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Send the details to:
Perfumer & Flavorist+ magazine
336 Gundersen Drive, Suite D
Carol Stream, IL 60188-2403 USA
fax: 1-630-653-2192 • e-mail: perfumer@allured.com

@perfumerflavorist | Perfumer & Flavorist | @perfumer_flavorist

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EDITORIAL

Content Director	Jeb Gleason-Allured | 1-630-344-6069/jallured@allured.com
Editor in Chief	Katie Anderson | 1-630-344-6077/kanderson@allured.com
Associate Managing Editor	Emily Little | 1-630-344-6058/elittle@allured.com

SOCIAL MEDIA

Social Media Manager	Emmanuel Henderson | 1-630-344-6020/ehenderson@allured.com

ADVERTISING SALES

Business Development Manager	Jolly Patel | 1-630-344-6061/jpatel@allured.com
Advertising Production Manager	Kasia Smialkowski | 1-630-344-6025/ksmialkowski@allured.com
Advertising Production & Business Intelligence Specialist	Ethan Grisham | 1-630-344-6068/egrisham@allured.com

AUDIENCE DEVELOPMENT

Audience Development Manager	Sam Attebery | 1-630-344-6027/sattebery@allured.com
Customer Service	1-847-559-7554/customerservice@perfumerflavorist.com

DESIGN

Assistant Design Manager	James Fergus
Senior Graphic Designer	Hon Bannapradist
Digital Production Specialist	Kyle Torain

CORPORATE

Partner & CEO	George Fox
Partner & President	Janet Ludwig
Director of Events	Christine Meehan
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Allured Business Media
1-630-653-2155 • fax 1-630-653-2192
336 Gundersen Drive, Suite D
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For both the US and internationally, telephone: 1-847-559-7554
(9 AM-5 PM Central, Mon-Fri) | Fax: 1-847-291-4816
E-mail: customerservice@perfumerflavorist.com
Address: *Perfumer & Flavorist+*, PO Box 3009, Northbrook, IL 60065-3009

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Due to Supply Chain Constraints…



Bloomberg reported in April of last year that Madagascar's key vanilla-growing region has been hit with intense cyclones, stripping the pods from their vines.

There's a common joke in my family whenever a gift doesn't arrive on time or there is an unexpected change in plans. We say, "Due to supply chain constraints, we're going to dinner on Tuesday instead of Wednesday," or "Due to supply chain issues, your birthday present will arrive sometime in the next two months." It's a catch-all that encompasses every possible situation.

The term "supply chain" has become a bit of a monolith in recent years, especially since the COVID-19 pandemic. But it truly is something that touches every industry and affects every single person who has ever purchased a consumer product. Your favorite chocolate bar might be increasing in price because the ingredients are harder to source.

We know that climate change is having a significant impact on several supply chains: take vanilla as an example. Bloomberg reported in April of last year that Madagascar's key vanilla-growing region has been hit with intense cyclones, stripping the pods from their vines. The cocoa supply has been hit with several challenges, from droughts to ethical labor concerns. The ingredients we love are becoming more scarce.

So how do companies pivot when they're faced with these constraints? Many companies are looking towards sustainable alternatives to these well-known ingredients so that they can keep making the products we love. Cargill partnered with Voyage Foods in the spring of 2024 to expand its portfolio of sustainable alternatives to cocoa-based products. Ingredion developed several ingredient solutions to replace the flavor and functional attributes of eggs to combat the recent price hike due to avian flu. Bunge launched its Beleaf PlantBetter[a] as a plant-based butter alternative to address the volatility in butter pricing. There are so many other examples of companies using their creativity to address these problems.

While we hope that these supply chains will eventually reach a state of normalcy, the time to get creative with solutions is now.



[a]Beleaf PlantBetter is a trademark of Bunge.

Image by Africa Studio at Adobe Stock



EMILY LITTLE
Associate Managing Editor
elittle@allured.com

Editorial Advisory Board

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Ingredients



Diisoamyl thiomalate

Penta International Corporation

https://www.pentamfg.com/

Diisoamyl thiomalate synthetic (FEMA# 4096, CAS# 68084-03-7, JECFA# 1672) contains a flavor profile of coffee, bread and similar to fermented yeast. The odor type is that of Coffee, yeast and very similar to rye bread. Our material is Kosher and Halal Compliant.



Phenylethyl isovalerate

Avant Organics

avantorganics.com

Phenylethyl Isovalerate (FEMA 2871, CAS 140-26-1) has a rich and fruity flavor profile. It is often described as having primary notes of floral and fruity that resemble the aroma of apple and pear. This compound also displays a slight tropical nuance, sometimes likened to pineapple or exotic fruits. One of the most interesting characteristics is its ability to be both creamy and sweet with a subtle ester-like quality that contributes to its depth. Phenylethyl Isovalerate can be used to add fruity sweetness in confectionery, enhance fruity or floral notes in beverages, contribute to creamy, fruit flavors in dairy products such as yogurt and ice cream, and add subtle tropical and fruit dimensions to bakery products. Phenylethyl Isovalerate can be seen as a versatile ingredient in the flavor industry due to its ability to blend seamlessly with other fruit and floral notes, enhancing complexity in formulations.



Natural beta-damascone, neat

Xiamen Bestally Biotechnology Co.,Ltd

https://bestally.globalchemmade.com

A very powerful fruity floral note, beta-damascone (FEMA #3243, CAS #23726-91-2) is a complex odor of rose, plum, blackcurrant, wine and tobacco. It is used in all types of fruit flavors, performing extremely well in berries.



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https://www.symrise.com/de/scent-care/aroma-molecules/perfumery-ingredients/

Get to know Terranol* again, the renewable and stable molecule. Terranol* offers the same kind of earthy-humid scent as patchouli, adding a dark, fruity twist. It makes a creation feel complete. It also gives the earthy, mossy feel of green moss, like the scent of the forest.

Terranol is a registered trademark of Symrise.

Images courtesy of the manufacturers

Alexander Mohr Appointed President of International Fragrance Association

On November 14, 2024, The International Fragrance Association announced the appointment of Alexander Mohr as president of the organization. He succeeds Martina Bianchini, who has been in the position since 2016.

"I am honored to take on the role of president of IFRA and continue the organization's commitment to safe and sustainable fragrance," said Dr. Mohr.

Dr. Mohr served as the executive director of the European Flavor Industry Association from 2016 to 2024. His previous role include secretary general of the Association of European Producers and Steel Packaging and leading public affairs for the European container glass industry. He has also held roles as a political consultant and lecturer, and Dr. Mohr is a published author on policy and regulatory issues.

Past president Martina Bianchi said, "Alexander's deep understanding of the trade association landscape and his pan-sectoral expertise make him the ideal person to guide IFRA forward. I am thrilled to see him take on this position and am confident he will continue the drive towards IFRA's vision."



Alexander Mohr's appointment was first mentioned to fragrance stakeholders at the Global Fragrance Summit in Dubai.

Berjé Inc. Names Christopher Monaghan as Director, Business Development & Key Sales

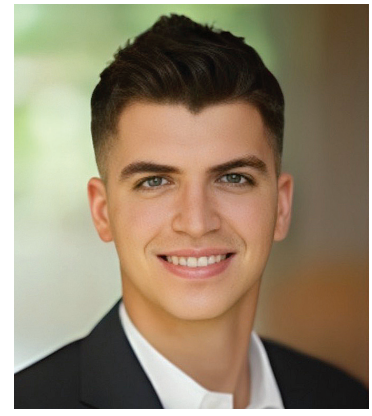
Berjé Inc. has announced the appointment of Christopher Monaghan as the director of Business Development & Key Sales. With over a decade of experience in the flavor and fragrance industry, Monaghan is said to bring a wealth of expertise and strategic insight to the Berjé team.

Monaghan's career began as a perfumer's assistant at Firmenich, after an internship with Robertet whilst he was still in college. His technical and commercial expertise is said to align well with Berjé's commitment to expanding its market presence, deepening client relationships, and enhancing technical sales capabilities.

"I'm really excited to work for Berjé and I feel the energy within the team and the momentum. It's always exciting joining a team with the reputation in the industry that Berjé has," said Monaghan.

Monaghan holds a Bachelor of Science in Chemistry, complemented by an MBA (2021).

Berjé's CEO, Gillian Bleimann Boucard, said, "We are thrilled to welcome Christopher to the Berjé family and look forward to his contributions as we pursue new growth and innovation in the industry."



"I'm really excited to work for Berjé and I feel the energy within the team and the momentum. It's always exciting joining a team with the reputation in the industry that Berjé has," said Christopher Monaghan.

From top: courtesy of IFRA; Berjé

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Robertet Acquires Supercritical CO_2 Extraction Company Phasex



The acquisition aims to develop new ranges of natural ingredients for both flavors and fragrances for Robertet. Courtesy of Robertet.

On November 4, 2024, Robertet announced the acquisition of Phasex, a supercritical CO_2 extraction company for natural products in particular, based in North Andover, Massachusetts, USA.

Phasex is said to be a pioneer in CO_2 extraction and focuses mainly on three market segments including natural products, biopharmaceuticals and polymers. The company was founded in 1981 by Val Krukonis, one of the early adopters and advocates for the use of supercritical CO_2 extraction for a broad range of applications in the United States. Phasex has recorded annual sales of between €5 million and €12 million over the past five years and, with Robertet's support, it aims to double its sales in the coming years.

Supercritical CO_2 Extraction

Supercritical CO_2 extraction is described as an innovative and environmentally friendly method for extracting high-quality aromatic or functional components from solid biomass or liquid raw material by using supercritical carbon dioxide. Supercritical CO_2 is said to be more environmentally friendly than available alternatives, such as hexane, butane and ethanol.

The supercritical process involves using pressure and temperature to reach the supercritical phase, where the CO_2 is between a liquid and a gas. In this phase, the CO_2 offers unique dissolving powers, which makes it possible to remove certain components from the substrate material.

Acquisition Details

- Designed to strengthen Robertet's production capacities and extend the CO_2 extraction offering to Robertet's customers in North America, through the vertical integration of a supplier that it has been working with closely since 2018.
- Develop new ranges of natural ingredients for both flavors and fragrances. In particular, Robertet will

Courtesy of Robertet

be developing a new product range leveraging North American and South American biomass.
- Reduce time to market, made possible by synergies between Phasex teams and Robertet's R&D teams in Grasse, France.

