two chemicals had to be kept in separate containers until used, or else they would react if any moisture was present. And because cream of tartar was imported from France, there were the additional problems of supply and expense. These factors fueled the search for a more efficient and economical baking powder.

Eben Horsford

Eben Horsford was the American scientist who solved this problem by replacing cream of tartar with calcium acid phosphate, also known as monocalcium phosphate.

Horsford had studied chemistry in Germany with Justus von Liebig, a prominent agricultural chemist, in 1844. He returned to the United States to become a professor of science at Harvard University in Cambridge, Massachusetts.

Although chemists at the time were familiar with calcium acid phosphate, it had not been made previously on a commercial scale. Horsford developed a process to manufacture the ingredient using cattle bones, which were ground and digested with sulfuric acid. The result was a mixture of phosphoric acid, superphosphates and calcium sulfate, which could then processed to produce calcium acid phosphate.

Horsford and his business partner, George Wilson, opened the Rumford Chemical Works in Rhode Island in 1854. Five years later, they began manufacturing and selling the correctly proportioned ingredients. They named their company after Count Rumford, the inventor who endowed Horsford’s position at Harvard.

While the introduction of calcium acid phosphate solved the problems of using cream of tartar, the baker still had to mix two products to get a satisfactory reaction. Horsford solved this final problem by thoroughly drying the ingredients and adding corn starch to keep them dry. In 1869, the Rumford plant began manufacturing baking powder as we know it today.

Since then, the only significant change has been source of the calcium acid phosphate. In the late 1880s, calcium phosphate mining eliminated the need for beef bones.
Count Rumford

Benjamin Thompson was born in Woburn, Massachusetts, in 1753. As a young man, he was a supporter of Britain during the years leading up to the American Revolution. When British forces evacuated Boston in March 1776, Thompson followed and sailed to England. There Thompson served under Lord Germain, Britain’s Secretary of State for America.

When Britain was defeated by the American colonies, Germain was accused of incompetence. To avoid the problems of his association with Germain, Thompson left for travel on the European continent.

After several months of travel, Thompson entered the service of Karl Theodore, the Elector of Bavaria, in today’s southern Germany. The Elector made Thompson a Count of the Holy Roman Empire. Thompson was allowed to choose his own title, and he selected Rumford, the early name of Concord, New Hampshire, where he had taught school and where his first wife had been born.

Throughout his wanderings in Europe, Rumford conducted scientific research on a variety of topics, including gunpowder, light and mechanics. His major focus was on heat, which he believed was a form of motion.

Rumford spent the last dozen years of his life in Paris. When he died in 1814, he left Harvard University money to establish a professorship in his name “to teach…the utility of the physical and mathematical sciences…for the extension of industry, prosperity, happiness, and well-being of Society.”

Justus von Liebig

As a child, Justus von Liebig was curious about chemistry, having been exposed to it through his family’s business in painting and common chemical supplies.

After studying chemistry in Germany and France, von Liebig began teaching at the University of Giessen, Germany, in 1824. There, von Liebig became a renowned chemistry instructor and created one of the world’s first major teaching laboratories for chemistry. Students from America and throughout Europe traveled to Giessen to study under his direction.

Von Liebig was especially interested in agricultural chemistry—the study of methods for growing food and producing useful products from agricultural sources. He discovered that plants feed on nitrogen from the soil and introduced nitrogen-based fertilizer. Fertilizers are used around the world today to increase yields of crops.

Another of von Liebig’s inventions was beef extract, a highly concentrated beef stock that was a nutritious substitute for more expensive beef. Von Liebig started a company that produced beef extract in Uruguay and began selling it in European markets. Von Liebig’s beef extract was popular in European households, and provided nutrition to soldiers during World War II.

Von Liebig is remembered for both his influential teaching and for his discoveries. The ideas proposed in his classroom provided the basis for research that continued for many years following his death in 1873.

Kikunae Ikeda

For many of years, people recognized four main tastes: sour, sweet, salty and bitter. Only recently were Americans introduced to a fifth taste: Umami.

Umami was discovered by Kikunae Ikeda, a Japanese chemistry professor at Imperial University of Tokyo, in 1908. Ikeda had studied chemistry in Germany with Wilhelm Ostwald in 1899.

Ikeda recognized that the flavor of broth made from kombo, a popular type of seaweed used in cooking, exhibited a flavor distinct from the four tastes recognized at the time. In laboratory tests using seaweed, he isolated the substance L-glutamate, known today as monosodium glutamate, or MSG. Ikeda acquired a patent for manufacturing MSG in 1908. Soon after, Ikeda worked with Saborusuke Suzuki, a businessman, to manufacture and market MSG as a flavor enhancer under the Ajinomoto brand name.

Although it is associated with Asian foods and restaurants, MSG is used in home kitchens and industrial food processing factories around the world to enhance flavor in a variety of foods, including broths, seasonings, potato chips and other snacks.

Since Ikeda’s discovery, other foods have been recognized for their umami flavor. Tomatoes, cheeses, meats and mushrooms, for example, all exhibit the flavor of umami. And other flavor compounds, notably fattiness and piquience (spicy heat) have been proposed.