SOCIETY NEWS

THE SOCIETY OF FLAVOR CHEMISTS, INC

President's Message

Lisa Vaughn 2017—2018

Greetings Everyone and Happy 2018!

I want to start off by thanking all of the exceptional volunteers who keep this organization running. There are so many moving parts and their consistent help and dedication is crucial to our success.

Symposium 2019 is quickly approaching, and plans are well underway. The venue for the Symposium has been secured at the Hyatt Regency in Princeton, October 16 & 17. We are happy to report that Justin Kozlowski will be the chair for the event. Justin has already started working on the program and we are excited to see the progress. Several members have expressed interest in helping with the program as well as other many other duties, so please contact Justin at:

symposium@flavorchemist.org.

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Board of Directors 2017-2018

President's Message - continued

Lisa Vaughn 2017—2018

Continuing on the topic of volunteering, please consider joining a committee, and if you are already on a committee, consider joining the board. I started on the West Coast meeting committee years ago, and I cannot say enough about what a rewarding experience this has been. The camaraderie and sense of serving such a unique and talented group of people is truly beyond what I expected.

A few notes on the upcoming meetings:

February 22 will be at the Chemical Heritage Foundation in Philadelphia
The 18th Annual Flavor Forum in California, will be a roundtable on Thursday March 8 at the Wyndham Anaheim
Ohio meeting will be April 12th in downtown Cincinnati at the Netherland
Roundtable in Newark on May 10 to finish off the year.

Behind the scenes, the scholarship committee will be hard at work reviewing the applicants and selecting the winners of the Jogue and Jaggard Memorial Scholarships. Also, keep an eye out for the redesign of the website, we are working to obtain a number of quotes to bring new life into the website.

Best Regards,

Lisa Vaughn

SFC President 2017-2018

Society of Flavor Chemists Flavor Symposium

October 15—16, 2019

Princeton NJ

Welcome, New Members!
From the September meeting in Newark

New Members Katie Crawley (left) and Jason Murphy (right) with Marie Wright

Katie Crawley (Direct to Certified) works at ADM Wild Flavors. She was raised in Cincinnati, OH, where she lives with her husband Brian and three children. She has a three-year old daughter Macie and twin one-year old twin boys Will and Luke. Katie's life is a little crazy and loud!

Katie attended the University of Cincinnati for her Bachelor's degree in Chemistry. Her degree was a co-op degree, where she worked every other semester. That is how Katie found her way into the Flavor Industry.

Jason Murphy—Direct to Certified

Jason has been in the flavor industry since 1999. He works for Wild Flavors and Specialty Ingredients and have been working for the A.M. Todd Company and Wild for the last seventeen years. He has a deep and thorough background in mint oils and mint flavors since 2005. Jason has been training to become a Certified Flavor Chemist for the past five years and is ready and excited for the opportunity to join the Society of Flavor Chemists to further his knowledge, professional capabilities, and career.

Welcome, New Members!
From the September meeting in Newark

New members (center left) Tomiko Stroud and Deirdre Forrester (center right)

with Frank Fischetti and Ketah Shaw

Tomiko Stroud— Apprentice

Tomiko was born and raised in New York City. She has a BS from the University of Buffalo, NY in Chemistry and a MS in Chemistry from Long Island University-Brooklyn Campus. She is Currently a scientist as PepsiCo, where she was introduced to flavor chemistry. Tomiko's other hobbies include do-it-yourself home improvements, spinning, reading, football, basketball, travelling, and eating foods from different cultures.

Deirdre Forrester — Apprentice

After joining Pepsico in 2011 as a flavorist trainee, Deirdre Forrester is thrilled to find a career which combines her love of cooking and baking healthier options without compromising flavor and taste. She has found her niche where she can combine the art of creativity and balance of science in flavor creation. Deirdre and her high school sweetheart of fourteen years, Alec, now husband, are expecting their first child in February 2017.

Welcome, New Members!
From the October Meeting at Flavorcon

Lisa Vaughn with new members Ryan McCoy, Alison Freedman and Paul Sampayo

Ryan McCoy—Apprentice

Ryan has a background in culinary arts which he used to put himself through school. He was originally leaning towards a pharmaceuticals path before being exposed to the flavor industry by a chef and friend from his time in the restaurants. Ryan is still an avid home cook and adventurous eater. He enjoys disc golfing, gardening, and home brewing. Ryan is married to Sarah for four years and as two boys; Oliver is three and Henry is one.