Jérôme Bruhat, chief executive officer of the Robertet Group, said, "The acquisition of Phasex represents a major step forward for us. Robertet is now the first company in the Fragrances & Flavors sector to have invested in CO_2 extraction in North America, with a clear focus on high-value-added extracts for both the Aroma and Nutricosmetics industries. By integrating Phasex's expertise, we are further consolidating our position as a leader in natural ingredients as we develop more sustainable, efficient solutions for our customers. Through this transaction, we have strengthened our industrial base in North America, which is one of the key drivers toward our goal of achieving €1 billion in total sales by 2030."

John C. Quinn, chief executive officer of Phasex, commented, "Joining Robertet is a great opportunity for Phasex to pursue its development and strengthen its leading position in CO_2 extraction. Phasex's employees are excited about the prospect of working with Robertet's team in R&D and processing the unique new products that Robertet is planning to develop following this acquisition. Thanks to the synergies between our teams, we will be able to meet the growing demands of our customers, while ramping up innovation in the natural products sectors. We are proud to be joining a family-owned group that shares our commitment to environmentally friendly technology."

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Eurofragance Brings Multi-Sensory Experience to in-cosmetics Asia

Eurofragance presented Scentphony, a multi-sensorial experience at trade fair in-cosmetics Asia in Bangkok from November 5 to November 7, 2024.

The experience was the result of collaboration between the fragrance house's perfumers and a music composer, combining fragrance trends with music to stimulate the senses and inspire creativity.

Eurofragance presented three different collections to attendees along with their associated products: the New Worlds collection, the Dopamine Rush collection, and the Self-Care collection. Visitors could explore each fragrance in the collection while listening to compositions created by Alex Aller, composer from Sound Earth Legacy. All of the fragrance compositions presented by the company include its new captive Euphorion[a].



Visitors were invited to sample the fragrance collections while listening to curated music collections. Courtesy of Eurofragance.

Collection Highlights

New Worlds collection: This collection, which includes fragrances that combine natural ingredients with futuristic notes, is ideal for consumers seeking innovative experiences and contains:

- **Cyber Pulse shampoo**: a revitalizing blend with fresh notes of patchouli oil, galbanum, and a hint of marine and incense.
- **Cosmic Sounds candle:** an immersive creation that fuses the captive Euphorion with marine notes, frankincense and wormwood.
- **Eau de parfum Ethereal Vibes**: an intriguing fragrance that combines the delicacy of ambrette seeds, the freshness of pear, the mystery of oud and the elegance of orris.

Dopamine Rush collection: Dopamine is a driving force behind the search for experiences that release feel-good hormones, awakening the desire for new adventures. In Dopamine Rush, Eurofragance presented:

- **Euphoric Shine shampoo**: a vibrant formula that combines lemon oil Murcia, raspberry, peach and vanilla.
- **In the Mood shower gel**: an exotic blend with geranium, lychee, bubblegum and raspberry oil.
- **Pop It effervescent shower gel:** a refreshing and invigorating experience with CO2 extract of ginger, spearmint, lemon and cucumber.

Self-Care collection: The self-care trend highlights the importance of prioritizing mental, emotional and physical wellbeing, recognizing the reality that taking care of oneself is essential to leading a fulfilling life. To achieve this peace of mind, Eurofragance proposed:

- **My Tempo pillow mist**: a gentle and relaxing blend of neroli oil, sea salt, cashmere and musk.
- **Twilight Soul massage oil candle**: a combination of Euphorion, sea salt, lily of the valley and sandalwood.
- **Senda body lotion**: a luxuriant fragrance with labdanum absolute, sea salt, magnolia and cedarwood.

Scentphony was fueled by Trendscenteur[b], Eurofragance's marketing tool. The company used Trendscenteur to identify and address key global and local trends in fragrance.

[a]Euphorion is a trademark of Eurofragance.

[b]Trendscenteur is a trademark of Eurofragance.

Courtesy of Eurofragance

MycoTechnology Names Jordi Ferre as Chief Executive Officer

On December 10, 2024, ingredient manufacturer MycoTechnology announced the appointment of Jordi Ferre as its new chief executive officer, effective January 2, 2025. Interim CEO Ranjan Patnaik will continue to serve as the company's chief technology officer.

Ferre currently serves as the head of the global food division at HealthTech Bioactives, a global ingredients specialist. Prior to this role, he served as the chief executive officer of AgroFresh and chief operating officer of PureCircle. He has over 30 years of experience in the ingredient industry, specifically with value-added ingredients.

"With his extensive commercial experience in natural, value-added ingredients, Jordi is well-suited to lead MycoTechnology through continued growth, including the development and launch of new, naturally derived sugar reduction solutions," said Rob Case, chairman of the MycoTechnology board of directors. "We're thrilled to welcome him aboard and believe that he will be a transformative leader to support to company's progress, culture, mission, and values."

"Based on its impressive technological developments to date and continuous innovation, MycoTechnology is ready to enter its next chapter of growth, bringing breakthrough natural solutions with a lasting impact," Ferre added. "I am excited for the opportunity to accelerate the company's expansion while strengthening both internal culture and global strategic partnerships."

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Ferre shared, "Based on its impressive technological developments to date and continuous innovation, MycoTechnology is ready to enter its next chapter of growth, bringing breakthrough natural solutions with a lasting impact."

Courtesy of MycoTechnology



Coty Launching Swarovski 'Pop Luxury' Fragrances in 2026



From left: Jean Holtzmann, chief brands officer, prestige, Coty, and Michele Molon, chief commercial officer, Swarovski.

Coty has nabbed a long-term beauty license for luxury crystal house Swarovski, encompassing a deal to develop, produce and distribute Swarovski fragrances. The first offering under this licensing agreement is anticipated to launch in 2026.

The move is part of a wider push to diversify its beauty range; in February of this year, Coty renewed its fragrance license agreement for more than 20 years with Bruno Banani; Coty had also renewed its fragrance license agreement with Mexx for 25 years.

Also in February 2024, Coty entered into a licensing agreement with Italian luxury fashion brand Marni to develop, produce and distribute a line of fragrances and beauty products through 2040.

Coty's latest results were boosted by growth in fragrances across the pricing spectrum (prestige scents up 9% like-for-like).

Jean Holtzmann, Coty chief brands officer, prestige, said, "We are delighted to announce our new, long-term partnership with Swarovski to develop and bring to market exciting new fragrance and beauty ranges. Renowned for its cutting-edge technology and unparalleled artistry, Swarovski has garnered significant recognition among global consumers, making it an ideal fit for a worldwide rollout across key markets such as EMEA, the Americas and Asia. This licensing agreement aligns with Coty's successful strategy of focusing on licenses with multi-category potential. We are excited to start working with Swarovski to develop truly brilliant beauty offerings that will inspire elegance and express individuality."

Michele Molon, Swarovski chief commercial officer, said, "Partnering with Coty is a significant step for Swarovski as we continue to expand our brand into new product categories. This partnership allows us to bring Swarovski's unique positioning of pop luxury–a luxury that is creative, fun, colorful and joyfully extravagant–to the world of beauty and fragrances whilst leveraging Coty's extensive industry expertise. Together, we will create beautiful and luxurious products that reflect our shared commitment to quality and innovation. We look forward to the endless possibilities this partnership will bring."

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Courtesy of Coty

Pickle-based Flavors Expected to Rise, According to Pinterest Predicts 2025



Pinterest Predicts 2025 announced that pickle will be the trending flavor in the upcoming year.

Social media and content sharing platform Pinterest released its annual Pinterest Predicts 2025 report. The report outlines several trends across various areas of beauty, home decor, food, and lifestyle based on user searches.

For 2025, Pinterest's analysts believe that pickle-based flavors will continue to inspire consumers.

"From sweet treats to tangy cocktails, the oh-so humble pickle is about to be in absolutely everything," the report states. "Gen X and Millennials will go all in on pickle cakes, pickle de gallo, and pickle fries — even pickle margaritas."

Trending Search Terms

Pickle margarita: +100%
Fried pickle dip: +80%
Pickle de gallo: +65%
Pickle fries: +50%
Pickle cake: +45%

p&f+

Image by New Africa at Adobe Stock



Turpaz Acquires German Flavor Company Schumann



The purchase is said to be a continuation of Turpaz's international expansion strategy and is designed to strengthen its position in the field of sweet flavors in Western Europe.

On November 7, 2024, Turpaz Industries acquired German flavor company Schumann & Sohn GmbH. This marks Turpaz's fourth acquisition of 2024.

Founded in 1948, the Schumann company currently operates a production and development site in Karlsruhe, Germany. The company's portfolio offers flavor solutions for the food industry and nutritional supplements, and specializes in sweet flavors. Schumann sold 6.7 million euros in the first nine months of 2024.

Karen Cohen Khazon, chairperson and CEO of Turpaz, said, "The purchase of Schumann is a continuation of Turpaz's global expansion strategy and strengthening of its position, whilst entering the sweet flavors market in Germany. We recognized the potential for growth based on the customer base and distribution channels of both companies. Leveraging the synergies between the companies will allow Turpaz to utilize the competitive advantages of both companies and accelerate the rate of organic growth."

Schumann shareholder Sabine Schuman and manager Gerd Mossmann commented, "Schumann's integration into the Turpaz Group will bring with it new opportunities to expand Schumann's product portfolio and distribution channels, by leveraging the geographical distribution of Turpaz, and will enable the preservation of Schumann's legacy and the development of its business in the German flavor market."

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Image by VolumeThings at Adobe Stock

Riverside Company Invests in Spanish Fragrances Business, Essential Compositions

On December 19, 2024, global investment firm the Riverside Company announced its investment in Essential Compositions, a fragrance manufacturer based in Spain.

Essential Compositions was founded in Gandía, Spain in 1980 and manufactures fragrances for perfumery, personal care, air care, and home care companies. The company currently sells its product to 250 customers across the globe. Essential Compositions owns a catalog of more than 20,000 registered formulations and has significantly invested in quality control and assurance initiatives in its production.

"We are delighted to secure our latest platform investment in the specialty ingredients space - an industry where we have a long track record and a global network of expertise, reinforcing our specialty ingredients super-thesis," said Karsten Langer, managing partner at Riverside Europe. "We are attracted to this sector by positive growth trends in the overall flavor and fragrance industry, particularly among mid-sized and smaller companies."



According to the press release, Riverside's company officials intend to enhance Essential Composition's commercial and R&D capabilities to support growth.

This announcement represents Riverside's sixth acquisition deal in the specialty ingredients space in Europe. According to the press release, Riverside's company officials intend to enhance Essential Composition's commercial and R&D capabilities to support growth.

