May 2023
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Industry Insights:
Mint & Menthol

Innovations in Mint & Oral Care

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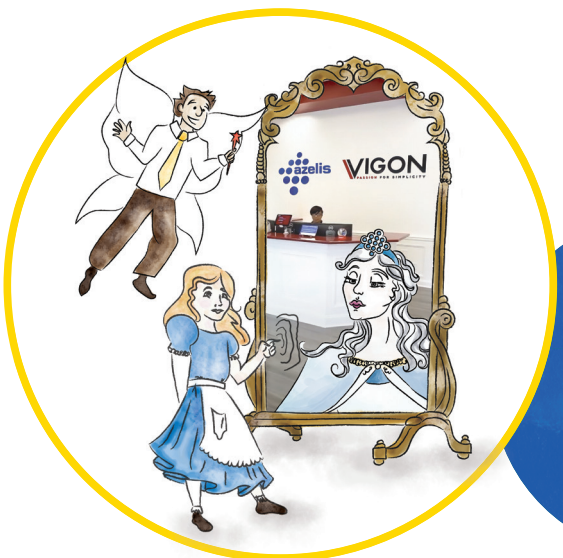
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What's Next for Flavor & Fragrance?



We've tapped professionals to touch on the intricacies of formulating with mint in various applications and what the future looks like for both markets.

The flavor and fragrance industry is picking up steam as in-person events are once again becoming a normal occurrence. I personally have made two trips to London, with a third scheduled for the British Society of Perfumers' One Day Symposium. I've just returned from Italy for the Exsence fragrance event and am beginning to prepare for EFEO and SIMPPAR in Paris later this month. I've met and reconnected with so many busy noses along the way and am looking forward to sharing their stories in future issues. Among these bustling events was the FAFAI International Convention & Expo which was held in February. FAFAI president Rishabh C. Kothari shares his experience from the event that exceeded expectations in terms of attendance and overall buzz energy emulating from the flavor and fragrance community on **page 36**.

With growth and innovation in mind, the May issue shines a light on the mint and oral care industries. Data Bridge Market Research[a] projects the mint and menthol market to reach $59.15 billion by 2029, at a CAGR of 5.30% during the forecast period. We've tapped professionals to touch on the intricacies of formulating with mint in various applications and what the future looks like for both markets. Readers can also find the latest "Flavor Bites" column penned by John Wright, Cyndie Lipka's organoleptic materials column now named "Flavor Materials Report" and the latest installment of "Perfumer Notes" in the pages ahead.

Speaking of the future, registration has officially opened for *Flavorcon* 2023, scheduled for November 8-9 in Cincinnati, Ohio. Be sure to visit *www.flavorcon.com* to register for the best rates and secure your spot at the two-day conference and expo hall. Want a taste of what's to come? Flip to **page 34** to discover new offerings as well as some sneak peeks at this year's speaker lineup.

[a]*https://www.databridgemarketresearch.com/reports/global-mint-and-menthol-market*



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Featured Insiders:

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The leading growth category for oral care is the whitening and sensitivity space.

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INDUSTRY INSIGHTS:
MINT & ORAL CARE

Discover the trends and consumer demands driving innovation in mint and oral care markets.

A.J. TODD, vice president, Commercial Development, ADM

***Perfumer & Flavorist* [*P&F*+]: Are there any products you're seeing major growth in mint and menthol? What is driving the growth?**

A.J. Todd [AT]: Invigorating and refreshing, mint can shine on its own or act as a supporting character when combined with other flavor profiles. That versatility allows mint to be incorporated into plenty of innovative food, beverage and dietary supplement developments. Additionally, consumers are looking for exciting flavor experiences shaped by their desire for discovery, while also supporting their holistic wellness goals. With a plethora of mint varieties to choose from, food scientists, manufacturers and chefs can satisfy evolving consumer demands and elevate offerings to new flavorful heights.



A.J. Todd

Notably, there continues to be growth opportunities for mint in active nutrition offerings. The refreshing flavor profile or cooling sensation from mint adds a sensory twist to everything from protein-packed snacks to energy drinks and recovery shakes. Consumers are also leaning into unique and fantastical flavors, such as "starlight" flavored cola, which uses mint to give an ethereal quality of space and dimension, but an ultimately relatable feeling of refreshment.

Personalized dietary supplements are also converging with the food and beverage space, bringing convenient products like gummy vitamins to wellness-focused consumers. Incorporating mint into these offerings can add important sensory appeal, capturing wider consumer attention.

***P&F*+: What are some of the current trends shaping the use of mint and menthol applications?**

AT: Today's consumers are wanting more from their product purchases. They're seeking foods and beverages that live up to their high sensory expectations and also align with their values, including considerations for what is best for the planet. As such, quality flavor coupled with transparent and responsible sourcing is crucial to meeting consumers' demands.

With a legacy in mint production and farming partnerships that span decades, ADM has developed a pioneering plant science program to create quality mint varieties, which also helps support companies working toward traceability targets, in addition to providing transparency to conscientious shoppers.

Specifically, our proprietary SustainMint[a] program delivers disease-resistant mint plants, enabling farmers to reduce their agricultural inputs of water, pesticides and herbicides. This is significant, as each is a factor that can help lessen the environmental impact of crop production, such as soil erosion and greenhouse gas emissions. Moreover, by working directly with farmers, we can offer brands quality and transparency from seed to fork, in addition to reducing our environmental footprint, and potentially that of our customers.

BONNIE TURNER, senior commercial director, Global Mint, Callisons

***P&F*+: Are there any products you're seeing major growth in mint and menthol? What is driving the growth?**

Bonnie Turner [BT]: The oral care, confectionery, and personal care markets from new product launches and



Bonnie Turner

[a]SustainMINT program is a trademark of ADM

organic sales growth still drive the mint and menthol industry above any other category. COVID-19 brought a lot of challenges to the confections market with sales revenue dropping significantly especially in the gum category during the pandemic. The oral care category remained unchallenged during that period.

The leading growth category for oral care is the whitening and sensitivity space. The leading consumer brands continue to innovate and bring new and exciting mint flavors with a signature twist to consumers. The whitening segment has been the major contributor in terms of revenue growth and is expected to continue leading the overall global category growth. Escalating cases of oral diseases across the globe and favorable application of functional toothpaste in preventing tooth decay and addressing sensitivity issues will drive the market growth in the upcoming years.

***P&F+*: What are some of the current trends shaping the use of mint and menthol applications?**

BT: The increased preference by consumers for sugar-free food and beverage is why the sugar-free confections market is experiencing high growth rates. Continuous product developments with new mint flavors used in sugar-free confections is a major factor propelling the mint and menthol industry forward.

Mint-based flavors continue to be the most in-demand flavors for oral care and confections. Menthol is a naturally derived compound found in peppermint and arvensis oils. The familiar presence of menthol and the way it causes the cool and refreshing sensation resulting in a state of perceived cleanliness go hand-in hand when it comes to the beneficial use in oral care and confectionary products. As mint-based flavors continue to increase in popularity it will drive additional menthol requirements as it is an intricate component of a mint flavor. Mint and menthol complement each other perfectly.





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www.mane.com/news/ingredients

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Laevo Citronellyl Acetate

Takasago International Corp

www.takasago.com/en/node/665

As part of the Takasago ingredients collection, laevo citronellyl acetate (FEMA# 2311, CAS#67601-05-2) is a perfect example of the "less is more" concept. You get state of the art floral (rosy, fresh) and fruity (earthy apple, pear and bergamot) notes. Being ISO16128 and readily biodegradable, laevo citronellyl acetate is the perfect sustainable solution.



ChromaTOF Tile

LECO Corporation

www.leco.com

LECO's data analysis software for GCxGC data, ChromaTOF Tile, provides an industry-first data comparison tool that identifies statistically significant differences between classes of samples, reducing days-to-weeks of work down to hours, or even minutes. Based on a tile-based Fisher ratio analysis by Robert Synovec, Ph.D., ChromaTOF Tile partitions the data into a set of regions (tiles) and compares regionalized data. This allows it to disregard normal variances of alignment shifts to focus on where the actual differences are, so users can stop looking at their data and start actually using it.

ChromaTOF Tile is compatible with all of LECO's GCxGC TOF-MS instruments, including the Pegasus BT 4D, the Pegasus GC-HRT+ 4D, and the original Pegasus 4D. A free 90-day trial of the software is available for all current Leco GCxGC customers on our website.



Damascenone, natural

Penta International Corporation

www.pentamfg.com

Now offering damascenone natural neat (FEMA# 3420, CAS# 23696-85-7). Containing a flavor base as woody, floral and herbal. Odor notes as sweet, fruity and raspberry. Our material is food grade, kosher, halal and is EU and U.S. natural. Dilutions are also available in a variety of diluents.



