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Floral Family Blossoms with Versatility for Perfumers

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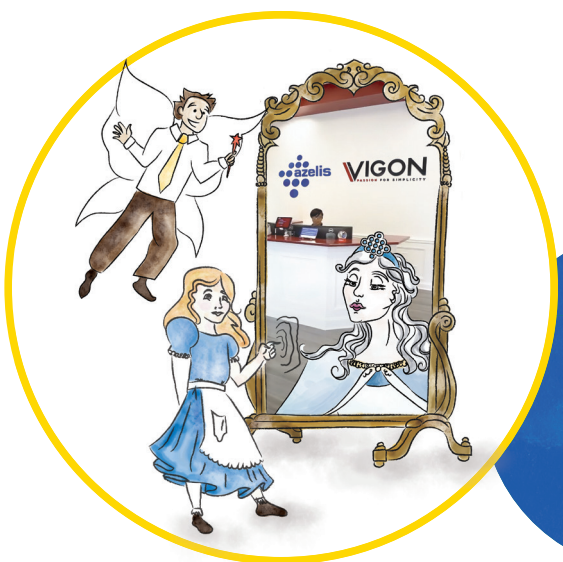
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AI's Evolution in F&F



Artificial intelligence is spreading its reach throughout the F&F realm. See how the concept has evolved in a short period below.

Artificial intelligence (AI) in the flavor and fragrance space isn't a novel topic. We've been reporting on investments and launches incorporating AI for years. This month's cover as well as the image above are actually AI generated.

But it seems that now, more than ever, perfumers are beginning to speak up about AI's place in formulation. I connected with fragrance curator and frequent podcast guest Mark Knitowski who shared anonymous responses from professionals in the industry on the topic. You can tune into the podcast by visiting *www.perfumerflavorist.com/multimedia*.

Some examples of recent AI innovation in scent include Firmenich's EmotiCode. The AI-generated, cross-category set of "design rules" for creating fragrances that is said to enhance consumers' mental performance in cognitive tasks. Another is Givaudan's Myrissi, an AI technology that is said to translate scents into color patterns. The technology is designed to capture and predict the spontaneous emotional perception of fragrance experienced by consumers, determining the best alignment between colors, emotions and scents.

In the flavor space, Mintel debuted its subscription-based Flavour Landscape Engine platform to give users access to a network that collects new products from 86 markets around the world and utilizes three algorithms said to pinpoint flavor trends relevant to each user's market.

Ready to learn more about AI in scent? It will be one of the many discussion points at *World Perfumery Congress* 2024 in Geneva. Be sure to visit *www.worldperfumerycongress.com* and add your name to the mailing list.





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The global cannabidiol market size was valued at an impressive $6.4 billion in 2022.

Featured Insider:

- Pope Scientific

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INDUSTRY INSIGHTS:
Cannabis, CBD & Terpenes

An industry insider discusses trends and demands driving innovation in the cannabis, CBD and terpenes market.

The global terpene resins market was valued at $991 million in 2022 and is projected to reach $1,450 million by 2027, growing at a CAGR 7.9% from 2022 to 2027, according to Markets and Markets[a] reporting. Whereas the global cannabidiol (CBD) market[b] size was valued at an impressive $6.4 billion in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 16.2% from 2023 to 2030.

In this month's Industry Insights section, *Perfumer & Flavorist*+ (*P&F*+) has tapped Pope Scientific Sales & Technical specialist Ryan Stendler to discuss the current trends and demands in the space as well as outline the challenges within the market.



Ryan Stendler

RYAN STENDLER, Sales & Technical specialist, Pope Scientific

***P&F*+: What are some of the trends/demands driving innovation in the cannabis, CBD, and terpenes market?**

Ryan Stendler: One of the biggest trends we are seeing is a focus on hemp derived terpenes. Previously, these terpenes weren't a commonly targeted product by themselves, but now there is increased demand for pure terpenes to be used in cannabis products. As a result, there have been changes in the methods of extraction used. In the earlier days of the cannabis processing, ethanol extraction was the primary method used.

However, this approach can damage the terpenes due to all the all the heat required in removing the ethanol. When the terpenes were not a focus, this was nonessential, but now other extraction methods like supercritical CO_2 and hydrocarbon have become more popular. Once the terpenes are extracted, they need to be purified by distillation.

Pope's wiped-film stills have been used for this purpose, both our molecular stills and our hybrid stills. Wiped-film stills allow for low thermal stress on the terpenes, minimizing degradation while maximizing recovery. In addition, the hybrid stills allow for fractional separation if that is needed to provide the purest products possible.