Alison Freedman—Apprentice

Alison graduated from Virginia Tech with a Bachelors of Science in Food Science & Technology and has been working in the industry ever since. She is a die-hard Hokie fan. Other than work, Alison is passionate about cooking, traveling, college sports, French art, and spending her time wither family. She has one fur-child named “Kittie” that she adopted a year ago.

Paul Andres Sepulveda Sampayo—Certified

The idea of using chemistry as an art form has always been passionate for Paul, and that is how his journey into the flavor industry started. Paul is originally from Columbia, with a background in Chemical Engineering. He also has a Masters Degree in Fragrance & Flavors from Universitat Politecnica de Catunya in Barcelona. For the last seven years, he has been working as a flavorist for Foodarom (formerly Metarome). Paull has created and matched successful flavors for sweet applications such as nutraceuticals, beverages and dairy. Outside of work, Paul loves spending time with his family, travelling, and enjoying find arts like painting and drawing.

September Meeting in Newark

By Sharon Tortola

September 21st was a beautiful weather day in Newark, NJ. The Newark Airport Hilton was the site of this great event which had over 70 attendees. After a buffet lunch, the afternoon began with a Chemical Sources Association (CSA) sponsored presentation by Nadim A. Shaath, PhD. He discussed his new book Healing Civilizations: The Search for Therapeutic Essential Oils and Nutrients. Everyone in attendance received a copy, which Dr. Shaath graciously signed. His presentation was full of fascinating stories and photos of his travels to find plants with therapeutic properties. There was also a smelling session of some essential oils, highlighting several that are from Egypt.

The next portion of the afternoon was sponsored by the Society of Flavor Chemists. The first speaker was Dr. Keith Cadwallader, Professor of Food Chemistry at the University of Illinois. His presentation discussed the Flavor Program and the Flavor Science Lab at the University. He touched upon some research that had been done concerning the elucidation of the "chicory note" in roasted chicory coffee as well as the analysis of different spearmint oils.

The final speaker of the day was Dr. Rachel S. Myer, Executive Director of the University of California Conservation Genomics Consortium. Her talk was titled "A Botantist's Exploration of the Drivers of Food Innovation throughout the Global Neolithic Revolutions." Her presentation was very interactive and began with a story of how plants were domesticated and how she and 2 other botanists began a bitters company in 2012. Next she presented some findings from her eggplant research that showed how food evolves as technology evolves, how humans went from eating eggplant raw to applying heat and roasting techniques. There was also a tasting session of different fruits from various parts of the world and sipping Gymnema tea, which is known to knock out the ability to taste sweet for a couple of hours.

The educational day concluded with a cocktail reception after the SFC business meeting.

Flavorcon 2017

Flavorcon is a convention about the flavor industry put on by Allured, the publisher of Perfumer&Flavorist and other flavor-related periodicals. This year's convention was held October 24—26 at the Hyatt Regency in Rosemont, IL. The event included presentations, keynote addresses, supplier exhibitions, and a short meeting of the SFC.

The first day opened with a keynote address by Barb Stuckey of Mattson, the food design company. She talked about major macro trends transforming food and beverage. Deniz Ataman of Allured presented on how companies and researchers are using algorithms and technology to understand consumer preferences.

This year's Flavorcon featured a number of track breakout sessions in which three presentations occurred simultaneously. The first session had discussions on barbecues, beverage trends, and a panel on cannabis. The second track session had presentations on clean-label flavors, confection, and cultivating innovation.

The first day ended with a group trivia contest, followed by a cocktail reception in the exhibit hall.

In between presentations, an exhibit hall with over forty displays were available for the attendees to visit.

Exhibitors included flavor ingredient suppliers, equipment suppliers, laboratory services, software companies, and organizations.

There was a brief SFC business meeting to elect new members.

Flavorcon 2017

The second day opened with the keynote speech by David Tonucci of Givaudan talking about Consumer-driven innovation and regulation. This was followed by Deniz Ataman of Allured presenting on flavor trends titles “Meeting the consumer in the middle”.

After that, participants could attend one of three sessions, on blockchain and flood safety by Dr. Merve Unuvar; Creating natural compliant reaction flavors by Dr. Luke Grocholl, or balancing flavor with consumer nutrition trends by Chris Warsaw. A second set of breakout presentations included “Flavoring with modifying properties” by Matthias Guentert, “Growth markets in global beverages” by Howard Telford, and “Mulling over cinnamon” by Richard Pisano Jr. The last trio of breakout sessions were: “Clean labeling for meat & dairy” presented by Carrie Schoeder and Steve Zavagli, “Consumers top flavor preferences” by Robert Byrne and Lizzie Freier, and “It’s in the carbon: natural-source testing for F&F” by Florencia Goren.