Dihydrorosan

BASF SE

virtual-aroma-assistants.basf.com/s/deeplinks?prd=30035075&view=product

Dihydrorosan (CAS# 13477-62-8) is an impactful green and rosy top note with a citrus twist for an intensive effect in your application. It blends well with white floral and rose notes to give green leaf aspects. It provides a rounding-up effect to each application and brings green, floral freshness.



Heliotropine, natural

Aurochemicals

www.aurochemicals.com

Heliotropine natural (FEMA# 291, CAS# 120-57-0), presents scents of very sweet floral, warm, slightly spicy and cherry-like, which makes it the perfect choice to be used in a wide range of flavors and fragrances. It can be most commonly found in French-style vanilla flavors but offers endless possibilities to enhance your product.



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OQEMA's organic oils have been awarded the Soil Association's Food and Drink License, now offering the added guarantee of quality and integrity by the association. The award adds reassurance and trust that OQEMA's organic oils are committed to working with nature to benefit the planet through sustainable farming.



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www.symrise.com/de/scent-care/aroma-molecules/ingredient-finder/#Citronitrile

Citronitrile by Symrise reminds of citrus, rosy, waxy, cinnamon and coriander elements and offers more than citrus. It prolongs the value of citrus top notes to a new extent, blends well with floral rosy and balsamic ambery notes. It offers excellent stability and substantivity and it is inherently biodegradable.



2-Acetyl Pyrazine, natural

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www.pentamfg.com

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www.natadv.com

Fenchol (FEMA# 2480, CAS# 1632-73-1) occurs naturally in beer, lime oil, grape, brandy, hops, nutmeg, pine oil, and rosemary. Natural Fenchol can be described as having a camphoraceous dry odor that is both powerful and diffusive with woody and cooling nuances reminiscent of cedar, pine and eucalyptus. It provides flavors that are slightly bitter, spicy, citrus and earthy. This product is great in application for spice nuances for black pepper, parsley, basil, thyme, oregano and rosemary. It can also contribute to citrus lemon/lime flavors, as well as enhance mint notes. Used at 0.01ppm-1 ppm in finished goods.

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RIFM Announces Retirement of President James C. Romine, Ph.D.



Overseeing several milestones during his tenure, James Romine, Ph.D., included the peer-reviewed publication of more than two dozen groundbreaking research papers.

On February 21, 2023, the Research Institute for Fragrance Materials (RIFM) Board of Directors chair, Robert Weinstein, Ph.D., announced the retirement of James C. Romine, Ph.D., who joined RIFM in 2015 as president of the organization.

Romine final day of their presidency is March 31, 2023. Anne Marie Api, Ph.D., RIFM's vice president (since 2006), will serve as RIFM's president beginning April 1, 2023.



James C. Romine, Ph.D., joined RIFM in 2015 as president of the organization.

"Dr. Romine led RIFM through the most impactful decade of its half-century of ensuring the safe use of fragranced products," Weinstein said. "His strategy-focused leadership, decades of experience stewarding chemicals for commercial use, and genuine care for and mentorship of the people he led and worked with propelled the organization into a new era."

"When I joined RIFM in 2015, the organization was entering a period of profound transformation," Romine explained. "The groundwork for the most significant undertaking in RIFM's history—the criteria for the RIFM safety evaluation process for fragrance ingredients—had just been published. As a result, RIFM scientists began building on their previous safety work to create truly comprehensive, science-based evaluations of fragrance ingredients."

Romine's business processes savvy and his natural leadership drove the evaluation of the entire palette of discrete chemical safety assessments over the next several years. Safety assessments covering more than 85% of the industry volume of use are now peer-reviewed and published.

Overseeing several milestones during his tenure, Romine included the peer-reviewed publication of more than two dozen groundbreaking research papers highlighting animal-alternative methods, a comprehensive organizational strategy, and a complete rebrand, including the Institute's first-ever communications plan.

"Here was this outstanding organization, racking up significant achievements, of which few fragrance professionals, let alone the general public, had any awareness," Romine said. "Awareness of RIFM's critical work is growing daily, and I couldn't be prouder of this legacy."

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IFEAT Acquires ICATS

The International Federation of Essential Oils & Aroma Trades (IFEAT) has completed the acquisition of the International Centre for Aroma Trades Studies (ICATS).

ICATS was formed by industry expert, Tony Curtis, Ph.D., formerly of Bush Boake Allen, and David Williams, consultant and author on essential oils. Curtis and Williams are joint authors of the definitive textbook, An Introduction to Perfumery.

Henry Gill, vice chair of the IFEAT Education Committee, said, "This exciting development will enable IFEAT to expand its educational offerings to members. Through engagement with the membership, the existing IFEAT Diploma will be enhanced by broadening both the scope and flexibility, thereby better addressing the many challenges our industry faces globally."



Henry Gill, vice chair of the IFEAT Education Committee, said, "This exciting development will enable IFEAT to expand its educational offerings to members."

IFEAT Diploma Details

The IFEAT Diploma was developed for the aroma trades industry to provide flexible, in-depth specialist education aimed at those working in the aroma trades and associated industries. ICATS has been providing education for the aroma trades industry for over twenty-five years, including a former BA Business of Perfumery course at the University of Plymouth in the UK.

The IFEAT Diploma was originally developed in 1980 when Murray-Pearce worked closely with David Williams and Terry Pickthall of CPL Aromas to launch the IFEAT-supported Perfumery Education Centre (PEC) during the second IFEAT World Council meeting at the Cannes Congress.

ICATS later developed the IFEAT Diploma and relaunched it as a postgraduate program in 2009, followed by a flavor pathway with the late Mike Boudjouk closely involved as IFEAT's Education Committee Chair, supported by The British Society of Perfumers.

More details about the IFEAT/ICATS education programs are to come.



Robertet Acquires Aroma Esencial



Julien Maubert, director of Raw Materials division, Robertet, says, "This acquisition is fully in line with our desire to consolidate our position as world leader in natural aromatic ingredients[..]."

The Robertet Group has announced the acquisition of Aroma Esencial, a company based in Girona, Spain, specializing in the processing of natural products such as vetiver, patchouli, cedar, ylang-ylang and other strategic products for the aroma industry.

Per Robertet, Aroma Esencial has extensive experience, a high-end industrial tool for fractionation and molecular distillation and a range of strategic products for the fine fragrance industry.

Julien Maubert, director of Raw Materials division, Robertet, says, "This acquisition is fully in line with our desire to consolidate our position as world leader in natural aromatic ingredients and to strengthen our competitive advantage through a unique offering for our customers."





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Iberchem Launches Vita Digital Fragrance Creation Tool



Vita is a digital assistance tool designed to provide precise naturality data to accelerate the development of natural fragrances according to ISO16128 standards.

The global natural flavors and fragrances market[a] was valued at $9.15 billion in 2021 and is anticipated to expand at a compound annual growth rate of 6.3% from 2022 to 2030, according to Grand View Research. Responding to this growth and consumer demand, Iberchem launched Vita, a digital assistance tool designed to provide precise naturality data to accelerate the development of natural fragrances according to ISO16128 standards.

"The creation of Vita would not have been possible without our diligent regulatory experts and extensive collaboration with our IT team," says Paola Armengol, global regulatory manager at Iberchem. "Vita will elevate Iberchem in the natural fragrance industry as this new digital development allows natural scent creation with greater speed, precision, and accuracy. It is exciting to see the digital assistance tool being implemented into business operations at Iberchem and I look forward to seeing natural fragrance solutions made achievable by Vita."



"The creation of Vita would not have been possible without our diligent regulatory experts and extensive collaboration with our IT team," says Paola Armengol, global regulatory manager at Iberchem.

The accurate naturality data provided by the tool delivers increased transparency for natural ingredient sourcing. Per Iberchem, this transparency furthers the company's vision to expand its natural ingredient portfolio as perfumers can utilize Vita to refine their creative palette accordingly, to a more nature-conscious ingredient selection with speed and ease, delivering natural fragrances faster.