In the more general cannabis/CBD markets, we are seeing increased interest in synthetic production of minor cannabinoids. These are cannabinoids that are not present in hemp in a high enough concentration to make extraction from hemp feasible. Therefore, they are created synthetically and then purified much in the same way as extracted material. There has been a rise in the use of these minor cannabinoids as carriers in CBD formulations to allow for fully cannabinoid products.

p&f+

[a] *https://www.marketsandmarkets.com/Market-Reports/terpene-resins-market-258854428.html#:~:text=The%20global%20terpene%20resins%20market,7.9%25%20from%202022%20to%202027.*

[b] *https://www.grandviewresearch.com/industry-analysis/cannabidiol-cbd-market#:~:text=The%20global%20cannabidiol%20(CBD)%20market,16.2%25%20from%202023%20to%202030.*

Ingredients and Equipment

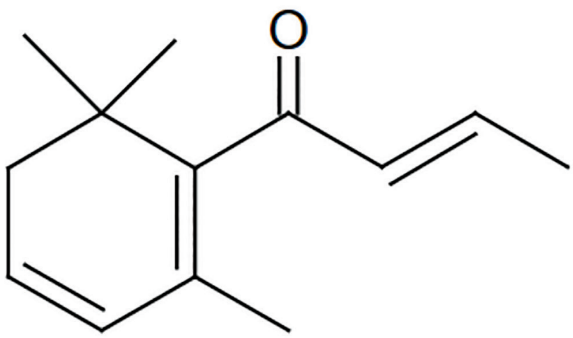


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www.hangzhougrascent.com

β-Damascenone; 1-(2,6,6-trimethylcyclohexa-1,3-dien-1-yl)but-2-en-1-one; 2-Buten-1-one (CAS# 23696-85-7/23726-93-4, FEMA# 3420). It features an intensely natural floral fruity note, with rose, plum, berry and tobacco odor. It can be used for fine fragrance, personal care, fabric care and home care with recommended use level from traces to 0.02%



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www.aluminumbottles.com/essential-oils-flavors/

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2-Octen-4-One

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www.natadv.com

Natural Advantage introduces natural 2-octen-4-one (FEMA# 3603; CAS# 4643-27-0). 2-Octen-4-one occurs naturally in roasted hazelnuts. Taste and odor feature a ripe, canned peach note and is used to create ripe/overripe strawberry, cherry, peach and apricot flavors. This product can also be used to round out yogurt flavors with mouthfeel and fruity sensations. Use levels at 2-5 parts per million as consumed. It is EU and U.S. natural, kosher, vegetarian and non-GMO.



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www.popeinc.com/still-products/fractional-distillation-systems/

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4-Methyl Salicylaldehyde

Penta International Corp.

www.pentamfg.com

4-Methyl salicylaldehyde (FEMA# 3697, CAS# 698-27-1, JECFA# 898) contains a flavor base of almond and cherry. Odor notes include almond, bitter almond and phenolic cherry. Our material is food grade, kosher and halal.



Red Seaweed Pure Jungle Essence m_0057500

Mane

www.mane.com/ingredients

Sustainably harvested by hand on the French Brittany coast, Palmaria palmata red seaweed is Mane's miracle ingredient (CAS# 223751-74-4, FEMA# 1121). This powerful extract, made via supercritical extraction, brings a nice algae touch in green tea or rooibos flavors along with mossy herbal facets. It also gives a salty effect, interesting in salt-reduced applications.



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www.aurochemicals.com/

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trans-2-*trans*-4-Hexadienal

Natural Advantage, LLC

www.natadv.com

Natural Advantage introduces natural *trans*-2-*trans*-4-hexadienal (FEMA# 3429; CAS# 142-83-6). The taste of natural *trans*-2-trans-4-hexadienal can be described as sweet and green, with dragonfruit and fresh melon nuances. It occurs naturally in dill, grape, guava, peas, strawberry, tea and tomato. *trans*-2-*trans*-4-Hexadienal can be used in various fruit flavors such as cherry, apple, dragonfruit and other tropical flavors. Use at 0.01 pmm – 1 ppm as consumed. It is EU and U.S. natural, kosher, vegetarian and non-GMO.



Cassia Oil

Berje Inc.

www.berjeinc.com/products/essential-oils/cassia-oil/

Cassia oil (FEMA# 2258, CAS# 8007-80-5) is warm and spicy, with an initial woody note backed by intensely sweet undertones. It frequently provides the bite to cinnamon candies and alcoholic spirits, and it works exceptionally well as a cinnamon-type fragrance within holiday candles. In flavor, cassia oil pairs well with ginger, clove and lavender.



