Citrus and the History and Future of Flavor Creation[a]

Highlights from the joint meeting of the Chemical Sources Association and Society of Flavor Chemists

During the September meeting of the Chemical Sources Association and the Society of Flavor Chemists, presenters Tony Batcup, Pia Henzi and Tillman Miritz of MCI Miritz Intercontinental discussed and presented blotters of Brazilian orange oil rectifications, extracts and CO_2 extracts. Rectifications involve orange oil "fronts," or volatiles, captured when heat is applied. Attendees smelled orange oil terpenes, followed by 10 times rectified orange oil, which was decolorized. Highly concentrated orange oil was also presented; the extracts were all produced using ethanol. The presenters explained that hydroxycoumarin-free orange oil can be produced using a combination of extraction and rectification.

"Orange is not orange; it can be quite different," said Miritz as the presentation concluded with CO_2 extracts.

History of the Flavor Industry

Later, Chuck Manley (Charles H. Manley LLC) discussed the history of flavors beginning with early meat extracts and butter flavors used to keep Napoleon's armies' food palatable. Later in the 19th century, Justus von Liebig employed acid hydrolysis for the savory profile in his Oxo soups, which later were absorbed into the Campbell Soup Co. For his namesake soups, Julius Maggi deployed acid hydrolysate for savory flavor. Throughout the 1800s, Manley explained, hydrolyzed vegetable proteins (HVP) boosted savory flavors. Then, at the dawn of the 20th century, Kikunae Ikeda discovered the umami taste in seaweed extracts. Today, of course, monosodium glutamate (MSG) and ribonucleotides are employed for umami effects in flavors. Soon after Ikeda's discovery, French chemist Louis-Camille Maillard articulated the process of nonenzymatic browning, a key foundation of today's savory flavors. In the 1960s, Manley said, Unilever patented reaction/processed flavors, which were eventually established as a separate category by the Flavor and Extract Manufacturers Association. (The International Hydrolyzed Protein Council reviewed the processing and safety of HVP.) Reaction flavors have provided top notes, including pyrazines, aldehydes, thiazoles, thiazolines, furans, furaneols and sulfur substitution compounds. Today, said Manley, about 45 thiazoles are used in flavors, typically at low thresholds. Contemporary commercial savory flavors employ top notes; HVP; hydrolyzed animal protein (HAP); autolyzed yeast extract (AYE); fermentation foods such as soy sauce; salt/sugars; lactic acids; spice extracts; carriers such as starches and gums; thermally processed flavor bases; and extracts of dry powders of garlic, onion, cheese, mushroom, meat, tomato, fish, and molasses, among others.

The variables allowed for reaction flavors are as follows:

- Temperature: 100–180°C
- Duration: 15 min to 6 h
- pH range: 3–8

Thermally processed flavors were defined by the US Department of Agriculture (*www.usda.gov*) in 1990, and are described as follows:

> During the heating process, chemical reactions occur between reducing sugars and amino acids or proteins. This process conforms to what is commonly understood in chemistry to be the "Maillard reaction." End products of Maillard reactions are referred to as Maillard reaction flavors, "processed flavors," or as "reaction flavors."

The advent of Maillard reaction chemistry has contributed to the increased technical requirements among flavorists, commented Robert Peterson (The Coca-Cola Co.). In earlier eras, he said, those without technical backgrounds could enter the field with little trouble. Technical innovations have permanently changed the requirements of the job.

Moving forward, Manley noted that better understanding of the olfactory system and exploration of G protein-coupled receptors, as well as understanding of taste at the cellular level, are pushing the flavor industry into its next phase. As a result, high-throughput screening is now used to find novel taste compounds, including enhancers for savory, sweet and salty taste. And now, researchers have identified kokumi (roughly translated as "rich taste") compounds, which target the calcium channels on the tongue, creating new taste possibilities. Meanwhile, flavor and biotech companies are using enzymes and microorganisms to produce new natural sources for flavor ingredients.

In closing the day's presentations, Eugene Buday (GSB & Associates) echoed Manley's narrative of evolution, noting that chemoreception research will allow the

[a] A summary report of Mike Fasano's (David Michael & Co.) presentation on vanilla, "Vanilla: Anything but Plain," appeared on Page 36 of the November 2011 issue of *P&F* magazine; *www.perfumerflavorist.com/magazine/pastissues*.

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Barbara Tangel (IFF) and Cyndie Lipka (Sethness Greenleaf) were thanked for their years of service as they officially stepped down from the CSA board.

Attendees sampled blotters of citrus from MCI Miritz and vanilla from David Michael & Co.

Speaker Mike Fasano (David Michael & Co.) and Christine Daley (Aromalink LLC).

Presenters Tony Batcup, Pia Henzi and Tillman Miritz (all MCI Miritz Intercontinental).

Speaker Chuck Manley discussed the history of the flavor industry.

flavor industry to "decipher the Rosetta Stone" of sensory preference at the receptor level, allowing formulators to decode taste and flavor liking. Yet no matter how deeply decoded flavor science becomes, a need for stability expertise and ingredient interaction knowledge will always keep flavorists relevant.

"You never finish learning in this industry," said Buday. "Why something smells or tastes as it does must be a flavorist's passion." His advice to formulating flavorists: "You're never done until you try everything."

Next meeting: February 16, 2012, Sheraton Hotel, Newark International Airport; www.flavorchemist.org.

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