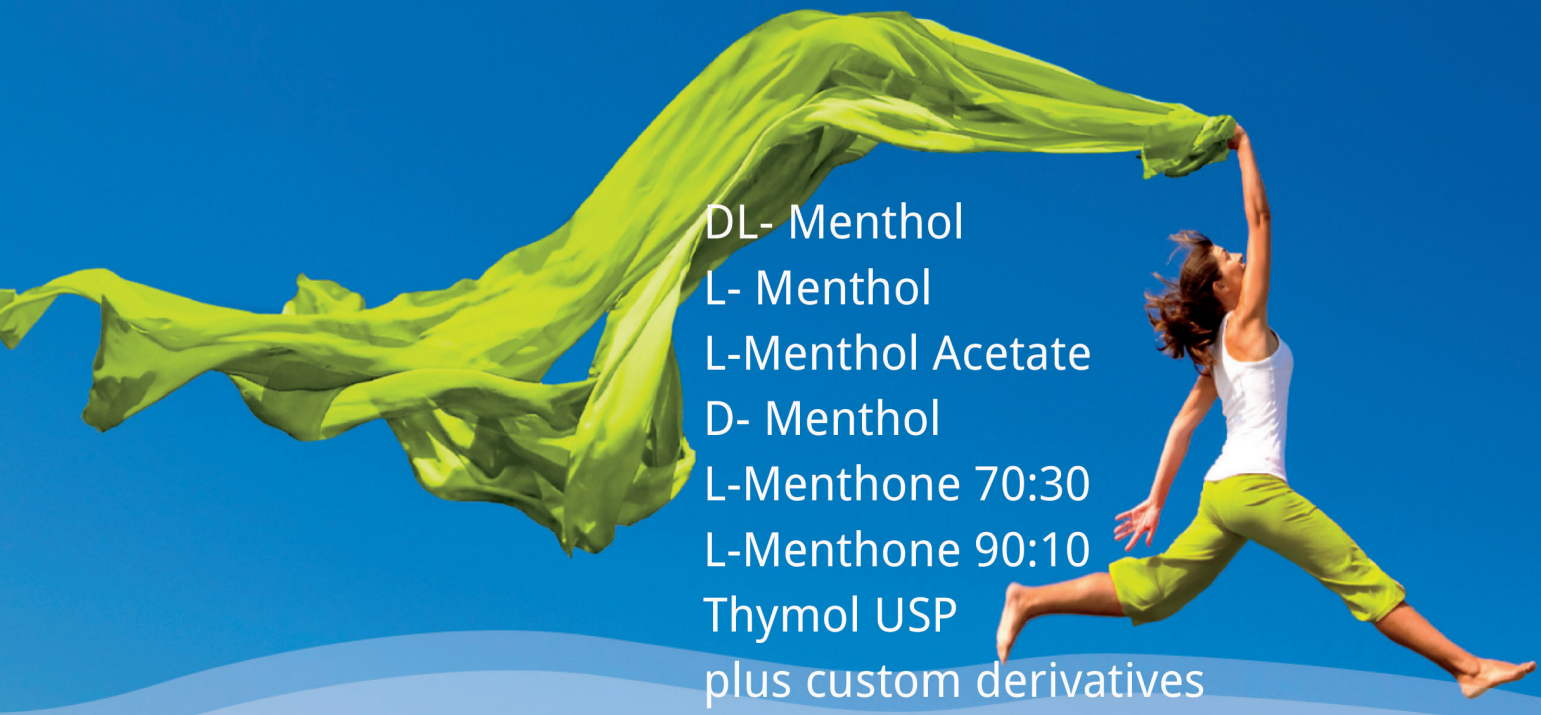
"Thanks to Vita perfumers can create our formulas faster than ever before," says Ana Ripoll, perfumer at Iberchem. "I can independently check the percentage naturality of the final formula, and modify the formula accordingly, without needing to consult our regulatory department. This means I can work quicker, in a more convenient way, whilst learning about all the properties of our raw materials and formulations which can be helpful for future projects."

[a]*https://www.grandviewresearch.com/industry-analysis/flavors-fragrances-market*

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The chief perfumer shares her fragrance journey and passion for formulation.

Sarah Horowitz-Thran, owner and chief perfumer, Sarah Horowitz Parfums

***Perfumer & Flavorist+* [*P&F+*]: What led you to the fragrance industry?**

Sarah Horowitz-Thran [SHT]: I started creating custom fragrances in a little shop in Boston, Massachusetts, owned by an independent perfumer when I was 18. I fell in love with the customization aspect, our fragrances should reflect the idea that each of us is unique and enables us to tell our personal story without words. I fell in love with the materials I was working with, the history, the lore, the sacredness of perfume as well as how perfume has the ability to connect us, to the moment, to our memories and even our highest aspirations. I loved it all and still do.

***P&F+*: What applications do you primarily formulate for? Do you have a favorite?**

SHT: EDP, fragrance oils and candles. My favorite type of formulating at the moment is creating for eau de parfum, it combines the longevity of a higher oil content with the silage the alcohol brings.

***P&F+*: Describe yourself in three ingredients.**

SHT: Jasmine, vanilla and patchouli—always and forever.

I have always worshiped my Aunt Melanie; the consummate hippie, I think I inherited that inner hippie from her. When I first discovered patchouli in the 80s, it was immediately associated with love and open mindedness. I knew then as I do now how it can be polarizing but for me, it is the grounding, earthy note from which so much can grow. It can add depth and balance sweetness—I just love it.

Which brings me to vanilla, an ingredient that can be warm and rich, sweet or sexy. I loved the juxtaposition of the earthy, sharp notes of patchouli with the sweetness of vanilla. To me, the most interesting fragrances, much like people, are stories told in juxtaposition. (*You can read more about Horowitz-Thran's passion for vanilla in her "Perfumer Notes" column on* ***page 26****.*)



Name: Sarah Horowitz-Thran

Title: Owner and chief perfumer

Location: Westlake Village, California

And then there is jasmine. I prefer Jasmine Grandiflorum absolute. To me, jasmine, with it's night blooming intoxication, it's sensuality, it's sacredness. Jasmine as a middle note resonates with me; from the first moment I experienced it to this day.

***P&F+*: How has the job of perfumer changed during your career?**

SHT: As an independent perfumer, I was pretty much on my own when I started in the early 90s. There were a small handful of us scattered around the United States, and I didn't know anyone else in Los Angeles that was doing what I was doing when I first started. Now there are so many of us and I am honored to sit on the board of The Institute of Art

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and Olfaction in Los Angeles, California, a nonprofit focused on the art and education of perfumery as a practice. There are many like-minded artists to connect with now. It's amazing!

***P&F+*: Are the types of projects you're working on changing over time? How are the creative demands of the job evolving?**

SHT: Yes! In regard to the perfumery aspect, the ever-changing regulatory landscape creates new challenges every year for existing formulas and the creation of new ones. But the highest evolution for me personally has been the scale of my own work and vision. When I started, I was committed to making one bottle completely custom, by hand, drop by drop at a time. This week, I suited up and blended hundreds of pounds of fragrance in our manufacturing facility and stirred it with a steel paddle! I opened a small run filling house almost a decade ago focusing on small and emerging brands, and at first, we were filling 500 bottles for a client. Now we are filling 50k for that client. I love being a part of the process, from fragrance development to manufacturing the final product and watching a customer's vision come to life. It's always a new challenge, and I find it so rewarding to see the palettes filled, wrapped and ready to go into the world.

***P&F+*: What is the best part of your job?**

SHT: I still conduct my fragrance journeys, the one-on-one experience. And the best part of my job is still seeing the light spark in a client's eyes when they try their fragrance on their skin for the very first time and know that it captured them.





For flavor profiles that are specifically designed to replicate toasted cheese the level of tetramethyl pyrazine needs to be increased to around 100 ppm.



BY JOHN WRIGHT
johnwrightflavorist@gmail.com

Flavor Bites: Tetramethyl Pyrazine

Tetramethyl pyrazine in meat, brown and nut flavors.

One of the most interesting questions facing flavorists is how to best balance taste and aroma effects. Judged strictly on aroma, tetramethyl pyrazine (FEMA# 3237, CAS# 1124-11-4) does not seem to be an obvious winner. The odor is mild, distinctly roasted, but with a faint minty back note.

Factor in taste and the judgment changes. Even at modest levels, tetramethyl pyrazine adds depth to the roasted profile. It is unlikely to ever stand alone as a roasted note, but it makes the characters of other pyrazines, especially 2,5-dimethyl pyrazine and trimethyl pyrazine, decidedly more realistic on taste.

Note that the dose rates given throughout this article are the levels suggested for use in flavors intended to be dosed at 0.05% in ready-to-drink beverages or in a simple bouillon.

Meat Flavors

Bacon: Even though dithiazine notes well and truly dominate bacon flavors, other roasted notes, especially pyrazines, are still important. Twenty ppm of tetramethyl pyrazine balances the picture.

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Chicken: Chicken flavors vary wildly in respect of roast notes. One hundred ppm of this raw material is a middle-of-the-road starting point.

Ham: Smoke notes significantly modify the perception of roasted notes in ham flavors. Thirty ppm of tetramethyl pyrazine helps to add depth and authenticity.

Lamb: Lamb flavors have, apart from the fatty notes, much in common with roast beef flavors. The ideal level of tetramethyl pyrazine is the same, around 200 ppm.