The final day began with the keynote presentation: “Do you speak data?” by Fernando Gomez-Gonzalez and Mindy Cultra, discussing new ways to prioritize innovation by quantifying human motivation. This was followed by a discussion on flavor trends in craft beer and cocktails by Jesse Valenciana of Goose Island Beer.

Flavorcon 2017 ended with closing remarks and a sneak peak at the next Flavorcon.

January California Meeting

Lauryn Mayberry and Scott Michaluk

The SFC January meeting was held on a beautiful sunny day at the Los Angeles Airport Marriott on January 18, 2018. The meeting began with a buffet lunch followed by the educational sessions which focused on the favor of proteins and new protein sources. As the protein trend continues to rise, more and more companies are experimenting with innovative sources.

Dr. Jing Zhao, an assistant professor from California State University Los Angeles, opened the educational session. Dr. Zhao shared findings in the flavor chemistry of food protein products. We learned about the volatile compounds responsible for odor and odor changes in food protein products and major taste compounds, including the components responsible for bitter taste. She discussed storage, packaging and other environmental factors that influence protein flavor. The presentations began with Jing Zhao speaking about food protein products. Jing started this presentation by going over the ever growing demand for protein, easy ways to consume it, and addressed what every Flavorist knows; it is difficult to flavor powdered protein. It can be bitter, salty, sweet and/or umami. In addition to that some have inherent volatile chemicals such as 3-isopropyl-2-methoxypyrazine which are difficult to mask. If that weren't bad enough she went on to show us the numerous reactions that could occur to create more off notes. She did give us some hope as she explained some tips to try to prevent some of the reactions from occurring!

Next, Dr. Changqi Liu, assistant professor at San Diego State University, gave an interesting and entertaining talk about the flavor of bugs and the reasons why we should to eat them. The flavors of various insects include sweet, spicy, bitter, and umami. We were informed of the good reasons to eat bugs, such as good nutritional value and a low environmental footprint. He went into the body of his presentation talking about the umami taste of bugs and how some have a pleasant taste and some have a polarizing taste containing (E)-2-decenal. He spoke about a giant water bug

January California Meeting cont'd

Randy Kreienbrink, CFS and Vice President of Marketing at BI, talked about using botanicals to build better functional foods and beverages. He covered market trends, product applications and technical challenges. Consumer trends such as wellness for consumers and animals, and "clean label" have helped the growth of plant-based protein ingredients and product markets. This can pose a challenge when formulating because it really limits the creativity, but sometimes it is a good way to pull us out of the box a little and explore the world of botanicals more. Other botanical markets also growing are colors from natural sources such as fruits and vegetables (in powder form or processed fibers). Snacks and RTD beverages are successful ways to deliver botanicals. Randy emphasized the need to label botanicals correctly advising us to be careful with claims about the botanical efficacy. He spoke about beets and their use for pre-workout products, but cautioned that it has a strong rooty earthy note that needs to be overcome. He also spoke about turmeric used for post workout inflammation. He also expressed that some of the more well-known botanicals like Guarana are still going strong. During and in closing his presentation he cautioned us to assure that the supply you select is traceable and from a trusted source.

Dr. Bonney Oommen, a dairy protein chemist, closed the educational program enlightening us on "will your flavor make the cut in a protein beverage". He discussed RTMs, RTDs, dairy proteins, and plant protein-based beverages. We learned about the typical customer and the main factors that affect approval which include protein and processing properties along with the science and art of improving the odds due to cost and customer engagement. He had a couple of interesting takeaways from the presentation. One was that customers have become accustomed to the "gritty/chalky" taste of rehydrated proteins and when provided a high protein beverage with little to no grittiness they will actually prefer the one with grit. The other interesting takeaway is that when formulating, it is easy to introduce excessive amounts of gritty taste to a beverage when processing, and that can start to occur fairly rapidly after processing. He empathized the importance of tasting the product once processed and during the shelf life to assure quality was consistent with what a consumer would demand.

Overall, for anyone formulating for clean label and/or protein based beverages, smoothies, or even meat replacements, these four individuals have a great deal of expertise to help avoid the pitfalls in formulating flavors for those products. After the interesting and information educational sessions everyone was invited over for the cocktail reception while the certified members attended the SFC business meeting. We would like to thank everyone for attending and look forward to seeing them, as well as some new faces, at next year's January meeting.