"Riverside's deep flavor and fragrance sector experience and global resources, particularly in the US, EU, and Asia, make the firm an ideal choice to help our organization continue its international development," said Alberto Catalá, chief commercial officer of Essential Compositions. "Essential Compositions has been family owned since its inception, so it was important to find a partner who would respect this heritage, while helping the company seize the current growth opportunities, particularly in international markets. My brothers and I will reinvest alongside Riverside, and we look forward to writing this new chapter with them."

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Image by artemstepanov at Adobe Stock

Formulation of great tasting plant-based foods and beverages with yeast-based solutions

The Director of Strategic Marketing and Innovation at Biospringer by Lesaffre discusses how yeast fermentation-based solutions can help solve taste and texture problems in plant-based foods.

SPONSORED BY Biospringer by Lesaffre



Fermenting has been booming in recent years: the authentic, almost ancestral nature of this process, along with its recognized health benefits, is making these ingredients increasingly attractive to consumers.

In recent years, all categories of plant-based foods have grown thanks to mainstream consumer appeal. This shift has been driven by the boom in flexitarianism and the desire to adopt more sustainable and healthier eating habits. But this positive momentum should not obscure the challenges in the development of tastier and cleaner substitutes.

Perfumer & Flavorist+ (P&F+) interviewed Heli Kilpala, Director of Strategic Marketing and Innovation at Biospringer by Lesaffre, to understand how **yeast fermentation-based solutions** are beneficial for alternative protein formulations, particularly in terms of **improving taste and texture**.

courtesy of Biospringer by Lesaffre

Have the stakes changed for the players involved as the consumer base for plant-based products and beverages has expanded?

Indeed, the challenges facing food manufacturers and flavorists are growing. Consumer profiles diversify and expectations become more complex: Generation Z, for example, has a taste for both innovation and authenticity. But if pleasure is still at the heart of their desire to buy, two additional considerations come into play: their well-being and that of their children, and the future of our planet. It was already a key trend in 2024, but **clean label** will certainly be more and more a feature of the current generation of plant-based products. Manufacturers need to prioritize **short, easy-to-read, minimally processed formulations**. Flavor inventors should help them by providing flavors that allow them to obtain **"natural flavor" labels**. Biospringer by Lesaffre is a strong partner to support them in this dynamic: our **latest innovations** will concretely help them to create flavors that are both personalized and planet-friendly.



Heli Kilpala, Formulation of great tasting plant-based foods and beverages with yeast-based solutions at Biospringer by Lesaffre

Can you tell us more about these yeast-based innovations?

Fortunately for Biospringer by Lesaffre, fermenting has been booming in recent years: the authentic, almost ancestral nature of this process, along with its recognized health benefits, is making these ingredients increasingly attractive to consumers. Our customers, both food manufacturers and flavor houses, already know their properties. We continue to innovate because they ask us to develop their potential to improve their formulations in a cleaner way. We have expanded our range of solutions to address 3 key challenges for the **alternative protein sector**: nutrition, taste and labelling. As consumers are also looking for products with high protein content, we offer a vegan protein derived from yeast fermentation with a very high-quality profile and no side effects / undesirable functionalities. To enhance the taste experience, we have a wide range of solutions, but the latest innovations focus on several specialties. The first is the **Maillard reaction**, which provides flavor houses with customized building blocks for the **creation of signature profiles** for their customers. Then new ingredients to **block unwanted flavors** and others that provide **cocoon sensation** or **more umami** for better texture and flavor. These solutions are already in use by several of our customers and are another step forward in our commitment to ingredient exclusivity.

Naturalness is certainly an issue, but formulators also have certain cost constraints: are you responding to these cost-optimization pressures?

It is true that innovative ingredients and specialty products are more expensive than standard products or other less natural solutions. Of course, we are **careful to consider the cost of using our ingredients** and the benefits to our customers. We show some efficiencies depending on the end product and its formulation. For example, using our solutions can be a way to **reduce the list of ingredients**, so it's not just about cost, it's about less logistics for raw materials. Some others must be used at very low dosages, such as masking solutions to **avoid off-notes in animal-free products or sport nutrition applications**. We know that alternative ingredients to mask off-notes are expensive. Therefore, a **low dosage in formulations** is a real advantage. In short, our solutions are designed to **achieve better formulations** and can also reduce our customers' costs. But we should be careful, because many parameters need to be considered when formulating foods. What is certain is that we strive to innovate to deliver the **greatest value to customers**, including cost.

Finally, what are some of the challenges you face as a supplier of yeast-based solutions?

Like all industrial companies, we need to modernize our production facilities and working methods to become more agile and supply increasingly **environmentally friendly raw materials**. In this journey, digital is one of the strategic levers enabling us to be even closer to our customers to understand their needs and challenges in the fast changing world. Thanks to the support of the Lesaffre Group, we are integrating more and more of the expertise and tools that will allow us to make this transition as quickly as possible. It will also allow us to innovate faster and more efficiently. This will have a **positive impact** on the food system and plant-based innovation. Finally, the integration of Savory Ingredients will allow us to diversify our portfolio and expertise. As you can see, we're working hard to remain an **innovative, agile supplier that increasingly respects the planet**. That's what Lesaffre Group stands for and we're committed to achieving it.

courtesy of Biospringer by Lesaffre

PROFILES: YUSIF JNR MEIZONGO

Maison Yusif was named "Niche Perfume of the Year," "Best Cosmetic Brand of the Year" and "Best Perfume Brand of the Year" two years in a row at the Ghanas Manufacturing and Industry Awards.

Yusif Jnr Meizongo, Founder, Olfactive Director & Head of Creatives

Can you share a defining moment or significant breakthrough in your career as a perfumer?

Yusif Jnr Meizongo [YJM]: A significant breakthrough in my career was becoming the first olfaction trainer from West Africa, certified by the International Perfume Foundation in Los Angeles. This achievement recognized my ability and positioned me as a leader in olfactory education within the region.

The certification allowed me to train others in fragrance creation, contributing to the development of West Africa's perfume industry. It also enhanced my global credibility and visibility, enabling me to share my knowledge and passion for perfumery with a wider audience. This milestone has been crucial in setting up my brand, Maison Yusif, as a prominent name in the niche perfume market and inspiring many aspiring perfumers in the region.

What were some of the biggest challenges you faced when entering the perfume industry, and how did you overcome them?

YJM: I faced significant challenges entering the perfume industry, including limited resources, market competition and cultural feeling. Starting Maison Yusif from the trunk of my car made sourcing materials and reaching customers difficult. Competing with established global brands required a unique value proposition, while the new concept of niche perfumery in Ghana demanded consumer education.

To overcome these challenges, I focus on innovative craftsmanship, creating a unique fragrance that tells stories and evokes emotions, and distinguishing my brand from competitors. I also engaged in philanthropic initiatives through my Home of Humanity Foundation, building community goodwill and enhancing brand loyalty. Winning awards like "Niche Perfume of the Year," "Best Cosmetic Brand of the Year" and "Best Perfume Brand of the Year" in 2023 and 2024 at the Ghanas Manufacturing and Industry Awards for my fragrance boosted my brand's visibility and credibility, allowing me to compete internationally.



Yusif Jnr Meizongo shares, "A significant breakthrough in my career was becoming the first olfaction trainer from West Africa, certified by the International Perfume Foundation in Los Angeles."

Name: Yusif Jnr Meizongo

Title: Founder, Olfactive Director & Head of Creatives, Maison Yusif Fragrance

Location: Accra, Ghana

Can you describe a time when a fragrance formulation didn't turn out as expected? How did you address the issue?

YJM: I see every mistake in fragrance formulation as a chance for creativity and innovation. I do not believe in true mistakes in perfumery; instead, I views it as an art form that allows for improvisation and the development of new styles.

For example, if a fragrance formulation did not turn out as expected, I would analyze what caused the unexpected result. Rather than discarding it, I would

Courtesy of Maison Yusif

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experiment with the notes, adjusting them to create a new scent profile. This approach not only salvaged what could have been seen as a failure but often resulted in unique fragrances that resonated with my customers.

Each misstep is a chance to explore new olfactory combinations, leading to innovative creations that reflect my artistic vision. I believe the creative process in perfumery is fluid, and every experience, whether successful or not, contributes to my growth as a perfumer and the evolution of my brand, Maison Yusif. This mindset has allowed me to continuously push boundaries and redefine what is possible in the fragrance industry.

How do you find the right balance between artistic expression and the technical limitations of perfume formulation?

YJM: I expertly balance artistic expression with the technical limitations of perfume formulation through creativity, knowledge, and adaptability. I view perfumery as an art form, where each fragrance tells a unique story and evokes specific emotions. This artistic vision drives me to experiment with various ingredients, pushing the boundaries of traditional scent creation.

To address the technical aspects, I have honed my skills and understanding of both modern and traditional perfumery techniques. I recognize the importance of creating fragrances that are not only aesthetically pleasing but also stable and commercially practical. When faced with challenges in formulation, I improvise, treating each misstep as an opportunity for innovation.

This approach enhances my artistry and solidifies my brand, Maison Yusif, as a leader in the niche perfume market, highlighting the beauty of combining artistic expression with technical ability.

Are there specific skills or knowledge areas you believe are crucial for a perfumer to master? What resources (books, courses, mentors) were most valuable to you in your development as a perfumer?

YJM: I emphasize several crucial skills for a perfumer:

- Olfactory Skills: Understanding and finding various fragrance notes to create balanced perfumes.
- Formulation Techniques: Knowledge of how ingredients interact to craft stable and appealing fragrances.
- Creativity and Innovation: Experimenting with new combinations to develop unique scents.
- Market Awareness: Understanding consumer preferences and trends to resonate with the target audience.

I value mentorship from industry leaders like Yusuf Bhai, Creezy Courtoy, Sophie David, Allyson Correia, & Francis Kurkdjian. I have also enhanced my expertise through formal education in perfumery from institutions in Dubai, Turkey, France, Nigeria, and South Africa.

How do you maintain your creativity and stay inspired in such a niche industry?

YJM: I stay creative and inspired in this niche perfume industry through several key practices. I draw inspiration from Ghana's rich cultural heritage and biodiversity, believing that the unique scents of my homeland help me create fragrances that resonate both locally and globally. I am committed to continuous learning, seeking to enhance my knowledge and skills through workshops, courses, and mentorship from industry leaders. This dedication helps me stay updated on trends and techniques, fueling my creativity.

Viewing perfumery as an art form, I treat each fragrance as a canvas for expression. I embrace experimentation, seeing every formulation as an opportunity to explore new olfactory combinations. This artistic approach keeps my creative process dynamic and fresh.

Additionally, my philanthropic engagement through my Home of Humanity Foundation connects me with my community. This involvement inspires me to create fragrances that reflect social values and cultural narratives, enriching my work and fostering a sense of purpose.