Pork: Thirty ppm of tetramethyl pyrazine is a modest starting point in pork flavors, rising to 100 ppm in more distinctly roasted profiles.

Roasted beef: Understandably, pyrazine roast notes are much more important in roast beef flavors and the ideal level of tetramethyl pyrazine reflects this. Two hundred ppm is a good starting point.



Two hundred ppm is a reasonable level for this ingredient in butterscotch and related flavors.

Brown Flavors

Bread: Different types of bread flavor call for different levels of roasted notes. Twenty ppm of tetramethyl pyrazine works in most types but higher levels are better in pizza base flavors.

Butterscotch: Two hundred ppm is a reasonable level for this ingredient in butterscotch and related flavors.

Chocolate and cocoa: Cocoa flavors can accommodate high levels of tetramethyl pyrazine, in conjunction with trimethyl and other pyrazines. Aside from cost restraints, 2,000 ppm works very well. Correspondingly lower levels, around 1,000 ppm, apply to chocolate flavors.

Coffee: This raw material is also important in coffee flavors, adding depth of taste and realism. Two hundred and fifty ppm is a good starting point.

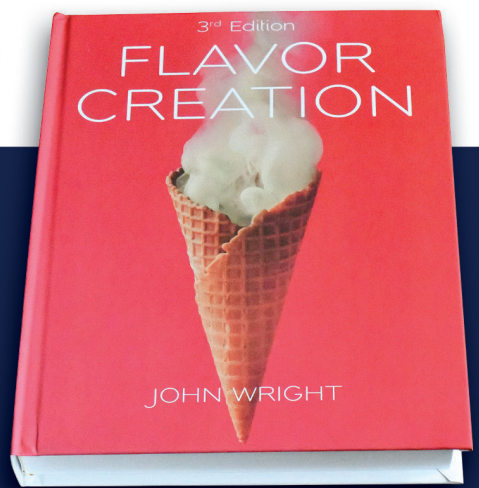
Malt and malted milk: Roasted notes are nowhere near as important in malt and malted milk flavors, but 20 ppm of tetramethyl pyrazine still makes a useful impact.

Molasses and brown sugar: The variation in levels of this ingredient in molasses and brown sugar flavors is not as wide as might be expected. Two hundred ppm works well in molasses flavors, but the level reduction in brown sugar flavors is quite modest, only down to 100 ppm.

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Soy sauce: Roasted notes are not key to soy sauce flavors, but they do play a part. Twenty ppm of tetramethyl pyrazine certainly adds depth.

Vanilla bean: It is very challenging to know when to stop adding ingredients to vanilla bean style flavors. Nature sets us an unusually complicated challenge! A tiny touch, as little as 5 ppm, of tetramethyl pyrazine makes a noticeable difference.

Nut Flavors

Almond and pistachio: All nut flavors benefit from roasted pyrazine notes with varying composition and levels. One hundred ppm of tetramethyl pyrazine helps to add depth to almond and pistachio flavors, counteracting the harshness of benzaldehyde.

Hazelnut and praline: Hazelnut and praline flavors are a far cry from almond flavors and have a similar pyrazine balance to cocoa flavors. More tetramethyl pyrazine is needed to keep the balance, between 300 ppm-400 ppm.

Peanut: A similar level works well in peanut flavors, although the pyrazine balance is quite different. Five hundred ppm is ideal.

Pecan: Pecan flavors are much more subtle and restrained. Two hundred ppm of tetramethyl pyrazine adds an attractive depth of taste.

Walnut: The same 200 ppm is also perfect in walnut flavors to offset the nutty dryness of the profile.

Other Flavors

Butter: Tetramethyl pyrazine may seem like a very strange suggestion for a fresh butter flavor, but there is a very faint hint of heated profile lurking behind even the freshest butter. One ppm is all that is required for a very subtle effect.

Cheddar cheese: Fresh cheddar cheese has been subjected to a more obvious heat process and 5 ppm of tetramethyl pyrazine is a better bet. For flavor profiles that are specifically designed to replicate toasted cheese this level needs to be increased substantially, to around 100 ppm. In all cases it is assumed that tetramethyl pyrazine will be used in conjunction with other pyrazines.

Dried mushroom: Dried mushroom flavors, especially those aimed at the magnificent profile of boletus mushrooms, have a dried note that drifts slightly in an ammoniacal direction. Tetramethyl pyrazine, in combination with other pyrazines is exceptionally helpful. Three hundred ppm is a conservative starting point.



Tetramethyl pyrazine may seem like a very strange suggestion for a fresh butter flavor, but there is a very faint hint of heated profile lurking behind even the freshest butter.

Fried potato: Potato flavors can be sharply divided into boiled and fried. Pyrazines only have an incidental impact in boiled potato flavors, but they are very important when the profile is fried. Two hundred ppm of tetramethyl pyrazine rounds out the pyrazine complex and helps distract attention from the necessary, but distinctly problematic, flavor of 2,4-decadienal.

Pandan: This raw material also form a key part of pyrazine complexes used as the centerpiece of realistic pandan flavors. One hundred ppm works very well.

Popcorn: The roasted notes in typical popcorn flavors are a world away from most other heated flavors. They may not even depend significantly on pyrazines. Nevertheless, tetramethyl pyrazine can still add attractive depth of taste at levels around 200 ppm.

Seafood, crab: All seafood flavors, irrespective of the method of cooking they intend to duplicate, need pyrazines. Crab flavors are well served by the addition of 50 ppm of tetramethyl pyrazine.

Seafood, shrimp: Shrimp flavors, steamed or fried, along with the related profiles of lobster and langoustine, gain taste and authenticity from 100 ppm of tetramethyl pyrazine.

Toasted coconut: Tetramethyl pyrazine might be in the realm of deliberately contrarian flavor creativity for plain coconut flavors but it is highly effective in toasted coconut flavors. Levels vary, but 50 ppm is reasonable.

Toasted corn: Similar comments apply to corn flavors. Again, 50 ppm has a very pleasant effect in toasted corn flavors.

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UNPARALLELED FIRMENICH SIGNATURE AND CAPTIVE INGREDIENTS SET THE STAGE FOR SHARING INNOVATION 2023

This collection of six natural and synthetic Firmenich signatures includes two newly released to the market captive ingredients and offers regulatory solutions for sustainable formulations.



This year's selection of natural ingredients highlights Firmenich's partnership with **NELIXIA**, a member of the **Naturals Together™** program who guarantees 100% traceable products. Discover the Upcycled **CARDAMOM GREEN POD GUATEMALA SFE**, processed with Firmenich's solvent-free Supercritical Fluid Extraction method, and the previously captive **AMBRETTE FIRABS**, a unique blend created from a co-distillation of precious ingredients.

In the synthetics category is a range of floral solutions, predominately Biodegradable and scoring high on Green Chemistry. **LILYFLORE®** and the recently captive **MIMOSAL** offer a competitive and modern edge as Lily-of-the-Valley substitutes, **DOREMOX®** compliments Rose blends as a Rose Oxide replacer and **CYCLOPIDENE** plays on the side of Tuberose and Ylang Ylang.

Sharing Innovation 2023 will be launched this May at SIMPPAR in Paris where Firmenich welcomes you to smell these unmatched wonders of the world.

Perfumer Notes: VANILLA ABSOLUTE, MADAGASCAR

A new appreciation for a fragrance industry staple.

BY SARAH HOROWITZ-THRAN, owner and chief perfumer, Sarah Horowitz Parfums



When I was a child, I use to think of vanilla as basic and plain but as a perfumer I have found that there is nothing basic about it. Photo by Raquel Startz

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When asked to choose one material to talk about, really, there was no hesitation for me. Although I have a profound love and appreciation for so many materials in my palette, my first true love remains a constant in my own fragrances. As common as it may seem, vanilla continues to enchant, seduce and surprise me.

My first encounter with vanilla in any form is much the same as many others, I imagine—my mother's baking. When she would bake cookies or cakes and the vanilla extract came out, I could feel my mouth water but it is far more than that, it was the feeling that it evoked. Warmth, safety, love—all of that wrapped up in one of my first fragrant memories.

When I began my baby steps into the world of perfumery, vanilla fragrance oil was the first material I encountered (along with patchouli which is another love I could spend pages on). I am not a classically trained perfumer, I came to perfumery on a very unorthodox path. My passion was first sparked at a little blending bar in Boston, blending fragrance and essential oils when I was 18 years old. I fell in love then with the fragrance of vanilla and it became my signature. Very typical perhaps, but it was the gateway for me into a larger world, one that I had no idea would change my life from that point on.

When I first encountered the true vanilla absolute from Madagascar, that was it. The depth, the warmth, and the complexity of the natural opened before me, and led me into a whole new appreciation and application of vanilla.