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Isobionics

www.isobionics.com/global/en/product-finder/natural-β-bisabolene-90.html

Due to our cutting-edge fermentation technology we guarantee premium quality and reliable availability. Isobionics® Natural β-Bisabolene 90 (FEMA# 4940, CAS# 495-61-4) is EU and U.S. natural, pesticide-free, Kosher and Halal certified. It is compliant to EU and U.S. food grade regulations.



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Symrise AG

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

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FEMA 2720
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2,6-Dimethyl-5-heptenal, Natural
FEMA 2389
fruit, tropical, melon, watermelon

2-Octen-4-one, Natural
FEMA 3603
peach, pineapple, strawberry

t,t-2,4-Hexadienal, Natural
FEMA 3429
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Bedoukian Research, Inc. Taps Jim Zitelli as Chief Financial Officer

Bedoukian Research, Inc. (BRI) announced Jim Zitelli as chief financial officer leading the company's global finance initiatives.

Zitelli brings with him over 30 years of experience in the financial arena. Most recently, Zitelli was the global vice president of Finance for Symrise's Scent and Care Division. Zitelli spent the vast majority of his professional life in strategic FP&A where he partnered with manufacturing and sales to determine how best to grow the businesses.

Robert Bedoukian, president of Bedoukian Research stated, "On behalf of BRI, I would like to take this opportunity to welcome Jim on board as our new CFO. With his strong finance background, Jim will play an instrumental role in shaping our future growth. Jim's strengths in strategic financial management within the flavors and fragrances industry and a commitment to invest in growth opportunities are ideal for BRI's future, and we are confident that his results-oriented mindset will help BRI deliver for all of our stakeholders. BRI will continue to be a strong growth-oriented company that is focused on innovation while offering our customers the highest quality products."



Most recently, Jim Zitelli was the global vice president of Finance for Symrise's Scent and Care Division.

3 Leading Global Essential Oils Market Drivers

The global essential oils market is projected to grow at a CAGR of 11.8% from 2022 to 2027[a], reaching a market value of $15.3 billion by 2027. The market reached a valuation of $8.8 billion in 2022.

Essential oils are increasingly being adopted in various new industries due to their health benefits and minimal side effects.

The demand for essential oils in North America is rising as consumers prioritize a healthy lifestyle and seek ingredient transparency.

In addition, the applications of essential oils in R&D and product development are expanding rapidly.

Market drivers:

1. There is a growing demand for aromatherapy products and premium fragrances.

2. The modern sedentary lifestyle has led to increased levels of stress and anxiety worldwide, resulting in a higher demand for aromatherapy.



The demand for essential oils in North America is rising as consumers prioritize a healthy lifestyle and seek ingredient transparency.

3.The fragrance industry has shifted from traditional perfumes to focus on wellness and self-care, with aromatherapy becoming a vital component of fragrance, beauty and wellness products.

The demand for essential oils is expected to surge in countries like China and India, driven by increasing consumer preference and targeted marketing campaigns highlighting the health benefits of essential oils.

[a] https://www.perfumerflavorist.com/fragrance/regulatory-research/news/21877905/report-global-essential-oils-market-growth

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Kerry Debuts Taste Facility in Karawang, Indonesia



The facility is the company's largest greenfield investment in SEA and will encompass a manufacturing site, research and development pilot plant and a sampling hub.

On June 14, 2022, Kerry officially opened a state-of-the-art taste manufacturing facility in Karawang, West Java, Indonesia. The 50,000m^2 facility is said to significantly expand Kerry's taste offering in Southeast Asia (SEA).

According to Kerry, the facility is the company's largest greenfield investment in SEA and will encompass a manufacturing site, research and development pilot plant and a sampling hub. Its wide range of process technologies is designed to enable the creation of authentic taste experiences, inspired by popular local and traditional cuisines.

As part of Kerry's Beyond the Horizon sustainability strategy, the company has prioritized sustainability initiatives across the entire facility and all utility equipment has been designed to the latest energy efficiency standards.

Dignitaries from Indonesia and Ireland attended the inauguration ceremony, including Nurul Ichwan, Indonesia's deputy for Investment Promotion, Ministry of Investment; H.E. Padraig Francis, ambassador of Ireland to Indonesia; Tom Moran, Kerry Group Board chairman; Edmond Scanlon, Kerry Group CEO; along with trade association leaders and community officials.