By blending cultural elements, continuous education, artistic exploration, and community involvement, I successfully maintain my creativity and passion in the evolving perfume industry.

Have you ever had a fragrance experiment go amusingly wrong? What happened?

YJM: I am not going to bore you with a long passage here. My answer is NO! Every mistake is a fresh style in perfumary to me as it is an art and only the perfumer can express what he wants to bring out.



Three hundred ppm is a great level of addition for 2-phenyl 2-butenal in cocoa flavors.



BY JOHN WRIGHT
johnwrightflavorist@gmail.com

Flavor Bites:
2-Phenyl 2-butenal in Brown, Savory, Nut, and Other Flavors

Learn about the diverse range of applications for 2-phenyl 2-butenal.

2-Phenyl 2-butenal (FEMA #3224, CAS #4411-89-6) has a very attractive cocoa aroma, softer than 5-methyl 2-phenyl 2-hexenal, perhaps less distinctive but definitely less strident. This note is paired with an equally soft and pleasant tinge of honey. These two notes obviously work well together in brown flavors. Their combination also add interest, at modest levels, in quite a smorgasbord of other flavors.

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.

Brown Flavors

Caramel: 2-Phenyl 2-butenal is the perfect ingredient for caramel flavors. Levels of addition vary, but 300 ppm is typical.

Chocolate and Cocoa: Three hundred ppm is a great level of addition for 2-phenyl 2-butenal in cocoa flavors, adding an attractive subtlety to 5-methyl

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2-phenyl 2-hexenal. Lower levels have a similar effect in all styles of chocolate flavors.

Coffee: The effect of 2-phenyl 2-butenal in coffee flavors is much less obvious, but 100 ppm has a noticeable impact on complexity and authenticity.

Honey: This raw material makes a moderate addition to the core profile of honey flavors at around 50 ppm, adding interest and depth.

Malt: For malt and malted milk flavors the effect is more subtle, adding authenticity at around 20 pm.

Citrus Flavors

Grapefruit: This ingredient might seem a very far fetched possibility in citrus flavors, but it has an interesting, rounding effect at low levels. Five ppm is well worth trying in grapefruit flavors.

Orange, Juice: Ten ppm makes a useful addition to orange flavors, working better in juicy profiles than in peely flavors.

Tangerine and Mandarin: Ten ppm is also effective and interesting in both tangerine and mandarin flavors.

Savory Flavors

Asparagus: 2-Phenyl 2-butenal adds a little depth and complexity to asparagus flavors. Ten ppm is a good starting level of addition.

Bacon: The effect in bacon flavors is to add realism to the heavier meaty notes. Fifteen ppm works well.

Beef: Exactly the same effect is evident in all styles of beef flavors. The dose rate is also similar.



This ingredient might seem a very far fetched possibility in citrus flavors, but it has an interesting, rounding effect at low levels.

Cheese: 2-Phenyl 2-butenal can be used at higher levels in all types of cheese flavors, starting at 50 ppm.

Chicken: Fifty ppm is also highly effective in chicken flavors, rounding out the meaty core of the flavor.

Ham and Pork: Adding 2-phenyl 2-butenal to ham and pork flavors is a very similar exercise to adding it to bacon flavors and the dose rates are similar.

Mushroom: 2-phenyl 2-butenal only works on cooked mushroom flavors, where it adds authenticity at around 20 ppm.

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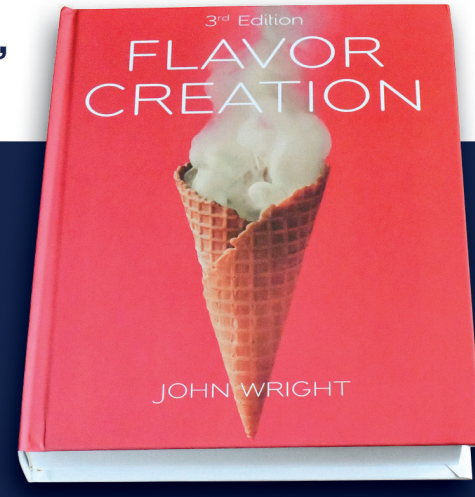


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Pepper, Bell: 2-Phenyl 2-butenal softens the harshness of methoxy pyrazines in bell pepper flavors at around 5 ppm. It is more effective in cooked bell pepper flavors.

Potato: This ingredient is effective in all cooked potato flavors. The ideal level in fried potato flavors is a little higher than in boiled potato flavors, 50 ppm compared with 20 ppm.

Seafood: This raw material can be used in all cooked seafood flavors. Twenty ppm is a reasonable starting point. The effect in white fish flavors is also interesting at around 10 ppm.



This raw material can be used in all cooked seafood flavors starting at 20 ppm.

Soy Sauce: Soy sauce flavors, in general, need something above and beyond the obvious ingredients. 2-Phenyl 2-butenal helps in this regard at 50 ppm.

Tomato, Processed: 2-Phenyl 2-butenal adds little to fresh tomato flavors, but it is helpful in cooked or processed tomato flavors at 20 ppm.

Truffle: The danger with truffle flavors is that they can come across as very simplistic, driven by one major sulfur note. The impact of 2-phenyl 2-butenal is similar to that in cooked mushroom flavors, as is the ideal 20 ppm level of addition.

Nut Flavors

Hazelnut: 2-Phenyl 2-butenal is an extremely useful ingredient in most nut flavors, with the possible exceptions of almond and pistachio, adding complexity and authenticity to the central nutty ketone chemicals. Two hundred ppm is a good level of addition in hazelnut flavors.

Peanut: The impact of 2-phenyl 2-butenal is very similar in peanut flavors but the best level of addition is less obvious, ranging from 100 to 200 ppm.

Praline: Praline flavors behave in a similar way to hazelnut flavors and 200 ppm of 2-phenyl 2-butenal works equally well.

Walnut: Walnut flavors are in a more subtle category than peanut and hazelnut flavors. Consequently, the ideal level of 2-phenyl 2-butenal is a little lower, from 50 to 100 ppm.

Other Flavors

Coconut: 2-Phenyl 2-butenal adds realism to coconut flavors at levels of addition in the region of 50 ppm. It works equally well in fresh and dried coconut flavors and also in coconut water flavors, all at the same 50 ppm level.

Corn: This chemical adds an interesting nuance to corn flavors at around 10 ppm. It is more effective in toasted corn flavors than in sweet corn flavors.

Rose: Everything about this ingredient points to its use in rose flavors and, understandably, the level of addition is an order of magnitude higher than in many other flavors. Five hundred ppm is very effective.

Sake: Sake flavors present an interesting challenge and 2-phenyl 2-butenal adds to the aged aspects at levels around 30 ppm.

Tea, Black: One hundred ppm of 2-phenyl 2-butenal blends into the profile of all black tea flavors, with the exception of Earl Grey tea flavors.

Tea, Green: 2-Phenyl 2-butenal is rather less at home in green tea flavors, but it can add a useful note at a much lower level, around 10 ppm.

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Bestally is a pioneer dedicated to developing natural flavor specialties and providing values to our partners since 2003. We focus on sustainable business which includes stable quality, fair prices and continuous supply.We devote ourselves to consistent ESG investment as our social responsibilities.

Natural Lactones
FEMA 2796 Natural Gamma Octalactone, Chiral
FEMA 3091 Natural Gamma Undecalactone, Chiral
FEMA 2400 Natural Gamma Dodecalactone, Chiral
FEMA 2361 Natural Delta Decalactone, Chiral
FEMA 2401 Natural Delta Dodecalactone, Chiral
FEMA 3590 Natural Delta Tetradecalactone, Chiral

Natural Specialties
FEMA 2747 Natural Methional
FEMA 2720 Natural Methyl 3-Methylthiopropionate
FEMA 3310 Natural Methyl Thiobutyrate
FEMA 3343 Natural Ethyl 3-Methylthiopropionate

FEMA 3155 Natural 2-Ethyl-3-Methyl Pyrazine
FEMA 3919 Natural 2-Ethyl-6-Methyl Pyrazine
FEMA 3149 Natural 2-Ethyl-3(5 or 6)-Dimethyl Pyrazine
FEMA 4434 Natural 2-Ethyl-5,6-Dimethyl Pyrazine
FEMA 3208 Natural 2-Methyl-3-Methylthio Pyrazine
FEMA 3132 Natural 2-Methoxy-3-Isobutyl Pyrazine
FEMA 3358 Natural 2-Methoxy-3-Isopropyl Pyrazine
FEMA 3433 Natural 2-Methoxy-3-Secbutyl Pyrazine
FEMA 3964 Natural 2-Acetyl-3-Methyl Pyrazine
FEMA 3134 Natural 2-Isobutyl Thiazole
FEMA 3555 Natural 2-Isopropyl-4-Methyl Thiazole
FEMA 3680 Natural 2-Ethyl-4-Methyl Thiazole

Fragrance Innovation Shines at **Beautyworld Middle East 2024**

See event highlights, key conference discussions and the announcement of 2025 dates.



This year, BeautyWorld Middle East continued to cater to fragrance creators, distributors, and retailers with a vast selection of offerings, featuring an impressive array of fragrance compounds, perfumed candles, incense sticks, solid perfumes, and room fragrances.

Courtesy of BeautyWorld Middle East

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Editor's Note: This copy is provided by the BeautyWorld Middle East team.



This year's event saw Quintessence's highest-ever participation, a testament to the feature's growing influence in curating unique and luxurious olfactory experiences.

Courtesy of BeautyWorld Middle East

Beautyworld Middle East 2024 recently concluded its 28th edition, which took place from 28-30 October at Dubai World Trade Centre, drawing more than 70,000 visitors and showcasing the latest in beauty and fragrance innovation. This year's exhibition underscored the immense cultural and commercial significance of fragrance in the Middle East, celebrating niche brands, regional powerhouses, and international giants through curated displays and interactive sessions.

As one of the most influential beauty and wellness trade fairs globally, Beautyworld Middle East brings together industry leaders, fragrance connoisseurs, and emerging brands. From the deeply rooted tradition of oud to bold, contemporary blends, fragrance remains at the heart of Middle Eastern culture, and the 2024 edition offered something for every segment of this diverse market. In line with regional projections from Expert Market Research, which estimate the fragrance market to reach $7.21 billion by 2032, this year's show highlighted both the growing demand and innovation that are propelling the sector forward.

Beautyworld Middle East 2024 offered an extraordinary showcase that celebrated every aspect of the industry, from the essence of raw materials to the allure of finished perfumes. This year, the show continued to cater to fragrance creators, distributors, and retailers with a vast selection of offerings, featuring an impressive array of fragrance compounds, perfumed candles, incense sticks, solid perfumes, and room fragrances, among others. With a dedicated emphasis on both innovation and tradition, the segment underscored the region's commitment to both modern trends and age-old practices in scent creation, attracting a diverse international crowd eager to explore the latest developments.