I think what truly makes vanilla unique is its versatility, its broad appeal and the fact that almost everyone has some scent memory association with it from an early age. Photo by Raquel Startz

First Impression

Childhood. Warmth. Safe, yet sexy. Delicious. When I was a child, I use to think of vanilla as basic and plain but as a perfumer I have found that there is nothing basic about it. It is so versatile, and can act as the star of the show, or enhance other materials to allow them to shine, giving them a warmth and depth they would not otherwise have on their own.

Sourcing

Vanilla beans grow from a tropical flowering plant in the orchid family. Vanilla absolute is as costly as it is labor intensive. It takes between four to five years after planting to set its first blooms, and it takes 600 hand-pollinated blossoms to produce 1 kilo of cured vanilla pods.

Vanilla flowers are pollinated between November and January and continue to grow until the June or July harvest when the still-green pods are hand-picked and sorted by maturity. The pods are then blanched in hot water, alternately laid out in the sun by day and then sweated by night, which produces an enzymatic process where the vanillin molecule develops—a process that can take up to six months. Shortening this process produces an inferior product[a], and of course, synthetic vanillin

[a] *www.edenbotanicals.com/vanilla-absolute.html*

is much less expensive but there is no comparison to the natural, complex aroma profile of the vanilla absolute from Madagascar.

Synthetic vanilla oils are very inexpensive and what I think most consumers are accustomed to. The complexity of the absolute is worth the cost and the wait.

How I Use Vanilla

In everything. I tend to have a signature in my fragrances; I love weaving a hint of vanilla with musk and patchouli. The earthiness of patchouli with the warmth and sweetness of the rich vanilla. There is nothing sexier to me as base note accord, and weaving this into a composition that includes a lush floral, like jasmine or rose gives it an earthiness and a depth that I love on the skin. I used vanilla as a star ingredient along with patchouli in Gothic 1 and Gothic 2, both niche fragrances designed for Loree Rodkin, the jewelry designer. Her work is detailed, and intense and exquisite and the fragrances captured her essence completely. The other fragrance I feel extremely proud of is because it truly captured the soul of the brand Pirette. The brand is from California and is dedicated the surf community, and wanted to capture the scent of sex wax (used on surfboards), sunscreen, salty waves and the surfer lifestyle. We used vanilla in the base note accord to capture the warmth of the sun and the wax for the boards and it truly embodies their vision convectively. I love it.



I tend to have a signature in my fragrances; I love weaving a hint of vanilla with musk and patchouli. Photo by Raquel Startz

Versatility and Formulation

There is nothing more versatile than vanilla. This can be used to subtly scent a bath or body product marketed for children,or to anchor a complex base note accord for a sexy, sophisticated gender-neutral fragrance. We have seen it shine as a solo note, thinking of the 90s gourmand moment where Vanilla Fields by Coty was a staple, or even before, when Comptoir Sud Pacific, which launched in the 70s, saw a resurgence in its vanilla-focused collection in the 90s as well. It can also be found in the juggernaut Angel by Theirry Mugler, classics like Shalimar by Guerlain and Youth Dew by Estee Lauder, Tobacco Vanille by Tom Ford, as well as countless other fragrances today. Its appeal is not limited to age, gender or sophistication level but in how you utilize it.

Vanilla's Uniqueness

To me, the closest material to vanilla is tonka bean, although I feel tonka is a bit more powdery, with a more coconut vibe.

I think what truly makes vanilla unique is its versatility, its broad appeal and the fact that almost everyone has some scent memory associated with it from an early age. It can surprise you, and it can be exactly what you expect, depending on the application. The fact that one material can evoke both the safety and warmth of a mother's love, to seduction in another setting, is something that sets this material apart. As in life, it is not the thing itself but what you do with it that defines it.

p&f+

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~ black pepper

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FEMA 3201
~ Onion, garlic, tomato, alliaceous

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FEMA 2675
~ Sweet, spicy, clove-like

Dimethyl Trisulfide, Natural
FEMA 3275
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Mint, other herbs and botanicals are breathing new life into culinary dishes, confections, dairy products, baked goods and beverages.

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MINT & SPICES

FLEX VERSATILITY IN CULINARY COMBINATIONS

Push the envelope on traditional flavor combinations and culinary applications with mint and spices.

BY TIM CHAMBERS, vice president, Global Essentials–Technical, ADM



Tim Chambers

Invigorating mint has a taste profile beloved from backyard gardens to commercial kitchens. Mint, other herbs and botanicals are breathing new life into culinary dishes, confections, dairy products, baked goods and beverages.

Capturing authentic flavors within these various applications can be a challenge, so it's essential to start with flavor solutions that are consistent, sustainably sourced and of the highest quality.

HERITAGE AT THE HARVEST

Mint farming is a legacy business in the United States, dating back more than 150 years. Growers use traditional practices to distill mint oils that deliver a variety of sensorial and taste experiences. Further refinement is an art and a science, where advanced distillation methods amplify the overall character. Flavorists then further enhance it by hand-crafting blends of mint oils to create that unique flavor experience. Additional customization can be traced to the source, as diversity within the regions and growing conditions can impact the characteristics of the mint oil. For example, peppermint cultivated in the Pacific Northwest has a different quality than that of peppermint grown in India. To ensure the highest quality of mint oils, formulation experts standardize the sensory and analytical profiles from season to season to mitigate any natural variability that Mother Nature may have caused.

Responsible sourcing is also crucial for producing quality products that have wide consumer



Cool mint with warm and earthy cumin are a delightful coupling in savory meals, such as Moroccan-style lamb stew and roasted vegetables.



Mint brightens berry-based drinks, from blueberry lemonade to a blackberry mojito.

Click above to play

appeal. As consumers become more eco-conscious, products with transparent- and/or sustainable-sourcing credentialed ingredients have become increasingly important. Mint is a refreshingly natural flavor with clean label appeal, particularly when advancements in new varietal developments are providing farmers with sustainable solutions that require less water, fertilizer and energy than traditional mint plants. Traceability in the mint supply chain is essential for consumers in today's market. It offers full transparency back to the original farm and helps demonstrate environmental stewardship. When suppliers deliver on these demands, they give brands a winning edge with today's conscientious consumers.

AUTHENTIC FLAVOR SOLUTIONS

Translating nature into flavor starts with understanding the chemistry within the plant and best practices for isolating those key attributes. Mint has the versatility to create many complex and enjoyable flavor experiences. With hundreds of aromatic molecules within mint oils, flavorists can utilize mint fractions to balance the green notes and sweeten the overall body.

Mint can be a very polarizing flavoring ingredient on its own, but it also plays an important role in flavor systems, where a small amount adds refreshment or simply complements the other flavor attributes. For instance, an energy drink formulation may have a splash of spearmint to enhance the product's citrus profile. Similarly, a chef may add a touch of arvensis oil to a culinary dish to balance the herbal and spicy characteristics.

UNEXPECTED MINT PAIRINGS

Many consumers are seeking food and drink that can take them on a flavor journey and boost their mood. This interest in adventurous taste profiles enables brands to push the envelope on traditional flavor combinations and culinary applications, providing consumers with a sense of exploration in everyday eating occasions. For instance—

Culinary Creations: Cool mint with warm and earthy cumin is a delightful coupling in savory meals, such as Moroccan-style lamb stew and roasted vegetables. Mint can also temper heat-inducing chili in spicy Thai noodles or salsa. Citrusy and slightly sweet coriander is offset with refreshing mint in roasted chicken or rice pilaf. Additionally, licorice-like fennel, tart apple and herbal mint combine well for salads and slaws.

Dairy & Dairy Alternatives: Cardamom has a sweet, floral flavor that pairs well with the fresh taste of mint in Middle Eastern-style yogurt dips or a sweet, creamy lassi. Warm and spicy ginger and cooling mint are also enjoyable in smoothie form, particularly when coupled with juicy tropical fruits. Cozy vanilla with mint is a subtly delicious frozen treat.

Bakery & Confectionery: Sweet, grassy pandan brings a taste of Southeast Asian cuisine to the quintessential flavor combination of mint and chocolate, whether in panna cotta or sticky rice cakes. Matcha, mint and coconut are another delightful trio for cheesecake or layered sponge cake. To put a fresh twist on strawberry shortcake, top it with a dollop of mint whipped cream. Plus, a "double dose" of sweet peppermint or the cooling warmth of cinnamon and mint are two classic breath-freshening options for chewing gum.



Matcha, mint and coconut are another delightful trio for cheesecake or layered sponge cake.

Alcohol & Beverages: Mint brightens berry-based drinks, from blueberry lemonade to a blackberry mojito. It also makes for an interesting pairing with tarragon in vodka-based drinks. When paired with cool cucumber, it's a refreshing infusion for water or gin-based cocktails. For a soothing sip, try lavender and mint in a fermented kombucha or steeped green tea.