Commenting on the new facility, Edmond Scanlon, Kerry Group CEO said, "The opening of our state-of-the-art facility will not only expand our reach into the flourishing Southeast Asian taste market but also revolutionise the way sustainable nutrition is embraced in the region. By collaborating with leading food and beverage manufacturers, we will harness our global technologies to create products that resonate with Asian consumers' specific taste preferences."

John Cahalane, president and CEO, Kerry Asia Pacific, Middle East & Africa shared, "As the largest economy in Southeast Asia, Indonesia is in a unique position to support the regional market. Our cutting-edge Karawang facility will spearhead creation of the next generation of sustainable food and nutrition in Asia, with a focus on taste, functionality, health, and wellness. With our sustainability initiatives, we aim to minimise the environmental impact of our activities, while fostering positive social impact through local employment and community engagement. The opening of the Karawang facility is a significant step forward in realising our vision of creating a world of sustainable nutrition. Innovating with our customers, we will create delicious products with improved nutrition and functionality, while ensuring a better impact for the planet. Working together, we can usher in a new era of sustainable nutrition."

p&f+

MG International Fragrance Company Awarded Chemistry Sector Environmental Award

During the 29th edition of the Şahabettin Bilgisu Environmental Awards organized by the Kocaeli Chamber of Industry in Turkiye, MG International Fragrance Company was awarded the Chemical Industry Environmental Award in the Large-Scale Enterprise Category for the second time.

The Chemistry Sector Environment Award recognizes the company's unwavering dedication to safeguarding natural habitats, preserving the ozone layer, promoting resource efficiency, implementing effective waste management practices, and taking proactive measures against harmful emissions.

MG International CEO Aslan Gülçiçek shared, "Throughout the last seven years, we have dedicated over $5 million towards environmental infrastructure and projects aimed at safeguarding and promoting nature through environmentally friendly production. It is with delight that we accept this precious award for the second time, acknowledging our continuous endeavors. In our pursuit of a more sustainable world for future generations, we will persist in our sustainability initiatives within the fragrance industry."

According to the company, MG International Fragrance Company's environmentally conscious practices include energy conservation, waste reduction, rainwater collection, recycling, odor control, carbon emission monitoring, socially responsible initiatives and biodiversity studies.



Aslan Gülçiçek (R), the CEO of MG International Fragrance Company, accepted the award from Hasan Tahsin Tuğrul, chairman of the Kocaeli Chamber of Industry Assembly.

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Takasago Senior Perfumer Shares Inspiration Behind Oscar de la Renta Fragrance Launches

Oscar de la Renta recently debuted two fragrances, Alibi Eau Sensuelle and Bella Tropicale, the first of which was created by Takasago senior perfumer Catherine Selig.

Alibi Eau Sensuelle is described as a "mysterious and seductive scent that allures" created with notes of bergamot, white tea blossom, rose, tiger orchid and sandalwood.

While Bella Tropicale offers "summer paradise in a bottle" featuring notes of pineapple, ylang ylang, coconut water, tonka bean, and ocean mist musk.

Perfumer & Flavorist+ connected with Selig (CS) to discuss the inspiration behind two Oscar de la Renta scents, Alibi and Alibi Eau Sensuelle, as well of the formulation process and themes tied to each creation.

What makes these two fragrances fit the Oscar de la Renta brand?

CS: The fragrances Oscar de la Renta Alibi and Alibi Eau Sensuelle translate into scent the Oscar de la Renta brand's modern femininity and timeless elegance.

These two fragrances fuse with the skin to add an invisible magic touch to the brand in line with the vision of the fabulous creative directors Fernando Garcia and Laura Kim.

What inspired each of these fragrances?

CS: Alibi was crafted like a fashion design. A unique mélange of materials was fashioned to express the duality of the contemporary woman today; powerful & free spirited with a sense of adventure.

Alibi Eau Sensuelle was inspired by the confident and mysterious side of the Oscar woman. I wanted to craft a seductive fragrance that would fuse with the skin like a soft whisper; a gentle touch that lingers to create a sense of intrigue, a warm and luxurious signature.



Takasago senior perfumer Catherine Selig.

Can you touch on the formulation of Alibi Eau Sensuelle? How do these ingredients coexist?

CS: Alibi Eau Sensuelle resonates with all the senses and fuses with the skin in a unique harmony.

At first breath, soft undertones of bergamot and white tea introduce the luxurious floral heart of rose, osmanthus and tiger orchid. As the fragrance dries down, the warmth of the base exudes confidence and sensuality with notes of skin musk, sandalwood and amber.

Did any trends or themes drive the creation of these fragrance? If so, how?