The exhibition also spotlighted a wide range of specialized products, alongside a substantial lineup catering to local preferences and international demand. Brands showcasing perfumes added a distinct ambiance to the exhibit, highlighting the increasing demand for fragrances. Altogether, this immersive fragrance display provided an ideal platform for brands to connect with industry professionals, fueling creativity and fostering a deeper appreciation for the art and science of fragrance.

Quintessence: The Art of Perfume

Quintessence feature remains a hallmark of Beautyworld Middle East, celebrating luxury and niche perfumery. With 56 unique fragrance houses, this platform offered an elegant showcase for high-end scents within a custom-designed, opulent environment. Key brands included Soul of Makeen, a luxury perfume brand inspired by the journey of the King of Dreams; Ramón Béjar, a brand that blends natural sophistication, offering limited-edition perfumes for a unique high-perfumery experience; Giardini di Toscana (GdT) from Tuscany renowned for its artistic perfumes that capture the essence of the region's natural beauty and heritage and the U.S.-based Free Yourself, which presented its luxurious scents and hand-poured candles in Dubai for the first time. This year's event saw Quintessence's highest-ever participation, a testament to the feature's growing influence in curating unique and luxurious olfactory experiences.

Capturing the Essence of Beautyworld Middle East

The Signature Scent competition invited fragrance houses to capture Beautyworld Middle East's essence in a bespoke designed fragrance. With 15 participants, the



According to the latest BeautyMatter Middle East Market Report, the fragrance industry is projected to achieve an annual growth rate of 11% from 2022 to 2027.

competition allowed exhibition attendees to blind-sample the scents using AirParfum technology, experiencing each fragrance without overwhelming their senses. After three days of voting, Zenith Echos, by perfumers Anne Louise and Elodie Bernard of Expressions Parfumées emerged as the winner.

Zenith Echos was created to capture the essence of Dubai and the atmosphere of Beautyworld Middle East. The fragrance blends warm sandalwood, reminiscent of sunlit dunes, with radiant musk notes that evoke the city's iconic skyline.

Emovation Lab: A Journey of Self-Expression through Fragrance

Beautyworld Middle East continues to push the boundaries of interactive fragrance experiences, and this year's Emovation Lab by Anfasic Dokhoon and Khaltat was no exception. The lab offered visitors the opportunity to create custom scents inspired by their emotions.

Shay Olimpia, Co-Founder of Anfasic Dokhoon said: "At the Emovation Lab you can create your fragrance based on how you feel. We like to talk about layering - in the sense that you don't need to become a perfumer to create your own identity and your own signature."

The Growing Appeal of Middle Eastern Fragrances

The cultural significance of fragrance in the Middle East is undeniable. Traditionally, scents are layered and sprayed liberally throughout the day, and the region has embraced unisex fragrances long before the Western world popularized them. Many international brands are recognizing this influence, with launches tailored exclusively for the Middle Eastern market.

The significance of the Middle Eastern fragrance market is also reflected in recent growth statistics. According to the latest BeautyMatter Middle East Market Report, the fragrance industry is projected to achieve an annual growth rate of 11% from 2022 to 2027. This expanding market was a focal point at Beautyworld Middle East, where McKinsey predicts global sales could reach $5.4 billion by 2027.

Fragrance Awards and Recognitions: Celebrating Excellence

The Beautyworld Middle East 2024 Awards, held on October 29, 2024, at the Conrad Dubai, were a dazzling highlight of the event, celebrating the best in beauty, fragrance, and wellness across 17 prestigious categories. This year's ceremony saw intense competition, with over 600 nominations, and honored innovative and high-performing brands in the industry, handpicked by an expert judging panel.

Fragrance played a standout role at the awards, reflecting the Middle Eastern market's deep appreciation for unique and compelling scents. In the fragrance categories, Al Majed Oud's Noir Parfum claimed the Popular Fragrance of the Year title, celebrated for its widespread appeal and ability to capture the essence

Courtesy of BeautyWorld Middle East

of Middle Eastern scent traditions. Meanwhile, Niche Fragrance of the Year was awarded to BohoBoco's Red Wine Brown Sugar, a bold unisex perfume featuring dry red wine and warm brown sugar notes, capturing the soul of its creator, Michael Gilbert Lach.

A Special Visit from Grasse

The presence of Jérôme Viaud, Lord Mayor of Grasse—France's iconic perfume capital—underscored Beautyworld Middle East's international prestige. Accompanied by 32 Grasse-based fragrance companies, Viaud emphasized the importance of this collaboration. "My first impression of Beautyworld Middle East is that it's such a huge and incredible event. I want to thank Messe Frankfurt for organizing an event on such a grand scale and welcoming us," Viaud stated. He continued, "Such an event is significant for us as we are coming with 32 companies from Grasse and we are proud to be a part of this spectacular event that is the ideal platform to highlight our region's rich heritage and ongoing innovation."

Next in Beauty: Insight and Inspiration for Fragrance Professionals

For fragrance industry professionals, the Next in Beauty program provided critical insights into market trends and emerging innovations. With specifically curated, free-to-attend sessions across three days, this year's program reflected the interests of regional and global audiences alike, presenting a diverse lineup of expert speakers and thought leaders in the fields of beauty innovation, fragrance, and market intelligence.

Among the highlights this year was a panel discussion titled "The Scent of Success: The Global Expansion of Middle Eastern Fragrances," featuring an expert lineup of industry leaders. The panel included Ralph Bou Nader, General Manager of Arabian Oud International; Rawya Catto, General Manager of CPL Aromas - Dubai Sales; Amandine Nikuze, Head of Fragrance Design at Ajmal Perfumes; Hany Rafik, Vice President of Marketing & Product Development at Abdul Samad Al Qurashi; and Julie Contat Desfontaines, Sales & Marketing Director for Fine Fragrance at dsm-firmenich.

The session was expertly moderated by Valerie Lovisa, a Sustainability Lecturer, Moderator, and Consultant at B Leader ABTYS, who guided the discussion on the burgeoning global reach of Middle Eastern fragrances and the market dynamics shaping the industry's future. This session explored the ongoing global fascination with Middle Eastern scents, breaking down the elements of successful brand expansion and the cultural nuances that have made regional fragrance houses appealing worldwide. Attendees learned how the artistry and unique heritage of Arabian perfumery are captured in these products and how they continue to resonate with consumers beyond the Middle East.

Another key panel discussion on the Next in Beauty stage was "The Fragrance Horizon - India's Rising Luxury Chapter," which explored how niche and luxury fragrance brands are capturing the attention of India's affluent consumers.

A key feature of the Next in Beauty program is its forward-looking emphasis on how brands can successfully navigate international markets. A standout panel titled "How to Succeed in the Chinese Market: Testimonials from Key Players" provided invaluable insights from industry leaders who have successfully established their fragrance brands in China. Panelists shared their experiences on market entry strategies, regulatory considerations, and consumer preferences specific to this dynamic market. Speakers included Olivier Viejo, VP of Fine Fragrance at dsm-firmenich Asia; Anne-Sophie Gauvin, Managing Partner at KEYI Ltd; and Muatasim Al Hinai, Managing Director of Oman Luxury. The





The BeautyWorld Middle East 2024 Awardsceremony saw intense competition, with over 600 nominations, and honored innovative and high-performing brands in the industry, handpicked by an expert judging panel.

session explored the unique challenges and opportunities in China's fragrance sector, with best practices for thriving in this rapidly growing market. The discussion was moderated by Dao Nguyen, Founder of Essenzia ByDao, who guided the conversation with expertise, offering the audience practical insights into successfully entering and growing China's fragrance industry.

Fragrance Compounds & Finished Fragrance

Beautyworld Middle East's Fragrance Compounds & Finished Fragrance segment once again demonstrated itself as a foundational pillar of the exhibition, with over 200 exhibitors presenting a wide range of raw materials, compounds, and finished products. Participants included established names like Sterling Perfumes, Armaf, Rasasi Perfumes, Ajmal Perfumes, and Swiss Arabian, along with emerging brands such as Abdul Samad Al Qurashi from Saudi Arabia and Junaid Perfumes from Bahrain. This section offered an expansive selection for retailers, distributors, and perfumers.

The fragrance compounds segment is particularly noteworthy, given the growth in demand for private labeling and bespoke perfumes. Exhibitors provided visitors with insights into the full fragrance creation journey, from sourcing raw materials to crafting complex compositions.

A Cultural and Commercial Convergence

Beautyworld Middle East's success this year speaks to the region's increasing role as a global fragrance hub, where tradition meets innovation. The Middle Eastern fragrance industry has long been rooted in rich cultural practices, and today it is celebrated for its vibrant, multifaceted approach to scent. With both local and international brands participating in Beautyworld Middle East, the event encapsulated the dynamism and diversity of fragrance in the region, a market set for sustained growth in the coming years.

Looking ahead, Beautyworld Middle East will return to the Dubai World Trade Centre from October 27-29, 2025, promising even more opportunities for the fragrance community to connect, innovate, and celebrate the art of perfumery as an integral part of its ethos. This year's exhibition reaffirmed that, for the Middle East, fragrance is more than just an industry—it is an essential part of cultural identity and an ever-growing global influence.

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Courtesy of BeautyWorld Middle East



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PRECISION FERMENTATION IS SHAPING THE FUTURE OF FLAVOR



At its most basic level, precision fermentation is a tool to transform cells into cell factories that assemble "molecules of interest" (desirable products) at a faster rate, resulting in a purer form.

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What a new generation of flavor molecules means for the industry, sustainability and consumer demands.

BY SUJA SENAN, senior innovation scientist, Sensient Flavors & Extracts



Suja Senan



Courtesy of Sensient Flavors

Precision fermentation is the new buzzword in the food industry. Like most innovations, it has its pros and cons. As a scientist, I believe any tool used for the right reason is good.

Over the past few decades, precision fermentation has been used to produce vaccines, hormones, enzymes, alternate protein sources and so much more. So, the question is, why not flavors?

With growing acceptance and applicability of precision fermentation in addressing problems of food security and sustainability, the flavor industry won't be far behind in embracing targeted fermentation for the generation of flavor molecules. In fact, many flavor companies have already made strides in being self-reliant in this space, especially in the face of lower fruit yields due to disease and climate changes.

We can leverage this proven technology to meet market demand for clean label, all-natural products with complex flavor profiles that expand into diverse global menus. And we can do it all while respecting the environmental impact of sourcing those flavors using sustainable practices.