MINT CONDITION

Ever-changing consumer palates provide endless inspiration for industry insiders. Mint flavors in new forms and functions can transform how consumers experience it—and their favorite foods. Furthermore, working with a vertically integrated supplier can be the root of creative innovation, whether that's science-based sensory enhancements or other collaborations to elevate brand offerings. From ethnic dishes to frozen treats, there are always new places to add uplifting mint flavor and freshness.

p&f+



FIRST LOOKS AT *FLAVORCON 2023* SPEAKERS & SESSION TOPICS

Take a look at the growing agenda for the two-day event specially curated for flavor experts.

BY JENNA RIMENSNYDER, managing editor, *Perfumer & Flavorist+*



Scheduled for November 8-9, this year's theme is Flavor's Fruitful Future, digging into the taste tech of tomorrow, transmission of knowledge from seasoned flavorists to newcomers and the latest ingredient launches to hit the developer's palette.

Ready to make your way back to Cincinnati, OH, for *Flavorcon* 2023 this November? Scheduled for November 8-9, this year's theme is **Flavor's Fruitful Future**, digging into the taste tech of tomorrow, the transmission of knowledge from seasoned flavorists to newcomers and the latest ingredient launches to hit the developer's palette.

Flavorcon (www.flavorcon.com) is hyper-focused on sensory and taste solutions for flavor chemists and flavored product innovators across all applications. This niche event is the only place where flavor chemists and product developers convene to learn, discuss, collaborate and network with their peers. Here's a look at a handful of delights on this year's menu.

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Flavorist Master Class

New to the *Flavorcon* agenda, a first-come-first-serve pre-*Flavorcon* session (November 7) designed to take attendees on a guided tour through a lineup of organoleptic materials with the help of Bell Flavor & Fragrances principal flavorist, Cyndie Lipka, and independent flavorist and "Flavor Bites" columnist, John Wright.

Attendees will have one 45-minute session with each flavorist over two separate groups of TBA materials. Seats are limited, be sure to register ASAP to secure your spot.



Cyndie Lipka



John Wright

Feeding the Future

ADM president of Creation, Design & Development and chief global flavorist Marie Wright is taking the stage to moderate a panel of seasoned and trainee flavorists to discuss best practices for mentoring aspiring flavor chemists.

Feeding the future of flavor development is top of mind at this year's event. These panelists will share experiences from their flavor journeys and how the industry can best relay the decades of wisdom and know-how to the up-and-coming flavorists of tomorrow as well as offer gems to flavorists looking to add to their skill set. Stay tuned for the details on each panelist set to join Marie Wright on stage.

Kroger senior innovation manager Natalie Taake will return to the *Flavorcon* stage for her session, "Confessions of a Former Sensory Scientist." Taake will paint a picture for the attendees on how to better work with their sensory partners and how the current approach for over-simplified sensory testing can be riskier than no testing at all.

Taake has spent her 20-year food and beverage career translating food science, culinary arts, consumer insights and trend prediction into actionable business strategies. A magnetic speaker and master taster, Taake's expertise has been featured on CNN, Food Network and America's Test Kitchen. You won't want to miss this line-up! More details on sessions to come as the event grows closer.



Natalie Taake



Marie Wright

How to Prepare

Visit *www.flavorcon.com* to receive the best rates for the event. The website also hosts details for hotel accommodations, the growing list of exhibitors set to fill the expo hall and the event schedule. Once registered, you'll receive updates on speakers, sessions and exciting event updates. Stay tuned!

p&f

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FAFAI International Convention & Expo **Exceeds Expectation**

See the recap of the 2023 installment that proved to be the largest to date.



"Since it was the Silver Jubilee event, all efforts were made to make the event larger than life," shared FAFAI president Risabh C. Kothari.

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The Fragrances and Flavours Association of India (FAFAI) held the Silver Jubilee Edition of the International Convention & Expo on February 23-25, 2023. Hosting 103 exhibitors within the Biswa Bangla Mela Prangan Convention Center in Kolkata, India, the three-day event welcomed nearly 2,400 attendees, including close to 1,900 delegates and 400 expo stall attendants and personnel.

The theme of the convention was "Asia: The Global Growth Engine," taking a look at how the F&F world has changed since the pandemic, particularly how the Asian industry will continue to grow. *Perfumer & Flavorist+* (*P&F+*) connected with FAFAI president Rishabh C. Kothari to get an inside look at the event's success.

> "With consumer spending and demand back on track after a lull of a couple of years, there is renewed enthusiasm within the F&F industry."

***P&F+*: What were some of the highlights of the event?**

Rishabh C. Kothari [RK]: This was the biggest and largest FAFAI Conference and Expo to date. Since it was the Silver Jubilee event, all efforts were made to make the event larger than life. From the event planning to the conference sessions, the hospitality, and even the evening entertainment featuring some of the biggest musicians and artists in the country, we were sure to attend to every detail to make this a successful event.



Rishabh C. Kothari

***P&F+*:** Were there any trends or themes you noticed from exhibitors? Are there any new ingredients making their way onto the market that were exhibited at FAFAI 2023?



The three-day event welcomed nearly 2,400 attendees, including close to 1,900 delegates and 400 expo stall attendants and personnel.



According to Kothari, a large number of booths showcased natural ingredients catering to the renewed interest in natural ingredients.

RK: This was one of the largest gatherings of the F&F industry in this part of the world after almost four years of the pandemic as well as the upheavals in Europe and the rest of the world. The excitement and enthusiasm for the event among attendees were palpable. All exhibitors had put a lot of effort into their booths, including the design as well as the presentations. There were a large number of booths showcasing natural ingredients catering to the renewed interest in natural, safe products and ingredients post-pandemic. The products offered also mirrored the general trend toward sustainable and nature-friendly products that can be seen in end-user or consumer product industries.

***P&F+*:** From your perspective, what does the future look like for F&F?

RK: With consumer spending and demand back on track after a lull of a couple of years, there is renewed enthusiasm within the F&F industry. There is a definite shift towards safe, eco-friendly, sustainable, as well as natural products and ingredients, but this is like any other trend that the industry has witnessed over the years and the industry continues to adapt to meet these evolving demands.

***P&F+*:** What can attendees expect from FAFAI 2024?

RK: The next FAFAI International Convention & Expo will take place at either the end of 2024 or the beginning of 2025 and will coincide with the 75-Year Platinum Jubilee celebrations of FAFAI. Given this would be a landmark event in the history of FAFAI, one can expect a much bigger event in all respects and aspects.

XXV

Thank You!

As the **25th edition** of the **FAFAI International Convention & Expo 2023** comes to an end, we promise to continue its fragrance over the coming years. Extending our heartfelt thank you to each and everyone for being a part of this expo and for making it a grand success.

Fragrant Wishes

Rishabh C. Kothari

President & Members of the Managing Committee













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The British Society of Flavourists Invests in Webinar Series

Honorary vice president Andrea Albertino checks in to discuss the impact of the series and the upcoming installments.



The British Society of Flavourists started organizing online webinars during the pandemic in order to offer scientific lectures to the flavor community.

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Perfumer & Flavorist+ *(*P&F+*) connected with the honorary vice president of the British Society of Flavourists (BSF), Andrea Albertino (AA), to discuss the line-up of impressive lectures that were hosted throughout 2022. The following introduction and answers were provided by Albertino.*

The BSF started organizing online webinars during the pandemic in order to offer scientific lectures to the flavor community when forced to be sitting at home, but it turned out to be a great success and continued throughout 2022. We had the honor to start at the end of 2020 with professor Gary Reineccius, Ph.D., followed for example by professor Vicente Ferreira, flavorist John Wright, professor Andrea Büttner and Martin Steinhaus, Ph.D., during 2021.

***P&F+*: Can you touch on some of the highlights from the 2022 lecture series?**

AA: We started in January 2022 and we had eight webinars in total with the purpose to touch different topics able to spark interest within our audience. The flavor industry is highly protective, for obvious reasons and it is not possible to pass the knowledge to flavorists working for different companies. Therefore, our intention has been, and still is, to involve speakers who are able to motivate and stimulate our members without sharing confidential information, to inspire new talents and generate new ideas. For the second year running, the BSF also organized an event in collaboration with the SFC (Society of Flavor Chemists) in the United States, following the great response we had a year before hosting professor Peter Schieberle and Joel Mainland, Ph.D.

We do believe that leveraging each other as societies with common goals is increasing our visibility inside the food industry as well as outside trying to make people aware of what flavors are and why taste and smell are fundamental senses in our daily life.

