

Reflections of a Retired Flavorist Before He Forgets: Cocoa

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When I was a young flavorist, requests for chocolate, coffee, tomato or meat flavors were not answered or were countered with an inadequate sample. When the request was for several of these, it indicated one of two things: it was an attempt either to get rid of the salesman or to determine if, by chance, the user may have discovered a firm far ahead in flavor technology.

Attempts at cocoa or chocolate flavors were overly dependent on vanillin, supplemented by honey notes—phenyl ethyl acetate, methyl phenyl acetate, etc. Iso amyl salicylate was also a favorite component but these renditions were far from cocoa or chocolate and, at best, were used to stretch the cocoa or chocolate flavor. We felt we had made a leap forward when we first used pyridine, even if the results were quite crude.

In our discussions with Mr. Robert Fries, Sr. (see our article on Peach, *Perf. & Flav.*, 17(1) 35), about the fortunate accident that led to the production of crude undecalactone and the then famous peach, he told me that in the same period another reaction, on a different product, went awry and developed a wonderful cocoa aroma. Unfortunately, attempts to reproduce it were unsuccessful and the first reacted cocoa flavor passed into history.

Our very early gas chromatographic work on the extractives of various cocoa nibs gave us a better picture of cocoa volatile composition and pinpointed the important keys. There were a number of key nitrogenous and honey-like components that did not correspond to anything known at that time. They remained unknown to us because the project did not warrant their isolation, identification, synthesis, etc. When later literature references revealed the pyrazines and the phenylalkenals, one immediately recognized that these were the main nitrogenous and honey-like keys.

Even at this late date we are not at liberty to reveal the name of the well-known and respected scientist who, after hearing us lament about the commercial unavailability of the key pyrazines, sent us small samples of many of the pyrazines in dilution. He asked to remain anonymous.

These pyrazine samples were so revealing, and some so obviously necessary, that we wrote to approximately fifteen flavorists, at various companies, and invited them to a meeting at Kohnstamm. They were given the opportunity to evaluate the samples we had at hand and the enthusiasm generated was obvious.

The rationale for the meeting was that there were obviously a few flavor producers that could produce, and keep captive, key flavor components. But it was unlikely that any of us, singly, could produce these materials or had the commercial clout to encourage a supplier to produce them. It was felt that if we showed collective interest we would be able to obtain these key components.

A number of additional meetings followed where we cooperatively presented, or purchased for presentation, GRAS raw materials heretofore commercially unavailable. The managements of several of the companies, when informed of these ad hoc meetings, requested that the meetings stop until held with the proper legal guidance and advice. Thus was formed, and incorporated, the Chemical Sources Association with Dr. James Ingle as the first president.

More recently I had the opportunity to relate to the anonymous donor of the pyrazine samples that several of us had received plaques and recognition for our pioneer roles in the formation of the Chemical Sources Association and that, regrettably, he was not there. With tongue in cheek (I hope) he said we could always strike gold medal which I could pass on to him, but that he still desired to remain incognito.

The fact that the key phenyl alkenals were patented, and initially unavailable commercially, led at Kohnstamm to a brain-storming session that eventually achieved the desired results. I can discuss the theory a little but the real breakthrough proved to be in the processing which I do not feel free to discuss.

It was recognized that cocoa was first fermented and then roasted. From the composition of the volatiles it was obvious that protein and sugars were involved. The fermentation resulted in the splitting of protein to peptides and then to amino acids. These, when roasted with sugar, form not only pyrazines, but also the deaminated, decarboxylated aldehydes corresponding to the amino acids involved.

It was also obvious that, once formed, the aliphatic aldehydes condensed with phenylacetaldehyde to form phenyl alkenals. Once the theoretical balance of amino acids and sugars was determined, the problem of reproducing the conditions of roasting proved to be the key.

In keeping with today's irrational demand for natural products and the even more ridiculous activity of our industry, supplying these in ever more concentrated form; the use of natural amino acids and sugars to obtain a natural reacted end-product plus added pure vanilla, cocoa distillate or extract, and traces of essential oils (such as Bois de Rose for its linalool content) results in quite satisfactory, less expensive and more concentrated "natural" cocoa or chocolate flavors. Other natural additives should be obvious to the flavorist.

Today, flavor producers readily supply samples of cocoa, chocolate and various meat flavors, with pride. Requests for tomato and coffee flavors are also filled. Nevertheless we have yet to see, and don't expect to see in the near future, a *fresh* coffee flavor or a good *cooked* tomato paste flavor.

Reference

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