What is precision fermentation?

To fully unpack precision fermentation, we should aim first to understand traditional fermentation.

Fermentation is a chemical process where molecules get broken down by yeasts and other microorganisms that grow in the absence of air. This transformation is common to sugars found in muscle, yeasts, some bacteria, and plants. This anaerobic process of fermentation also creates by-products (produces new molecules).

Throughout history, people have been exploiting microorganisms and their metabolic pathways for our benefit. We rely on the ability of bacterial and fungal cells



As precision fermentation advances, the scientific community will need to continue to overcome technical challenges for optimizing both the flavor and scalability of these products.

to break down substrates and release compounds that affect flavor, color, texture, and functionality of the food.

Within traditional fermentation, the frontier has been the application of high throughput sequencing and multi-omic approaches to decode the complex mechanisms in flavor generation during fermentation. This has led to better selection of starter cultures and optimization of fermentation conditions to improve yield of desirable traits and reduce undesirable by-products.

But what about precision fermentation?

At its most basic level, precision fermentation is a tool to transform cells into cell factories that assemble "molecules of interest" (desirable products) at a faster rate, resulting in a purer form.

Where traditional fermentation relies on existing machinery of genes within the organism, precision fermentation is a targeted technology of using bacterial and fungal cells as factories to provide high titers of desirable compounds.

Precision fermentation uses metabolic engineering tools to create a chassis of carefully assembled genes of interest. The genes of interest produce compounds—like flavors—that have not historically been produced by the organism on its own.

For example, precision fermentation enabled a yeast to produce nootkatone, which comes from grapefruit. A deep dive into the biosynthesis of nootkatone led to the identification of key enzymes, the genes for which could be assembled into a yeast that could ferment sugar and release nootkatone molecules.

Regulatory issues and consumer perception

Transforming cells into cell factories involves some metabolic engineering that can blur the line between genetically modified and genetically edited strains. The regulatory landscape varies a bit from region to region, but as long as the product does not contain any remnants of the edited gene, it does not require any special labeling in the United States.

Fermentation is a natural process. While precision fermentation does use modified microorganisms to

Image by Екатерина Чумаченко at Adobe Stock

initiate the fermentation process, those edited genes are filtered out and removed at the end, leaving no trace before entering the mainstream food supply.

The approach to produce flavors using precision fermentation is not new and can be compared to the processes that develop insulin, rennet, Reb M or recombinant soybean hemoglobin. In fact, this process has been used for decades to create the rennet that makes cheese curds.

Genome sequencing for flavor innovation

Advancements in bacterial and yeast genome sequencing, coupled with computational tools, enable a deeper understanding of metabolic pathways leading to flavor molecules. The critical factor in the success of developing flavors via fermentation—traditional or precision—is understanding the genome and the calculated or precise modification of the biosynthetic pathway leading to high yield of flavor compounds.

Whole genome sequencing includes the isolation of DNA, breaking them into smaller base pairs and then adapter-ligated DNA fragments are amplified and sequenced. High-throughput technologies based on 16S ribosomal RNA (rRNA) gene-amplicon sequencing has come a long way in the last 30 years. Today, there are many available genomes in the public domain, and it does not take a lot of resources to get your strain of interest genome-sequenced at a service company.

Apart from knowing the sequence, it is equally important to understand their function. The comprehensive landscape of multiple omics is crucial to gain a comprehensive view of biological complexity in the generation of flavors.

A multi-omic approach to strain development

Multi-omics can include any combination of genomics, transcriptomics (RNA sequencing), proteomics (protein interactions) or metabolomics (biochemical responses).

To decode the entirety of flavor generation, we must see the entire process and not just snippets. Computational tools can be especially impactful in mapping metabolic pathways to optimize the production of specific flavor molecules.

For example, in addition to the genome sequencing tools and the other omic tools to establish meaningful connections between genotype and phenotype, the Clustered Regularly Interspaced.

Fermentation optimization

Short Palindromic Repeat (CRISPR)-associated Cas9 nuclease system is another important tool in the precision fermentation toolbox.

After designing a high-performance strain, the next challenge lies in fermentation optimization and scale-up. In recent times, artificial neural networks (ANNs) have found application in predictive modeling of fermentation processes.

The advent of machine learning has accelerated the timeline for getting useful information to devise low-cost



production systems and maximize safety of using engineered strains

Preserving flavor preservation

As precision fermentation advances, the scientific community will need to continue to overcome technical challenges for optimizing both the flavor and scalability of these products. One challenge in using precision fermentation in replicating traditional fermentation is how to capture the full flavor complexity in one compound.

For example, cocoa fermentation or tea fermentation and their end-flavor profiles are an interplay of the substrate, the environment and the microflora that are intentionally or unintentionally bringing about the biochemical breakdowns called fermentation.

With precision fermentation being more targeted, it may produce a lot of one compound rather than a balanced concoction of multiple compounds that define a flavor profile.

Scaling precision fermentation

In terms of scalability, the designing of the strain is a big milestone, followed by optimization of the titer values in the fermenter. Based on the nature of the flavor compound, it may need a skid of multiple downstream processing units, like centrifuge and filtration columns, to end up with a pure compound.

There is a growing trend for companies to share production facilities or co-manufacturing sites as well as to rent equipment to optimize their process before investing in those in-house infrastructures.

Precision fermentation & the clean, sustainable food movement

Precision fermentation is working to change the food creation landscape. Scientists are already producing yeast extracts and peptones to support biomass, metabolite yields and strain recovery for industries like probiotics, food cultures, enzymes and alcohol. We are now leveraging those technologies to create distinctive flavors that meet the growing consumer demand for clean label and sustainable foods.

Fermented flavors align with consumers' desire for natural, clean, traditional and global tastes, offering functional and sustainable benefits. This new processing technique also helps solve ongoing pervasive issues with supply chain, sourcing ingredients and food insecurity. For example, fermented flavors have always triggered sentiments of "good for you," "clean" and "close to nature."

However, fermented products like miso, kimchi, natto, kefir and others take months to mature and develop their decadent flavors. Additionally, sourcing the right ingredients is the cornerstone of these products that are gaining a lot of momentum in a generation looking for exciting and culturally diverse flavors.

Unique blends of fermented koji with other ingredients in cocktails and on culinary menus speak to the trend of fermented flavors that embrace richness and a complex cascade of flavors. But how many of us can travel to savor these flavors, and how can we protect the unique flavor profiles of coffee, cocoa or tea that are fermented like an art?

This is where precision fermentation can help generate almost identical flavors using simple sugars and metabolically engineered yeasts in a simple fermenter without using protected lands or overconsuming in-demand plants. With precision fermentation, we can create nootkatone without grapefruit, vanilla without beans, and so on.

Precision fermentation can be the solution for getting novel compounds in high titers, in pure form, produced at large scale without needing to farm large arable lands or rely on trees susceptible to extinction, diseases or seasonal variabilities. At the same time, precision fermentation works on the premise that using designed strains can grow less expensive substrates, lowering costs while minimizing waste and environmental impact.

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Inside Unilever's New Fragrance House: Q&A with VP of Fragrance

Vivek Sirohi discusses the decision to careate Unilever's own fragrance house and what that means for the company going forward.



The company is planning to recruit expert perfumers in the United Kingdom, United States and India to work across the global portfolio of brands.

Courtesy of Unilever

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On November 22, 2024, consumer goods company Unilever announced a €100 million investment into its own fragrance house to drive in-house innovation. The company is planning to recruit expert perfumers in the United Kingdom, United States and India to work across the global portfolio of brands. Additionally, the new fragrance house will use digitally enabled fragrance design through new technologies, such as artificial intelligence (AI).

While the consumer product giant plans to continue working with external fragrance houses, this new initiative "will see Unilever transition to a hybrid model, where our digitally enabled teams are involved in every step of innovation, formulating fragrances that fit perfectly with our products."

"By recruiting expert perfumers and leveraging new capabilities including digital technology and AI, we will help drive unmissable brand superiority in line with Unilever's Growth Action Plan, developing fragrances that consumers love and enhancing the overall experience of our products," said chief R&D officer Richard Slater.

In October 2024, Mathieu Lenoir was appointed Unilever's Global Creative Centre Director for Fragrance, after working in the fragrance world for more than 30 years, including roles at several leading perfume houses, most recently at CPL Aromas. Lenoir has also held roles at Givaudan, Firmenich and other houses.

"I look forward to being part of Unilever's fragrance transformation journey," Lenoir said. "My dream, as a perfumer, has always been to be as close as possible to the consumer, and I feel Unilever is the best place to transform this dream into a reality."

Perfumer & Flavorist+ spoke with Vivek Sirohi, vice president of fragrance at Unilever, about this new venture and what this means for its partners and customers.

What inspired the decision to create a fragrance house within Unilever?

Vivek Sorohi: Fragrance transforms our products – it locks in loyalty and adds meaningful moments to consumers' daily routines. It also plays an invaluable role in signalling uniqueness, brand equity, driving unmissable product superiority and consumer choice.

We wanted to have more expertise in house so that perfumers are even closer to our brands and ultimately consumers. By combining our world-class R&D expertise, continuing to leverage our existing fragrance house partnerships, and hiring our own experts, we will strengthen that special blend of science and art to create better fragrances that consumers love.



Vivek Sirohi, vice president of fragrance, Unilever

Courtesy of Unilever

The press release said that the search for perfumers spans multiple countries. What is the benefit of this recruiting strategy?

VS: Our business is based on serving the needs of consumers around the world. We want to hire the best talent in the business—spanning the United Kingdom, United States and India—to drive that expertise and create beautiful fragrances that ultimately lead to quicker product launches and differentiation in competitive markets.

What kinds of technologies are going to be used in this new fragrance house?

VS: Our new fragrance house, powered by the latest digital and AI technologies, will operate at the intersection of science and innovation. We will use technologies such as neuroscience techniques to understand how fragrances can impact mood and measurably improve emotional well-being. Of course, Unilever's engagement with neuroscience always must have strong scientific foundations. Our scientific leadership in the field of olfaction and neuroscience is evidenced by a strong track record of peer-reviewed publications.

An example of this is developing fragrances that are scientifically proven to boost confidence. Our power brand Lux conducted neuroscience research with the University of Liverpool to explore the confidence-boosting effects of its fragrance via its effect on brain activity. This effect occurred as early as within 100 milliseconds. That's about the same speed as the blink of an eye, which is well before conscious processing is possible.

Tell me about the "hybrid model" that you're planning to implement. And how might it change its relationship with external fragrance houses?