CS: The creative process behind Alibi and Alibi Eau Sensuelle fragrances was an emphasis on the five senses to create an unforgettable experience for the wearer. These fragrances were crafted with precious, luxurious and textured ingredients that feel like a second skin.

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LUZ VAQUERO

The fragrance creation director shares their industry journey.

Luz Vaquero, fragrance creation director, Iberchem

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

Luz Vaquero [LV]: I have always been attracted to science since I was a child, but, at the same time, I had a creative side that I enjoyed exploring. When I discovered the job of the perfumer, I knew it was for me—a job in which science and creativity wonderfully converge. It's a perfect combination that I have been developing for more than 20 years now.

***P&F+*: What is your first scent/olfactory memory?**

LV: I can't say for sure what my first olfactory memory was, but I remember two smells from my childhood that left their mark on me.

The first was the peculiar smell of my grandfather's house; I loved that fresh, wet, green smell and I still remember it perfectly even today.

The second one was the smell of the beach. That warm, salty smell always takes me back to those long Mediterranean summers.

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

LV: 1. Lemon: Citrus fruits are part of my Mediterranean roots, and I love their energy and joy.

2. Iris: This is a discreet yet elegant flower; it doesn't call out for your attention, but its presence is unmistakable.

3. Amber: Powerful, strong and long-lasting.

***P&F+*: Any advice for people coming into the fragrance industry?**

LV: Put all your energy and enthusiasm into every perfume you create and leave a little bit of yourself in every one of them. In that way, all your creations will bear your stamp and will be yours forever.

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

LV: To be honest, it has changed a lot. Work used to be more relaxed, the deadlines for each project were much longer and the aim was, above all, to create a beautiful perfume.

However, immediacy has also impacted the world of perfume. Everything has to be carried out at a faster pace, and, as the consumer has changed, our work has changed too. We no longer remain loyal to just one perfume; we are constantly changing and adapting to each occasion, season and mood. The perfumer has to meet all these expectations and, at the same time, has to take into account not only the beauty of the fragrance, but also all the customer's other requirements, such as effectiveness, sustainability and safety.



Name: Luz Vaquero

Title: Fragrance Creation Director

Hometown: Murcia, Spain

Location: Spain

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2,6,6-Trimethyl cyclohex-2-ene-1,4-dione is extremely effective in honey flavors and works well in all different floral categories.

BY JOHN WRIGHT
johnwrightflavorist@gmail.com

Flavor Bites: 2,6,6-Trimethyl cyclohex-2-ene-1,4-dione

2,6,6-Trimethyl cyclohex-2-ene-1,4-dione in berry, orchard, savory, brown, citrus, nut and other flavors.

The character of saffron is one of those immensely frustrating aromas that are very attractive in isolation, but something of a challenge in compositions. 2,6,6-trimethyl cyclohex-2-ene-1,4-dione (FEMA# 3421, CAS# 1125-21-9) skillfully combines a dominant damson note with a delightful undercurrent of saffron. Now the saffron note is much easier to use to good effect. This chemical, which is often referred to as keto iso-phorone, is found very widely indeed in nature and invariably makes a positive contribution.

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.

Berry Flavors

Blackberry: When we look at potentially using 2,6,6-trimethyl cyclohex-2-ene-1,4-dione in berry flavors it is difficult to avoid a comparison with β-damascone. The damson note is an obvious similarity. Thankfully,

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it is not an either/or situation. The two chemicals work well in combination. A good starting point for this ingredient in blackberry flavors is 50 ppm.

Blackcurrant: The same comments hold for blackcurrant flavors. The ideal dose rate is a little lower, 30 ppm, and the combination works equally well.

Blueberry: With blueberry flavors it is not so important to use a combination. Fifty ppm of 2,6,6-trimethyl cyclohex-2-ene-1,4-dione is ideal, used alone.

Cranberry: 2,6,6-Trimethyl cyclohex-2-ene-1,4-dione adds depth and softness to all types of cranberry flavors at around 50 ppm.

Elderberry: Elderberry flavors are highly characterized and interesting, even if they are not yet especially popular. Fifty ppm of the ingredient fits in perfectly.

Gooseberry: Fifty ppm would be too much for delicate gooseberry flavors, but 20 ppm is close to ideal.

Raspberry: With raspberry flavors we are back to the decided advantage of using 2,6,6-trimethyl cyclohex-2-ene-1,4-dione in combination with either β-damascone or damascenone. Fifty ppm is a good level.

Redcurrant: Combinations are also helpful in redcurrant flavors and the ideal level is also similar, 50 ppm.