Flavor Research and Education Center

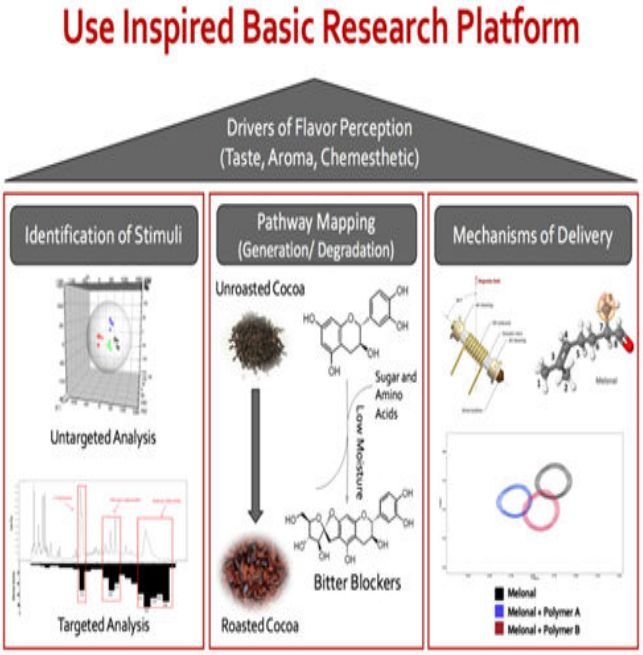
This issue, we take a look at the Flavor Research and Education Center, located at Ohio State University. One student at the Center, Geoffrey Dubrow, is the 2017 Jogue Incorporated Scholarship Award winner.

Professor Devin Peterson thought it would be a good idea to bring together industrial and academic leaders to discover innovative solutions addressing the challenges of the food flavor industry. He created a center of excellence that does just that. Seven years ago, while at the University of Minnesota, Peterson initiated the **Flavor Research and Education Center (FREC)** which originally consisted of eight member companies. Since then FREC membership has grown to include seventeen major industry leaders, including Abbott, ADM, Ajinomoto, Ardent Mills, Dr. Pepper Snapple, General Mills, IFF, Kellogg's, Kerry, Keurig, Kalsec, Molson-Coors-Miller, Nestle, PepsiCo, Smuckers, Synergy Flavors, and Takasago. In 2016 FREC moved to The Department of Food Science and Technology at The Ohio State University. Each year scientists and leaders from member companies gather to discuss current challenges in the industry and strategies for innovative solutions.

"We want to provide food solutions that have a population-wide impact. Flavor is a primary driver of food choice. So to increase the consumption of healthier foods, we need to make those foods taste good."

-Devin Peterson in Columbus 2020

FREC is an incredibly successful partnership between academic experts and industry leaders who advance basic knowledge to drive innovation in the food industry. Knowledge generation based on private sector needs is attractive to both academic and industrial partners. A core focus of FREC is to leverage the chemistry of food ingredients and processing technologies to provide technological solutions. This enables the development of foods with high flavor quality that are less dependent on the addition of sugar, salt or other additives. The goal is to empower the food industry to create healthier products while meeting the growing demand for clean labels.



Flavor Research and Education Center (cont'd)

The Peterson team advances the next breakthrough in analytical methods of flavor discovery. Traditional methods focus on measuring flavor based on aroma attributes. This approach is inadequate because it ignores the contributions of taste and chemesthetic somatosensory sensations, the flavor stimuli beyond aroma, which have a critical but often overlooked role in human perception. Traditional methods are also limited in scope as compounds are screened out of context (isolated, not in food) or draw conclusions from the effluent of a gas chromatographic column. To attain real-world and reliable results, Peterson has been developing a more comprehensive approach based on untargeted chemical fingerprinting methods coupled with multivariate analysis, termed flavoromics. This approach provides new approaches needed to advance our understanding of the stimuli that contribute to food flavor. Untargeted methods also provide the opportunity to uniquely identify precursors and pathways in flavor generation or instability. Peterson's approach paves the path for an exciting future in flavor discovery.