VS: We have important long-standing relationships and ongoing partnerships with each of the leading fragrance houses. Our transition to a hybrid fragrance model means we will combine developing our in-house expertise with those existing strategic partnerships to help deliver consistent and unmissable product superiority across our stable of brands. This is an evolution of our current approach and is about getting even better at what we do and being better partners.



Unilever's portfolio includes several well-known beauty and personal care brands, including Axe, Dove, Paula's Choice, and TRESemmé.

How does creating a Unilever fragrance house make its products better for consumers?

VS: Creating our own fragrance house will give us the ability to bring perfumers as close to our brands and consumers as possible and will allow us to respond more quickly to market trends and consumer preferences. We will be able to use our years of technical ability to create and test unique scents faster, ultimately leading to quicker product launches, better products and clearer differentiation in competitive markets. We will be able to increase efficiency and simplicity through greater control and insight behind the highly complex fragrance formulation process and be able to integrate fragrance development more holistically into our product development journey.

What do you think will be the most challenging aspect of this new venture?

VS: Given the speed at which digital technologies are developing, there will be many unknowns. Working collaboratively with our in-house experts and external partners, we'll continue to harness tech and innovation as it develops even further, blending the art and science of fragrance with new discovery to create amazing products.

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Courtesy of Unilever

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British Society of Flavourists to Pen UK/European-based Organoleptic Characteristics of Flavor Materials Column Series

This series is set to run in rotation with our U.S.-based panel series.



Image by Madeleine Steinbach at Adobe Stock

This column is an additional component to the continuing series of publications reporting on reviews of flavor materials by a group of creative flavorists.

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Editor's Note: This series will run in rotation with our U.S.-based panel series. This series is not a replacement, but rather an addition to the returning Organoleptic Characteristics of Flavor Materials Column moderated by Bell Flavors & Fragrances principal flavorist Cyndie Lipka.

The British Society of Flavourists (BSF) has hand-selected a group of flavorists to launch a UK/European-focused version of the Organoleptic Characteristics of Flavor Materials Column series.

This column is an additional component to the continuing series of publications reporting on reviews of flavor materials by a group of creative flavorists.

If you would like to provide the panel with a raw material or ingredient to feature, please email Paige Crist (pcrist@allured.com).

It is with *P&F+*'s great pleasure to introduce the panelists of the soon-to-come BSF-led Organoleptic Characteristics of Flavor Materials column:

Áine Walsh



Áine Walsh

Senior flavorist at Keurig Dr. Pepper, Inc., Áine Walsh has over 20 years of experience in the flavor industry, spanning across the USA and Europe. Specializing in flavor creation for beverages, Walsh holds both an MSc. and a BSc. in Food Science & Technology. A Fellow member of the British Society of Flavourist (BSF) and serves on the council as the Honorary Secretary. Walsh is a certified flavorist with the Society of Flavor Chemists (SFC) and a certified food scientist (SFC) with the Institute of Food Technologists (IFT).

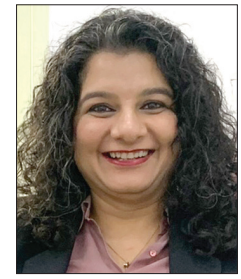
Andrea Albertino, Ph.D.



Andrea Albertino, Ph.D.

Andrea Albertino obtained his Ph.D. in chemistry in 2010 and joined the flavor industry the same year with Kerry Italy (formerly known as San Giorgio Flavours), working mainly on flavor encapsulation and scientific research projects. He continued his flavorist career with Kerry in Ireland till 2017 when he moved to Esarom-Austria and became senior flavorist in 2022, developing liquid and encapsulated flavors for the sweet and beverage end-use markets. Albertino started to be involved with the British Society of Flavourists in 2020 joining the Council and actively organizing online and in-person events. He then took on the role of honorary president in 2023 following Trevor Groome.

Kavita Bhatnagar, Ph.D.



Kavita Bhatnagar, Ph.D.

Kavita Bhatnagar, Ph.D., is a leading flavourist, blending academic expertise and practical experience to push the boundaries of taste and nutrition. She has a profound understanding of the complex interplay between flavor perception and dietary choices, enriched through transformative experiences at Harvard Business School, the University of Reading and comprehensive studies in food technology, dietetics and psychology at esteemed institutions.

Currently serving as the CEO of Kanegrade India, she leverages her extensive flavorist background to drive the company's success, emphasizing innovation and excellence in flavor development for diverse markets.

Bhatnagar is also a dedicated council member of the British Society of Flavourists and leads the *New Flavourist* magazine.

Jan Petka, Ph.D.

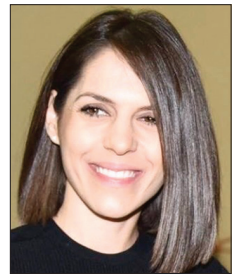


Jan Petka, Ph.D.

Jan Petka, Ph.D. is head of Flavor Development at Austria Juice. He studied Food Chemistry at the Slovak University of Technology in Bratislava and then worked as a flavor researcher. This allowed him to have long-term contact with pioneering flavor research laboratories in Dijon (France), Graz (Austria) and Zaragoza (Spain). Petka entered the flavor industry in 2005 when he started working for Akras Flavours, first as an analyst and later as a flavorist. In 2012 he was lucky enough to start building the flavor department at Austria Juice. Petka is the selector of BSF's science and industry news feeds and acts as publisher for podcasts and webinars on the BSF website.

Photos courtesy of British Society of Flavourists

Maria Palassarou, Ph.D.



Maria Palassarou, Ph.D.

Maria Palassarou obtained her Ph.D. in Flavour Chemistry in the Faculty of Pharmacognosy & Natural Products Chemistry at Kapodistrian University of Athens in 2014, and directly after, moved to London for her first role as senior scientist in Leatherhead Food Research. Working closely with the Sensory division, evaluating food flavorings organoleptically & analytically in various research products, she started pursuing her dream career of becoming a flavorist. Palassarou was trained as a Sweet & Beverage Flavourist at a small flavor house in London, Fuerst Day Lawson, combining creation with her analytical skill set. Palassarou had the opportunity to join Frutarom/ Tastepoint & IFF, before moving to Givaudan as flavorist II in the Science & Technology department working on the citrus category for Beverage applications in the global market. Palassarou joined the British Society of Flavourists Council in 2020, being a member of the Society since 2015, and is responsible for the BSF podcast post-production.

Trevor Groome



Trevor Groome

Trevor Groome, a past president of The British Society of Flavourists, has made significant contributions to the society, including being the main speaker on the BSF Podcast. He is also the founder of Orchid Aromatech, an AgriTech startup. In his role as the Innovation Platform Leader for RE-IMAGINE DIGITAL at IFF, Trevor has created and implemented successful tools for flavourists. Trevor, a flavourist himself, understands the complexities involved in creating food & beverage flavors. A lover of philosophy, Trevor is keen on exploring the intersection of technology and science.

Bimal Karmakar, Ph.D.

Bimal Karmakar, Ph.D., obtained his master's degree in food technology in 1992 (CFTRI, Mysore) and joined the flavor industry as a Trainee Flavourist in the same year with BBA (Chennai, India). After one year Karmakar joined an Indian family-owned flavor company in Delhi as a Flavourist, rapidly rising to the role of Chief Flavourist (Technical Manager) in 1998.



Bimal Karmakar, Ph.D.

While working as a flavourist, Karmakar completed his PhD in Flavour Biotechnology in 2000 — on the production of Natural Vanillin from Ferulic Acid/Lignin, using bio-transformation technologies

Karmakar continued his flavorist career in India till 2001, thereafter moved to Europe where he has over 20 years of experience in the European and International markets – including roles as Head Flavourist at Akras Flavours AG, Vienna, Austria; Senior Flavourist at Cargill Flavours System UK Ltd, (now Kerry); and overseeing a team as principal flavorist, Manager Flavour Creation & Application in Ungerer Ltd, UK.

Since 2020, Karmakar has joined Givaudan UK & EAME, where he works as principal flavorist and Formula Life Cycle Mgmt.

Karmakar has a broad and deep knowledge of flavor creation for global markets and specializes in the innovative creation & matching of flavors for beverages, sweet goods and savory products as well as GCMS analysis and interpretations.

Michele Pezzotta



Michele Pezzotta

Michele Pezzotta started his career in the flavor industry in 2014 at Kerry Italy, where he progressed from trainee to Junior flavourist, working mainly on flavor encapsulation and botanical extracts. In 2018, he joined Austria Juice as a flavourist, developing a deep understanding on Flavour development for Beverages applications. In 2021, he advanced his career by joining Silesia Flavours Global in Germany, where he specialized in flavor development for confectionery and bakery products. His involvement with the British Society of Flavourists (BSF) began in May 2023, when he actively supported the organization of the first BSF Symposium and the BSF Social group.

Britta Nobis

Britta Nobis is a creative Sweet flavorist specializing in beverages at Silesia Flavours Global with more than 20 years of experience in the flavor and fragrance industry. She started her career at Symrise

Photos courtesy of British Society of Flavourists

and later expanded her expertise at Frutarom in Switzerland, creating sweet flavors for various segments - she also gained professional experience in composing fragrance blends from natural extracts for cosmetics for Weleda. Since joining the BSF in 2021 she has been part of the BSF editorial team and has taken on the role of Honorary Membership Secretary in 2022.



Britta Nobis

John Forbes

John Forbes worked initially for Bush Boake Allen in London analyzing essential oils before moving to Treatt in Suffolk. Learning how minor changes in essential oil composition impacted the flavor and aroma of these complex natural materials, especially in mint oils, led to management in R&D and distillation where the isolation of citrus and non-citrus specialties allowed the production of novel ingredients for Flavour and Fragrance use. Promoting these natural isolates and concentrates to flavorists and perfumers in the United States, Europe and Asia was an integral part of this role. Before retiring, Forbes joined J.C. Buck Ltd as a technical manager and now works part-time as an independent consultant.



John Forbes

He is a member of the Royal Society of Chemistry, an associate member of the British Society of Perfumers and lectures on the Flavourist Training Course run annually with the British Society of Flavourists at the University of Reading. He is a fellow and committee member of the British Society of Flavourists and intends to keep sniffing and tasting critically for as long as his olfactory epithelium allows.

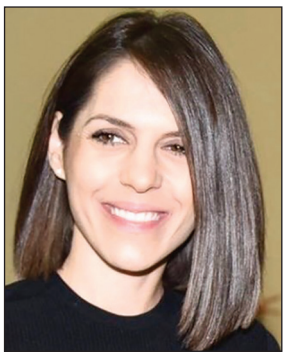
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In this month's column, we evaluate ingredients from Van Aroma, a company founded in 2006 and based in Bogor in Indonesia, specialized in essential oils and other natural extracts.