Strawberry: This is not such an obvious ingredient for strawberry flavors. Nevertheless, 20 ppm adds fresh, juicy nuances.

Savory Flavors

Peppers: 2,6,6-Trimethyl cyclohex-2-ene-1,4-dione, in general terms, is not widely used in savor flavors. There are exceptions. The most obvious are vegetables that, in a strict botanical sense, should be classified as fruits. Bell and jalapeno peppers fall into this category and benefit from levels of this ingredient ranging from 50 ppm to 100 ppm.

Potato: Potatoes must be about as far away from being in the botanical definition of a fruit as it is possible to get. Despite this, a hint, around 20 ppm, of this raw material is helpful.

Seafood: Seaweed flavors are an obvious home for this distinctive chemical. One hundred ppm is a good starting point. Lower levels, around 30 ppm, can work well in all shellfish flavors.

Tomato: Tomatoes, like peppers, are really fruits. They gain authenticity from low additions, around 10 ppm.

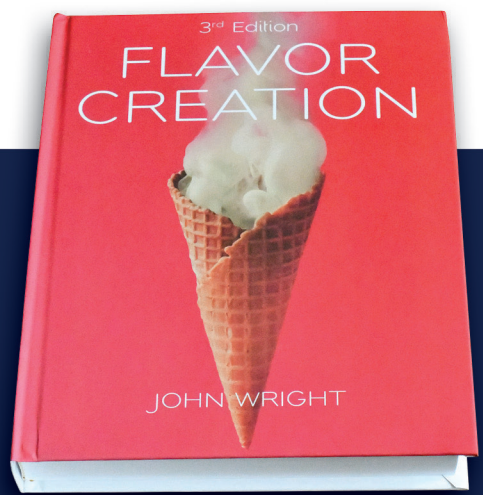


Bell and jalapeno peppers benefit from levels of 2,6,6-trimethyl cyclohex-2-ene-1,4-dione ranging from 50 ppm to 100 ppm.

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Orchard Fruit Flavors

Apple: It can be quite a challenge balancing out the dominant fruity aliphatic esters in apple flavors. At one time α-damascone was a good option. Now 2,6,6-trimethyl cyclohex-2-ene-1,4-dione can be used in a similar way, at around 50 ppm.

Apricot, Nectarine and Peach: This raw material really comes into its own in the peach apricot category. It provides depth and juicy character at around 100 ppm in peach and apricot flavors. Nectarine is a bit more subtle and 50 ppm might be more appropriate.

Cherry: Cherry flavors vary dramatically, but 2,6,6-rimethyl cyclohex-2-ene-1,4-dione is invariably useful. Start at 50 ppm.

Damson: If ever there was a flavor where damascenone was the obvious driving force, it is damson. Even so, 300 ppm of 2,6,6-trimethyl cyclohex-2-ene-1,4-dione works miracles, used alongside damascenone and raises the flavor into a different dimension.

Fig: Much more modest levels are all that is needed in fig flavors. Twenty ppm subtly adds to the background and enhances realism.

Pear: Pear flavors can have much the same issues with excessive ester notes as apple flavors. Fifty ppm of 2,6,6-trimethyl cyclohex-2-ene-1,4-dione smooths things down.

Plum: Plum flavors are not a million miles away from damson flavors, so additions need not be modest. One hundred ppm is only a starting point.

Brown Flavors

Chocolate and Cocoa: 2,6,6-Trimethyl cyclohex-2-ene-1,4-dione is effective in both cocoa and chocolate flavors, adding complexity and authenticity. Eighty ppm is a good level in cocoa flavors, with lesser levels in different chocolate flavor styles.

Maple: Similar levels work well in all styles of maple flavors, blending well with the dominant maple lactone character.

Molasses and Brown Sugar: The same is true for molasses and brown sugar flavors, but the ideal levels are higher. Depending on the profile, from 200 ppm to 300 ppm add lift and realism.

Citrus Flavors

Grapefruit: 2,6,6-Trimethyl cyclohex-2-ene-1,4-dione is found widely in many citrus fruits in nature. As an added component, it enhances juice notes, which is often a big positive. Fifty ppm is an ideal level in grapefruit juice flavors.

Lemon: One hundred ppm is better in lemon juice flavors, having the added benefit of providing a distracting note to partially cover loss of citral.



Fifty ppm of 2,6,6-trimethyl cyclohex-2-ene-1,4-dione enhances the note of fresh juice in both orange and tangerine flavors.

Orange and Tangerine: Fifty ppm of this ingredient enhances the note of fresh juice in both orange and tangerine flavors.