We started off with professor Giancarlo Cravotto, currently a full-time professor of Organic Chemistry at the University of Turin and vice director of the Department of Drug Science and Technology, who spoke about green extraction technologies. His main research interests are the development of green and sustainable synthetic and extraction procedures paving the road to non-conventional techniques such as



Flavor modulation is a hot topic across the flavor industry, from sugar reduction to plant-based food and beyond.

high-intensity ultrasound, hydrodynamic cavitation, microwaves, flow chemistry and ball milling.

Professor Andy Taylor was our guest in February who asked (and answered) if there is the possibility to predict sensory properties through flavor formulations. Taylor set up his own consulting company called Flavometrix and he is still part of the Food Science Group at the University of Nottingham in the UK. Luckily for us, it is unlikely humans will be fully replaced by machines in our field, but leveraging the progress of technology allows us to keep pace with such a fast-moving industry.

Taylor was followed in April by professor Chiara Cordero, who is also based at the University of Turin. She has been spending a lot of years working together with professor Carlo Bicchi who was our guest in 2021. Cordero, who was included by *The Analytical Scientist* in the "Women Power List" as one of the 50 most influencing women in the analytical sciences, is a full-time professor of Food Chemistry and her research is mainly focused on advanced food chemical characterization (fingerprinting with multidimensional technologies), solvent-free sample preparation for sensomic and discovery of food intake markers and metabolic fingerprint after diet-induced derangements.

Robert Cordina, Ph.D., was our guest in May, presenting a lecture with the title "The molecular basis of cuisines." Cordina is now an associate principal scientist at Mondelēz International and Committee Chair of the Food Group at the Royal Society of Chemistry, as well as a visiting lecturer in Food Chemistry. He has worked in both the pharmaceutical and food industries in several countries and he is currently the lead modeler for Computational Chemistry and Process Modeling for Mondelēz R&D globally. He presented an interesting point of view where cuisines can go beyond the well-known flavor pairing, showing that more than just finding common flavor molecules in different ingredients are needed to make a dish taste good.

After the summer break, we hosted Alex Woo, Ph.D., who presented a comprehensive lecture on flavor modulation, focused on clean-label sweetness. Woo currently works, after holding leadership positions in well-known multinationals, as an independent consultant specializing in taste and smell neuroscience and state of art clean label plant-based sweeteners and flavors. Flavor modulation is a hot topic across the flavor industry, from sugar reduction to plant-based food and beyond.

The last part of the year has been packed with three webinars in less than one month. First, we hosted Tian Yu, Ph.D., and Vanessa Rios de Souza, Ph.D., who presented novel approaches in Sensory Science using artificial intelligence (AI) tools. The former obtained a Ph.D. in neuroscience, the latter in Food Science and they both work for Aigora, an American technology company that helps sensory and consumer teams to implement AI.

In November, we held the second combined event SFC-BSF, hosting Jaroslava Panakova, Ph.D., and Prof. Barry Smith who have been able to entertain our attendees with topics that are not usually touched by flavorists. Panakova, who is an anthropologist based in Slovakia, discussed how odors, the mental representations of odorous stimuli, are considered socially constructed. Using her ethnographic material from the Yupik-Chukchi community in Chukotka, Russia, she explored how the smells associated with particular emotions encode the feeling of belonging, our social relationships and thinking about the world. Prof. Smith, who is the director of the Institute of Philosophy at the University of London's School of Advanced Study, highlighted the difference between the perception of flavors and flavors themselves. The relationship between them is far from simple and despite the psychologist and neuroscientist findings, there is room for the idea of flavor as a multi-dimensional experience affected not only by its chemistry but also by the experience around it.

We closed the year with a lecture held by Dan Saladino, a prominent BBC speaker, and writer who published in 2022 "Eating to Extinction," widely considered one of the best books of the year about food. In his lecture and in his book, Saladino stressed the serious problems we are having with our global food chain, facing the risk of losing a large amount of traditional and historical products across the globe and by no means increasing vulnerability in the face of climate change. He traveled the world reporting stories of the people who continue to cultivate and consume nearly forgotten foods and suggesting how to rescue our food system before it's too late.

***P&F+*: What were some of the major takeaways from the lectures? Any trends or innovations that emerged or were shared by speakers?**

AA: The world of flavors is very diverse and fast-pacing and it is nearly impossible to build up comprehensive knowledge covering every single aspect of it; therefore the only way to keep up with it and be competitive is to listen, learn and be inspired by eminent persons who are spending their lives exploring this fantastic subject from several different sides. Companies protect their internal knowledge as much as possible, therefore flavorists must find a way to expand their expertise beyond the day-to-day business and inspire young trainees: this is what our lecture series has been doing so far.

> "Companies protect their internal knowledge as much as possible, therefore flavorists must find a way to expand their expertise beyond the day-to-day business and inspire young trainees."

There are some major trends in our industry and speakers covered these topics with excellent lectures; I would mention AI, flavor modulation and sustainability above all.

***P&F+*: What are your plans for 2023? Will you continue with virtual lectures?**

AA: We have already started the year with a busy schedule and it is our goal to continue offering our listeners fascinating lectures and inspiring them to create new flavors, but always keeping an eye on industry trends, science and innovation. Online events, post-pandemic, are still a great opportunity to put together people working across the globe, at different time zone, without the necessity of jumping on a plane, but at the same time, it is our intention to mix things up, trying to offer, during 2023, hybrids event too. As always, the BSF welcomes new members to learn with us and connect with our diverse network.



Herbs will benefit from para-cymene such as thyme, rosemary, oregano, dill/pickle, pepper, sage, savory, bay leaf or a taco seasoning blend.



BY CYNDIE LIPKA
Principal flavorist,
Bell Flavors and Fragrances

Flavor Materials Report

Flavorist panel evaluates myrcene, para-cymene, fumaric acid and more.

Organoleptic Evaluation Panelists

- **Bill Aslanides**, Senior Flavorist, Synergy Flavors, Inc.
- **Deborah Barber**, Senior Flavorist, FONA
- **Nicole Hernandez**, R&D Manager and Senior Flavorist, FlavorChem
- **Christina Hook**, Flavorist, Bell Flavors and Fragrances
- **Judith Michalski**, Senior Flavorist, abelei flavors
- **Andrew Petrou**, Flavorist, Savory, Bell Flavors and Fragrances

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δ-3-Carene

Source: Vigon
FEMA# 3821, CAS# 13466-78-9
Naturally occurring in: Basil, bergamot, blood orange, cassia, cinnamon, citronella, curry, lavandin, lavender, lemon, lime, mace, mandarin, marjoram, nutmeg, orange, oregano, black pepper, petitgrain, rosemary, tagette and thyme.
Odor: @ 1%. Green, terpenic, herbal, peppery, woody, fresh, piney, dissipates pretty quickly.
Taste: @ 5 ppm. Light green citrus, bright, very slightly waxy, woody, tongue tingle, terpenic, piney and spicy.
Taste: @ 15 ppm. Citrus, lime, herbal, woody, waxy, pepper, metallic, piney, spicy.
*Possible application*s: This terpene works very well in citrus profiles, most especially in lime. Following that thought process, the panel sees also gin (or juniper) and margarita profiles as being appropriate. At the higher levels, the panel felt that this would work in black pepper, green bell pepper, jalapeño, rosemary, marjoram and thyme flavors.
➤**Vigon:** *www.vigon.com*



The panel picked up on the earthy undertones of 3-methyl-2,4-nonandione and mentioned mushroom, black truffle, sundried tomato and dried pepper such as Ancho for possible applications.