BY MARIA PALASSAROU
Flavorist, Givaudan

Flavor Report:
British Society of Flavourists Inaugural Column

Organoleptic Evaluation Panelists

- **Aine Walsh,** senior flavorist, Keurig Dr Pepper
- **Andrea Albertino, Ph.D.,** senior flavorist, Esarom
- **Bimal Karmakar, Ph.D.,** principal flavorist, Givaudan
- **Britta Nobis,** senior flavorist, Silesia
- **Ján Peťka, Ph.D.,** head of flavor development, Austria Juice
- **Kavita Bhatnagar, Ph.D.,** CEO, Kanegrade Flavors & Ingredients
- **Maria Palassarou, Ph.D.,** flavorist, Givaudan
- **Michele Pezzotta,** flavorist, Silesia Flavors

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In this month's column, our panel of flavor chemists (see sidebar for full list of panelists) evaluates ingredients from Van Aroma, a company founded in 2006 and based in Bogor, Indonesia, specialized in essential oils and other natural extracts. The resulting report features our impressions and recommendations for applications.

Caryophyllene oxide, natural

Source: Van Aroma
FEMA# 4085, CAS# 1139-30-6
Natural occurrence: Basil, cinnamon, black pepper, cloves, cannabis, lavender, oregano, rosemary, lemon verbena, guava, grapefruit.
Odor @ 100%: Woody, floral, ambrette, spicy, vetiver, perfume, musky.
Taste @ 2 ppm: Woody, floral, ambrette, musky, powdery, spicy, vetiver, cedar, carrot, earthy, dry, camphoraceous.
Possible applications: Its intense woody, earthy, dry notes would help in tobacco profiles, as well as tea flavors and spirits. The additional spicy, peppery top note would be useful in spices. Other possible uses are in floral tonalities like parma violet, or fruity like blackberry, raspberry, sour cherry, mango, guava, pomegranate, grapefruit.

Isoeugenyl acetate

Source: Van Aroma
FEMA# 2470, CAS# 93-29-8; 5912-87-8
Natural occurrence: Valerian, fennel, artemisia scoria, *Artemisia capillaris*.
Odor @ 100%: Spicy, clove, woody, smokey, fruity, warm, powdery, balsamic, carnation.
Taste @ 5ppm: Clove, spicy, herbal, terpenic, smoky, phenolic, earthy.
Possible applications: The dominant spicy, woody, smoky phenolic notes could help on spices tonalities, smoke, vanilla, coffee, chocolate, but also alcoholic like whisky, Weiss beer. Its clove element would fit in guava, banana, chestnut, nuts, Christmas flavors.

Cananga oil

Source: Van Aroma
FEMA# 2232, CAS# 93686-30-7, CAS# 68606-83-7
Natural occurrence: Essential oil extracted from cananga tree.
Odor @ 100%: Floral, ylang-ylang, white blossoms, peppery, woody, powdery, earthy, soapy, green, balsamic, slight animalic.
Taste @ 1ppm: Floral, ylang-ylang, jasmine, peppery, herbal, woody, animalic, green, soapy, aldehydic, powdery.
Possible applications: The characteristic floral note would fit well in white flowers and blossom profiles. Its woody peppery element could help on dry fruits, as also tobacco tonalities, tea and alcoholics like ginger ale and gin. Other possible uses in fruity tonalities like plum, apricot, peach, raspberry, banana, orange.

Patchouli terpenes

Source: Van Aroma
FEMA# 2838, CAS# 73049-85-1
Natural occurrence: Distillation fraction of patchouli oil.
Odor @ 100%: Woody, musky, herbal, terpenic, citrus, piney, cooling, earthy, floral, perfumistic.
Taste @ 1ppm: Woody, dry, herbal, earthy, spicy, peppery, smoky, musky, floral, citrus, terpenic, musty.
Possible applications: Its woody, musky element would fit well in berry flavors, dried fruits, pomegranate, grapefruit. The citrus terpenic note could be useful



The dominant spicy, woody, smoky phenolic notes of isoeugenyl acetate could help on spices tonalities, smoke, vanilla and coffee.

Image by Farknot Architect at Adobe Stock

on lime tonalities, whereas its spicy earthy aspect could help on cola flavors, tobacco tonalities, coffee, cocoa, alcoholic like gin, brandy/cognac, herbal liquors, as also seeds, and nuts.

Dihydroeugenol

Source: Van Aroma
FEMA# 3598, CAS# 2785-87-7
Natural occurrence: Rum, smoked fish, cured pork, cognac, malt whiskey, fermented tea, mushroom, rhubarb, dried bonito, cuttlefish and maté.
Odor @ 100%: Spicy, clove, woody, earthy, smoky, phenolic, floral carnation, metallic.
Taste @ 10 ppm: Spicy, earthy, terpenic, clove, woody, spicy, smokey, phenolic, leathery, medicinal, slightly ashy.
Possible applications: Intense spicy, clove, woody character that would be great addition in spice flavors, cinnamon, chai, cola, but also fruity tonalities like mango, guava, cherry, banana. Its ashy, phenolic, smoky note would fit well in vanilla and coffee flavors.

trans-Isoeugenol

Source: Van Aroma
FEMA# 2468, CAS# 97-54-1
Natural occurrence: Ylang-ylang, bilberry, guava, blackberry, tomato, cinnamon, clove bud and stem, nutmeg, mace, thymus, tea, coffee, beer, rum, plum, mushroom, dill, elder flower, pimento leaf and maté.
Odor @ 100%: Phenolic, smokey, woody, clove, spicy, dry, floral carnation, earthy, petrichor, meaty.
Taste @ 10 ppm: Phenolic, smokey, earthy, woody, clove, cinnamon, powdery, medicinal, floral carnation.
Possible applications: Its intense phenolic, woody, smokey spicy note would fit well in vanilla flavors bourbon type, spice mix, smoke tonalities, chocolate, coffee, as also cola, punch, Belgian beer. Due to its floral element, it would be a great addition in carnation flavor, but also honey. Its sweet banknote could help on brown tonalities like caramel. There was also a suggestion on meat flavors due to its savory aspect.

Methyl isoeugenol

Source: Van Aroma
FEMA# 2476, CAS# 93-16-3, CAS# 6379-72-2
Natural occurrence: Anise seed oil, basil, carrot, Ceylon cinnamon, clove, ginger, cubeb oil, nutmeg, turmeric, rose oil otto Bulgaria.
Odor @ 100%: Clove, woody, phenolic, smokey, leather, citrus, herbal green, fatty soapy, meaty notes.



Due to its floral element, trans-isoeugenol would work well in honey applications.

Taste @ 10 ppm: Spicy, phenolic, vanilla, smokey, floral, earthy, woody, elemi, tingling sensation.
Possible applications: Its clovy phenolic aspect would fit well in spice flavors, as also in vanilla profiles. Other possible uses in fruit tonalities like raspberry, pomegranate, orchard fruits, grapefruit.

β-Caryophyllene

Source: Van Aroma
FEMA# 2252, CAS# 87-44-5
Natural occurrence: In many plants' essential oils, namely *Cannabis sativa, Syzygium aromaticum, Piper nigrum, Rosmarinus officinalis, and Origanum vulgare L*; cinnamon bark oil, juniper berry oil, lavender water.
Odor @ 100%: Earthy, damp, musty, spicy, peppery, woody, carrot, resinous, fruity, camphoraceous.
Taste @ 10 ppm: Earthy, carrot, musty, woody, seedy, resinous, fibrous, parsnip, turnip.
Possible applications: Its intense earthy woody aspect would make it a great addition in citrus tonalities and mainly grapefruit essence type, as also nut profiles like pistachio. Strong musty notes which would work well on mango, guava, papaya, rhubarb profiles. Lastly its spicy peppery notes would fit on spices and black pepper flavors.

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Xiamen Bestally Biotechnology	*http://bestally.com*	23



CUE THE *coffee*

Esifurane
(FEMA 4104)

Mesifurane
(FEMA 3664)

Cocoa Hexenal
(FEMA 3199)

NEW

Homofuraneol
(FEMA 3623)

Furfural Mercaptan
(FEMA 2493)



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info@avantorganics.com
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www.avantorganics.com

To see our full Product Line scan below

AVANT
ORGANICS

Developing Better Products through Natural Chemistry

Penta Manufacturing Company is Family Owned and Operated for Over 45 Years.

Here is a partial listing of our Family of Coffee inspired ingredients utilized in flavor & fragrance formulations.

For detailed paperwork on all of our items consult our web site at www.pentamfg.com

- FEMA 2147 BENZYL MERCAPTAN
- FEMA 2486 FENUGREEK OLEORESIN
- FEMA 3062 2-THIENYL MERCAPTAN
- FEMA 3154 2-ETHYL-5,6-METHYL PYRAZINE
- FEMA 3158 2-FURANMETHANETHIOL FORMATE
- FEMA 3199 5-METHYL-2-PHENYL-2-HEXENAL
- FEMA 3236 MENTHOFURAN
- FEMA 3256 BENZOTHIAZOLE
- FEMA 3266 4,5-DIHYDRO-3(2H)THIOPHENONE
- FEMA 3305 3-METHYL-1,2-CYCLOHEXADIONE
- FEMA 3306 NUTTY PYRAZINE
- FEMA 3337 DIFURFURYL ETHER
- FEMA 3346 FURFURYL PROPIONATE
- FEMA 3366 2-METHYL-5-(METHYLTHIO)FURAN
- FEMA 3436 THYMYL METHYL ETHER
- FEMA 3555 2-ISOPROPYL-4-METHYL THIAZOLE
- FEMA 3680 2-ETHYL-4-METHYL THIAZOLE
- FEMA 3949 2-METHYL-3-(METHYLTHIO)FURAN
- FEMA 4179 2-METHYL FURAN
- FEMA 4538 METHYL FURFURYL MERCAPTOPROPIONATE
- FEMA 4676 1-(2-FURFURYLTHIO) PROPANONE
- FLAVIS 04.020 3,5-XYLENOL
- FLAVIS 04.089 3-ACETYLPYRIDINE
- 2,3,5-TRIMETHYL PHENOL

For a complete list of all our natural, natural identical and synthetic ingredients visit us at www.pentamfg.com

Penta®

Penta Manufacturing Company

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4 Dedrick Place, West Caldwell, NJ 07006 ■ Phone: (973) 740-2300 ■ Fax: (973) 740-1839

E-Mail: sales@pentamfg.com ■ Web: www.pentamfg.com

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