Nut Flavors

Almond and Pistachio: Effective levels of this ingredient in nut flavors are quite modest, but the effect is to add noticeably to authenticity. Thirty ppm is a good starting point in almond and pistachio flavors.

Hazelnut and Peanut: Slightly lower levels, nearer 20 ppm, are all that is required in hazelnut and peanut flavors.

Walnut: Additions used in walnut flavors are the lowest of all the flavors in this category. Ten ppm is ideal.

Other Flavors

Cereals: All cereal flavors can benefit from this raw material, but the level depends very much on the profile. One hundred ppm can only be seen as a rough starting point and can be adjusted considerably up and down.

Chrysanthemum: 2,6,6-Trimethyl cyclohex-2-ene-1,4-dione is perfectly suited to chrysanthemum flavors and contributes to the recognition character. One thousand ppm works very well.

Honey: This ingredient is extremely effective in honey flavors and works well in all different floral categories. Three hundred ppm is generally a decent starting point.

Tamarind: Tamarind flavors are only a minor, but interesting, category. Fifty ppm works well to add realism.

Tea: 2,6,6-Trimethyl cyclohex-2-ene-1,4-dione can be very effective in every type of tea flavors, but the ideal level varies. Black tea is the leader, with an ideal level of 200 ppm. Red tea, such as Oolong, is second, with around 100 ppm. Green tea trails, with an ideal level of 50 ppm.

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Ask an Expert

Senior perfumer Serge Oldenbourg answers burning questions from fragrance professionals.



Serge Oldenbourg, senior perfumer

We sent out an "Ask An Expert" alert on socials, to see if F&F professionals had any burning questions. *Perfumer & Flavorist+* tapped senior perfumer Serge Oldenbourg to field three questions that were "mailed" in. Below are Oldenbourg's insights—

After mixing the perfume concentrate in the factory, what happens next if it doesn't smell as intended?

Serge Oldenbourg [SO]: The first question is to ***know what went wrong***. Usually the mixture will be "reworked" and after analyses (GC and olfactive) by adding what is missing or remixed without what is overpowering or overdosed. Any other reason of "error" in production area should not be happening.

What is the end use of cinnamon leaf oil?

SO: Cinnamon leaf oil is basically another way to use eugenol. This oil contains about 90% of the eugenol, which you find also in clove buds oil (75%) or clove leaf oil (80%) and many other in far lower amount. These values are approximative and may vary according to the origin and production methods.

It is to be noticed that the other oil from the "cinnamon" family namely cinnamon bark oil is characterized with the presence of cinnamic aldehyde (about 80%) and little eugenol (3% to 4%); same plant/different parts.

Cinnamon leaf oil smells less valued compared to clove buds oil; a little bit dirtier, less refined. For this reason, it is used in more "technical" applications; for example, in soap fragrances in lower dosage (because of possible coloration problems) or in some detergents; the price is also an important factor!

It is also widely used in tobacco flavors and sometimes in toothpaste.

What's the substitute for galaxolide?

SO: This is ***the*** big question. As you know each material has its own olfactive characteristics and replacements are always problematic. Each time, depending on the type of material and obviously the structure of the fragrance, the perfumer has to "rebalance" their formula.

In the case of galaxolide, it is even more difficult as it is used some time in very high concentration (I have seen examples with over 30%) also due to cost in formula. Even in much lower concentration, and beside the price factor, a "substitution" is not easy; the first question should be to define the

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> Have a question for Serge Olgenbourg or a flavorist expert? Send an email to jtroyli@allured.com.

reason for the requested replacement. Some companies do not want to have the type of musk belonging to the group of polycyclic musks, but it could also be for other reasons.

Besides the price factor, there is also the fact that galaxolide is a good material for detergents (good stability and long lasting on fabrics).

And most important, the musky note forwarded by galaxolide is fitting many types of fragrances (a little bit of "universal" usage) and very well accepted by the consumers (without being conscient).

My conclusion: substituting galaxolide is "a lot of work for no secure results." It may be better to rethink the entire fragrance.

Have a question for Olgenbourg or a flavorist expert? Send an email to jtroyli@allured.com.

p&f+



Cinnamon bark oil is used in more "technical" applications like in soap fragrances in lower dosage (because of possible coloration problems) or in some detergents.



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BEST PRACTICES FOR MENTORING FLAVOR CHEMISTS

Marie Wright will be leading panel of seasoned flavorists discussing best practices for mentoring aspiring flavor chemists at *Flavorcon* 2023.