2-(3,7-Dimethyl-2,6-octadienyl) cyclopentanone

Source: Bedoukian
FEMA# 3829, CAS# 68133-79-9
Not found in nature.
Odor: @ 1%. Fruity, pulpy/pit (stone fruit), cherry, anisic, sweet, candied, slightly green, juicy, tropical, heavy and waxy.
Taste: @ 5 ppm. Woody, green, fatty, fruity, "canned" note, tropical, lactonic, waxy fatty fleshy.
Taste: @ 15 ppm. Very high at this level, green, fruity, fatty, lactonic, juicy, "canned" note.
*Possible application*s: Bedoukian has fondly named this material Apritone which the panel has agreed with basically. We all felt that this interesting material brings the stone fruit character to profiles and we would also add mango to that list. Other sweet applications we thought of included berries, rhubarb, pineapple, apple, papaya, guava and pear.
➤**Bedoukian:** *bedoukian.com*

Myrcene, natural

Source: MilliporeSigma
FEMA# 2762, CAS# 123-35-3
Naturally occurring in: Anise, star anise, apricot, basil, bay leaf, bergamot, blood orange, blueberry, caraway, cardamom, carrot, cassia, celery, cinnamon, coriander, cumin, curry, dill, eucalyptus, fennel, fig, gin, ginger, grapefruit, guava, juniper, lavendin, lavender, lemon, lemongrass, lime, lovage, mace, mandarin, marjoram, melissa, nutmeg, orange, oregano, papaya, parsley, black pepper, peppermint, petitgrain, rosemary, sage, savory (winter/summer), spearmint, tarragon, tea, thyme and yuzu.
Odor: @ 1%. Terpenic, basil sweetness, dark green, fresh, piney, tropical, mango, metallic, woody.
Taste: @ 2 ppm. Metallic, tropical, terpenic, piney-woody, green.
Taste: @ 4 ppm. Heavy greenness, citrus, slightly waxy, oily, terpenic, woody, piney, metallic, slight bitter, hops/beer, tropical.
*Possible application*s: Despite the mentions of metallic, myrcene isn't tainted by that descriptor. The panel felt that there was a good bit of tropical character to this and would benefit from adding to mango, passionfruit and other tropicals. This could easily be added to citrus such as orange and grapefruit, but also be at home in peach and rhubarb. Vegetable flavor such as celery, carrot, green pepper, bay and parsley. If we think in other directions, we see this easily fitting into gin, beer especially hoppy profiles and cannabis flavors.
➤**MilliporeSigma:** *www.sigmaaldrich.com*

3-Methyl-2,4-nonandione

Source: MilliporeSigma
FEMA# 4057, CAS# 113486-29-6
Naturally occurring in: Parsley, black tea and green tea.
Odor: @ 0.1%. Creamy, dry like straw, dried leaves, dried fruit, slight buttery, floral, cooked or burnt sugar.
Taste: @ 0.1 ppm. Tea, brown, leaves, cooked caramel, fishy, dry, herbal and woody.
Taste: @ 0.3 ppm. Mushroom, dirt, brown, truffle, floral, herbal, buttery, creamy, slight licorice late.
*Possible application*s: Some panelists found this material to be more buttery, creamy and mentioned flavors such as butter, dairy, toast (especially French toast), bakery, caramel, raisin and honey profiles. There was also anise and licorice mentioned. Others picked up on the earthy undertones and mentioned mushroom, black truffle, sundried tomato and dried pepper such as Ancho. Let's not forget that this is found in black and green teas and might be a good addition to oolong and matcha as well.
➤**MilliporeSigma:** *www.sigmaaldrich.com*

Fumaric acid, natural

Source: MilliporeSigma
FEMA# 2488, CAS# 110-17-8
Naturally occurring in: Apple, cabbage, carrot, chickpea, chive, fennel, fig, fish, onion, papaya, pea, pomegranate, rhubarb, soybean, starfruit and tomato.
Odor: @ 1% PG. Ranged from none to mildly acidic or sweaty.
Taste: @ 20 ppm. Acidic, slightly brown with a late delivery, slight fresh cut apple.
Taste: @ 50 ppm. Apple tartness, very nice depth with more nuance or sweetness to it.
*Possible application*s: I'm not even sure I knew that this was FEMA GRAS. I know its used in applications for an acid linger to assist in delivering profiles. So this is the real beauty of reviewing old raw materials off of the GRAS 3 list. Distinctly apple with a green mouth linger, I think that this will be an essential new add for forthcoming apple profiles. It would also add believability to pear, plum, grape, kiwi, pomegranate, pineapple tamarind and Jamaica profiles.
➤**MilliporeSigma:** *www.sigmaaldrich.com*

Bergamot Oil

Source: MilliporeSigma, (Simone Gatto)
FEMA# 2153, CAS# 8007-75-8
Odor: @ 1%. Piney, fresh, yellow, green, floral, peppery, woody, powdery, tea-like.



Use level of 3-(methylthio)propyl mercaptoacetate will dictate profile as it so often does but most felt that savory uses would include beef and pork, bacon, toasted sesame, soy sauce or stir fry profiles,

Taste: @ 0.5 ppm. Slightly low, woody, citrus, fresh, floral.
Taste: @ 1 ppm. Waxy, citrus peel, slightly floral, woody, piney.
*Possible application*s: Naturally all of the citrus profiles come to mind with only a touch being needed to brighten mandarin and grapefruits. Other fruits would include mango, peach, apricot, blackberry, blueberry and possibly strawberry. If we focus on beverage flavor profiles we should get Earl Grey tea out of the way, but the panel would also like to include gin in your creative musings.
➤**MilliporeSigma:** *www.sigmaaldrich.com*

Jasmin Sambac, CO_2

Source: Excellentia
FEMA# 2600, CAS# 1034798-23-6
Odor: @ 0.1%. Floral, sweet, fruity, animalic, powdery, fresh, waxy.
Taste: @ 0.1 ppm. Slightly low, sweet, floral

Taste: @ 0.5 ppm. Waxy, creamy, floral, fruity and slightly barnyard.
Possible applications: For me, the creamy character was a bit of a surprise at low levels. One panel member mentioned cream and milk flavors and it might be worth a go in alternative non-dairy milk alternatives. However, we all thought that this would lend beauty and nuance to mango, peach apricot, strawberry, raspberry, cherry, blackberry, grape and banana flavors.
➤**Excellentia:** *excellentiainternational.com*

Para-Cymene, natural

Source: Vigon
FEMA# 2356, CAS# 99-87-6
Naturally occurring in: Star anise, apricot, basil, bay leaf, bergamot, blackberry, buchu, cardamom, carrot, cassia, celery, cinnamon, citronella, clary sage, coriander, cumin, curry, blackcurrant, davana, dill, eucalyptus, fennel, fig, ginger, grapefruit, guava, juniperberry, laurel, lavendin, lavender, lemon, lemongrass, lime, lovage, mace, mandarin, marjoram, melissa, nutmeg, onion, orange, oregano, papaya, parsley, black pepper, peppermint, pineapple, rosemary, sage, savory (winter/summer) spearmint, tagette, tangerine, tarragon, thyme, turmeric, yuzu.
Odor: @ 1%. Thyme, herbal, woody, terpenic, camphoraceous, oxidized lime, buchu.
Taste: @ 1 ppm. Herbal, citrus, woody, piney, thyme, cooling.
Taste: @ 2 ppm. More herbal, savory, piney, cooling.
Possible applications: The most frequently mentioned herb was by far and away, thyme. Other herbs will benefit from this as well such as rosemary, oregano, dill/pickle, pepper, sage, savory, bay leaf or a taco seasoning blend. Ginger, gin, blueberry and bell pepper were also mentioned by the panel.
➤**Vigon:** *www.vigon.com*

1-Octen-3-one, 1% in ethanol, natural

Source: Natural Advantage
FEMA# 3515, CAS# 4312-99-6
Naturally occurring in: Banana, beer, cheese, fish, ham, milk, mushroom, pea, peppermint, pork, potato, shrimp, soybean, spearmint, thyme, watermelon, yuzu.
Odor: @ 1%. Fresh, dill, green, waxy, cucumber, green grape, sweet, fruity, seedy, earthy, jammy, mushroom, tropical, metallic, marine and slightly mushroom.
Taste: @ 1 ppm. Earthy, mushroom, jammy, seedy, metallic.
Taste: @ 2 ppm. Jammy, cooked, earthy.
Possible applications: The association with 1-octen-3-ol is somewhat close but this ketone does have other distinct characteristics to it. Most of the panel saw fruity, jammy notes that made them think of berry fruit preserves and mentions of apricot, mango or peach to be used as a seedy or woody note. For me, this was much more in the earthy field capturing thoughts of fish and seafood, pea, dill and ripe cucumber. Meaty notes do come through making one panelist think of pork, chicken, fried potato and cheese notes!
➤**Natural Advantage:** *www.natadv.com*

3-(Methylthio)propyl mercaptoacetate

Source: Treatt (Endeavour)
FEMA# 4561, CAS# 852997-30-9
Not found in nature.
Odor: @ 0.1%. Savory, bacon fat, mustard, sesame, stir fry, earthy, soy sauce, nutty, vegetative, brown.
Odor: @ 1%. Tropical fruit, raw broccoli, radish.
Taste: @ 0.1 ppm. Low, but detected, slightly savory
Taste: @ 0.5 ppm. Savory, fatty, generic tropical, but still weak.
Possible applications: The name and use levels indicated by FEMA lead me to believe that this would be wowsers for impact. So, we smelled at 0.1% but we also felt that we could smell at 1% and so we did. Use level will dictate profile as it so often does but most felt that savory uses would include beef and pork, bacon, toasted sesame, soy sauce or stir fry profiles, Brussel sprouts, cabbage, broccoli, radish and mustard. At higher levels, we thought that this would play well in tropicals such as durian, papaya and passionfruit.
➤**Treatt:** *www.treatt.com*

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