

## The History of High Potency Sweeteners: Tales of Discovery

Most sweeteners were discovered accidentally.

### Saccharin



#### Ira Remsen (1846 – 1927)

There is some controversy over the discovery of saccharin. Constantine Fahlberg was working in the laboratory of Ira Remsen at Johns Hopkins University. According to Fahlberg's account, he accidentally spilled some laboratory material on his hand, and noticed the sweet taste later in the evening when he was eating dinner. Fahlberg and Remsen published the work jointly (Fahlberg, C.; Remsen, I. Ueber die Oxydation des Orthotoluolsulfamids. Chem. Ber. 1879, 12, 469-473.). Later Fahlberg patented saccharin without including Remsen on the patent. Fahlberg went on to become wealthy. Remsen went on to become the president of Johns Hopkins University, and he commented "Fahlberg is a scoundrel. It nauseates me to hear my name mentioned in the same breath with him."

### Cyclamate



#### Ludwig Frederick Audrieth (1907 - 1967)

Michael Sveda was a graduate student at the University of Illinois, working in the laboratory of Ludwig F. Audrieth on the synthesis of anti-pyretic (anti-fever) drugs. While working in the laboratory in 1937, he put his cigarette down on the lab bench. When he put it back in his mouth, he discovered the sweet taste of cyclamate.

## **Aspartame**

It was December, 1965. Jim Schlatter, a chemist at G.D. Searle, was working on a project to discover new treatments for gastric ulcers. To test new anti-ulcer drugs, the biologists used a tetrapeptide (four amino acids) normally produced in the stomach; Schlatter was synthesizing this tetrapeptide in the lab, and one of the steps in the process was to make a dipeptide intermediate, aspartyl-phenylalanine methyl ester.

In the course of his work, Schlatter accidentally got a small amount of the compound on his hands without even noticing it. Later that morning, he licked his finger as he reached for a piece of paper, and noticed a sweet taste. His curiosity drove him to ask "Where did that sweet taste come from?" His first thought was of the doughnut he had eaten during his coffee break, but he realized that he had been to the bathroom and had washed his hands since then. It could only be the aspartyl-phenylalanine methyl ester he had worked with. He knew that aspartic acid and phenylalanine, which make up this product, are natural amino acids present in all proteins, so he felt it would be safe to taste the material. It was sweet! He and his lab partner, Harman Lowrie, both tasted the material in 10 milliliters of black coffee, noting the sweet taste as well as the absence of any bitter aftertaste, and recorded the results in Schlatter's laboratory notebook.

## **Acesulfame**

Acesulfame was discovered by another chemist, Karl Clauss, in 1967. He noticed a sweet taste when he licked his finger to pick up a piece of paper (Clauss, K.; Jensen, H. Oxathiazinone Dioxides--A New Group of Sweetening Agents. *Angew. Chem. Internatl. Ed. Engl.* 1973, 12, 869-876.).

## **Sucralose**

Sucralose may have the strangest "accidental discovery" story. A British sugar company, was looking for ways to use sucrose as a chemical intermediate. In collaboration with Prof. Leslie Hough's laboratory at King's College in London, halogenated sugars were being synthesized and tested. A foreign graduate student, Shashikant Phadnis, misunderstood a request for "testing" of a chlorinated sugar as a request for "tasting," leading to the discovery that many chlorinated sugars are sweet with potencies some hundreds or thousands of times as great as sucrose (Selinger, B. *Chemistry in the Market Place*, 4th Ed., Harcourt Brace Jovanovich: Sydney, 1989, pp 425-429) .