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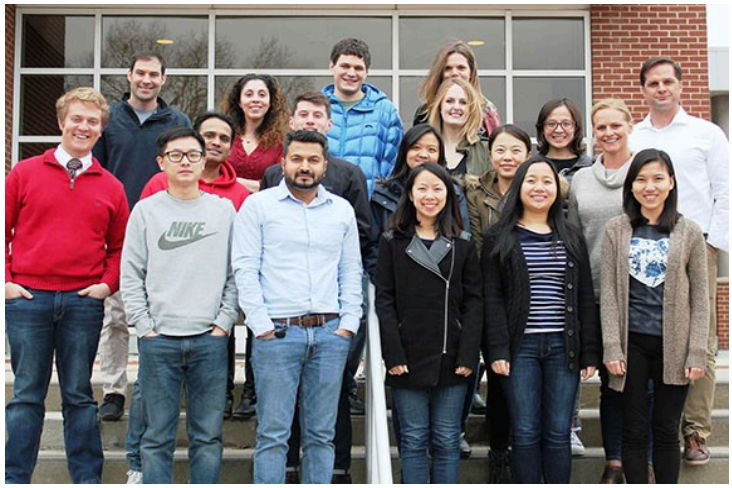
FREC provides a strong fundamental research platform for collaboration. It fosters cross-disciplinary food research to translate basic discoveries into applied outcomes. Providing solutions based on real market needs is fundamental. Peterson's goal is to get more from nature, guided by science, to support the development of sustainable, nutritious, and healthy foods with higher product acceptability. Healthy food and more sustainably sourced products have limited societal impact if people do not consume them. Ongoing research topics at FREC include characterizing chemical stimuli that impart flavor to food (taste, aroma, and chemesthetic/mouthfeel), investigating multi-model flavor interactions on perception, flavor modulation, mapping pathways of flavor generation or stability, and mechanisms of flavor delivery.

More information about FREC can be found at www.frec.osu.edu



Peterson Research Team

Flavor, Satiety, and Obesity: What Can a Flavorist Do?

Shane T McDonald

Obesity is well-recognized health crisis facing the world today. According to the World Health Organization criteria, 30% of American adults are obese. Globally, more people are overweight or obese rather than malnourished for the first time in history. I recently read a new book: "Flavor, Satiety, and Food Intake" edited by Beverly Tepper and Martin Yeomans (2017, IFT Press and Wiley Blackwell). Here is what I learned.

Weight gain occurs when long-term intake of food energy exceeds energy utilization, with the excess energy stored as fat. This only happens when the mechanisms for energy expenditure and energy intake and are not properly regulated. So, it is important to look at the mechanisms to control energy intake. Two key terms are satiation and satiety. Satiation is the process that brings a meal to an end (I'm full). Satiety is the suppression of appetite until the next meal (how long until you are hungry again). There are various physiological factors behind these two processes, but sensory affects also influence them.

"Sensory specific satiation", which is the comparative decrease in liking for a food consumed compared to a food not consumed. A common example: you eat pasta until you are "full" (satiation), but eagerly eat a piece of cake offered as dessert. This tends to make satiety more complicated than eating food you until are full.

Foods differ in their ability to satisfy. One example in the book mentioned the difference between 500 g (not counting core, stem, etc.) of apples, 500 g of apple sauce (eaten with a spoon) and 500 g of apple juice. The apples are more satisfying than the sauce, which is more than the juice. Apples take a lot longer to consume and involve a lot of chewing. Apple sauce takes less time and little chewing, but it still eaten with a spoon. The juice could be consumed in seconds. The total amount of time the food is in contact with your mouth, the more sensory specify satiety, makes the apples more satisfying. This is the problem with sugar-sweetened beverages. They can be consumed quickly and have little satiety, so it is easy to over-consume calories.

Westernized diets, with highly processed and prepared energy-rich foods, are widely accessible, aggressively marketed, cheap to buy, and fast to consume. They are often eaten "on the go" or with distractions like watching television, which does not induce as much satiety as sitting down with a fork and spoon and eating your dinner. So, one way to obviate the obesity crisis it to make food and drinks with the ability to promote the feeling of fullness and reduce hunger sensations between meals and hopefully reduce energy consumption.

How does satiety and satiation work? Some has to do with physiological factors (like stomach distension when full), but humans have a way of overcoming these barriers. Taste has a big part of satiety. Taste, traditionally divided into sweet, sour, bitter, salty, and umami, is believed to be a measure of the body's need for macronutrients. Sweet foods indicate carbohydrates, salty indicates salt, a necessary nutrient, and umami is an indictor of protein. On the other hand, sour suggests spoiled and bitter suggests toxic. Most of the calories injected are either sweet or salty/savory; relatively little of the daily calories come from sour or bitter.

We tend to eat more of food that we find tastes good, and are drawn to high energy-density foods. While this may been understandable from an evolutionary standpoint, it is now helping to promote obesity. Taste is involved with meal termination. Sensory specific satiety suggests that if we eat a lot of carbohydrate, we will be less interested in eating more, but maybe drawn to more protein. The more overall exposure to food taste we get, such as eating slowly or highly flavor foods, will bring our mealtime to a close.

Another concept is the idea of "reward value of food", which is the amount of food that will reinforce a behavior. Food is a potent rewarder of behavior, and it depends on a number of factors, such as hunger, recent experience with a food, and the liking of food. The more work we are willing to do to obtain a certain food, the more rewarding it is. Chocolate tends to be highly rewarding, while Brussel sprouts are less. Very young children will stop eating when satiated. But as they get older, they are willing to ignore satiation signals in over to eat very rewarding foods. So, the idea of food scientists is to find ways to make "heathy foods' more rewarding and more satisfying.

Flavor, Satiety, and Obesity (con't)

All the senses are involved in the experience of food. These effects can be separated into exteroceptive and interoceptive senses. The former is before injection: orthonasal smell, sight and sound and touch (outside of the mouth), and the latter is after the product is in mouth (retronasal smell, taste, internal touch, chemesthesis, and internal sound (like crunching). People will eat more of a variety of products, even if the only difference is color. This may be a type of sensory specific satiety, where consuming one kind of food decreases the desire for the same food compared to uneaten different food. Texture of food before eating and after can also trigger sensory specific satiety.

So, what is the role of odors on food intake? Unlike taste, which is linked to macronutrients, aroma/odors are more related to food choice or avoidance. We perceive odors two ways: aroma is smelling something externally by sweeping molecules from the air into the nose (orthonasal). When food is in the mouth, volatile molecules escape the food matrix and are swept into the back of the mouth and then into the nose, called retronasal. Odors are difficult to describe in an abstract way and are usually described in terms of the object that possesses it (fruity, meaty, floral). The relationship between flavor and diet seems a lot more diverse than taste. It is unlikely that retronasal olfaction is important in satiation.

Ambient odors are perceived vis orthonasal stimulation, which allows us to sense the presence of food remotely. The smell of food creates the anticipation of good taste. Food flavors are considered to be more pleasant when in a hungry state rather than a satiated state. People in a protein-depleted state develop an appetite for savory over sweet foods, and adjust their protein intake. Exposure to beef odor enhances the appetite for beer and other savory foods but suppresses the appetite for bananas and sweet foods. This phenomenon is described as "sensory specific appetite". The odors are associated with certain food qualities – bread aromas with carbohydrate and meaty aromas with protein.

In summary, taste is more involved in meal termination, while smell is more involved in food choice and anticipation and initiation of eating. Foods that are consumed quickly with little effort (soft texture and little chewing) can lead to over consumption. Making food harder and chewier slows the rate of eating, more satiating, and lower food intake. The food industry should make food that people would want to eat less of, not more of, while still stating palatable. Odors are not directly related to satiation, but do steer food choice. Food odors could be used to steer towards healthy choices and to eat fewer calories.

Adding seasonings like spices and salt increase energy intake as people will eat more of a food with their preferred level flavor. Palatability and consumption tend to increase with increasing level of seasoning until an optimal level is reached, then declines with additional seasoning. However, people will eat less of a highly seasoned food than a similarly liked food with lower flavor intensity. This is due to either a stronger sensory clue on how much the person ate, or that the person is associating the stronger flavor with higher level of nutrition.

Is it possible to alter the reinforcing value of food? Food is less rewarding due to factors such as: being full, less variety, and recent experience with a certain type of food. Similarly, hunger, dietary variety, and restriction of specific food may increase the rewarding value of food. It may be possible to train yourself, by eating only high energy density foods when almost full and low energy density foods when hungry.

So, what can the flavorist do to help?

We need to make sure healthy food is palatable. That may not affect satiation, but you can make sure heathy, satiating foods are palatable. We should concentrate on foods that are eaten early in the meal, so that you fill up in healthy food. We can also, make the aroma of healthy food more enticing, since aroma directs food choice. Also, developing and promoting more highly spiced and flavored foods may help. There tends to be an optimal level of flavor, and flavoring at that level or somewhat higher may contribute to sensory specific satiety. And, it may help to just make food flavor memorable, so people savor what they eat and don't forget what they ate. Food awareness is also a factor in food satiety.