To give flavorists and product developers the tools they need to succeed in an increasingly complex market, Flavorcon *will connect the dots among emerging R&D advances, food and beverage market and flavor trends.*

To give flavorists and product developers the tools they need to succeed in an increasingly complex market, *Flavorcon* (November 8-9) will connect the dots among emerging R&D advances, food and beverage market and flavor trends, and supply chain innovations.

One of these sessions will be moderated by Marie Wright, who will be leading a panel of seasoned flavorists discussing best practices for mentoring aspiring flavor chemists.



Marie Wright, President of Creation, Design & Development and Chief Global Flavorist at ADM

Marie Wright is a transformational leader with extensive technical marketing and global technical management experience driving creative ingenuity with her team to deliver ground-breaking flavor solutions that satisfy global tastes. Wright presents internationally, and she founded a unique mentorship program for future flavorists.

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Panelists



Katie Crowley, Senior Flavorist at ADM Nutrition

Katie Crowley, graduated from the University of Cincinnati with a BS in Chemistry. "I have a deep passion for this career. I get lost in conversation about my training, especially to those aspiring to trek this journey themselves. The industry is ever evolving, and learning new ways of working and areas of creativity is what makes it so exciting." Crowley and her husband, Brian, are parents to three children. Macie, 10, and twin boys Will and Luke, 8. "I went through training, while juggling pregnancy, motherhood and work. Do what you can, when you can and be present in the space you are in."



Richard Dandrea, Principal Flavorist at Robertet

Richard Dandrea is currently a principal flavorist and manager of the Robertet Flavor Development Laboratory in Piscataway, New Jersey. Dandrea has been involved in flavor creation for 35 years and is a certified member of the Society of Flavor Chemists. Dandrea has a BS degree in Food Science from Rutgers University and an MBA from Fairleigh Dickinson University.



Alpa Roman, Certified Senior Flavor Chemist at Lucta

Alpa Roman is a certified senior flavor chemist at Lucta, located in Mahwah, New Jersey. During her 28 years at Lucta/FFS, Roman's focus has been on creative flavor development for the food, beverages and pharmaceutical industries. With over 30 years of flavor industry experience, she previously held positions at Ungerer & Co., Bush, Boake, Allen and Hagelin & Co. Roman is an active member of the Society of Flavor Chemists since 1999, where she mentors and trains aspiring flavorist. Additionally, Roman was the past president of Chemical Source Association and on the board for WFFC where she co-chaired the Education Seminar.

The fourth and final panelist will be announced in the coming weeks.



Attendees on a guided tour through a lineup of organoleptic materials with the help of Cyndie Lipka and John Wright.

Flavorist Master Class

New to *Flavorcon*, this first-come first-served pre-*Flavorcon* session is designed to take attendees on a guided tour through a lineup of organoleptic materials with the help of Bell Flavor & Fragrances principal flavorist, Cyndie Lipka, and independent flavorist and "Flavor Bites" columnist, John Wright. Attendees will be split into two groups, first attending a 45-minute session with one of the flavorists and then swapping to join a 45-minute session with the other. These sessions are a $50 add on to your conference registration.

This event is limited seating so be sure to register ASAP secure your seat, visit *www.flavorcon.com*.

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Registration is now open for *Flavorcon* 2023! Scheduled for November 8-9 in Cincinnati, OH, be sure to visit *www.flavorcon.com* to receive the best rates.

The two-day conference will include a series of data/analytics presentations, interactive educational talks and panel discussions featuring some of the industry's leading experts. Attendees will come away inspired with new tools and connections to create flavorful wins and products consumers love.



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In this article I describe the relationships of fragrances and colors by sharing some of my experiences bringing color into my creations.

Floral Family **Blossoms** with **Versatility** for **Perfumers**

Six florals to keep on your radar when formulating.

BY NEHA OKHADE, perfumer, Agilex Fragrances

Perfumery is an artform that allows me to bring life to many abstract ideas. It has the power to illustrate my creative ideas in the utmost convincing way. Mary Webb describes this thought in a very beautiful way, "Fragrance is the voice of inanimate things." I always think being a perfumer allows me to bring life to my ideas by using my magical palette of fragrance ingredients. My fragrance creations touch lives and souls in so many different ways.

In this article I describe the relationships of fragrances and colors by sharing some of my experiences bringing color into my creations. If you are one of my regular readers, you probably observed my writings are inspired by my culture, traditions and of course, mother nature[a]. This article will continue this tradition.

Recently, I celebrated Indian festival of colors called Holi (which also marks the beginning of spring). This is a festival where we put color on each other. It's a symbol of friendship, love and affection. During Holi parties, we find heaps of different colors kept on the tables, people put those colors on each other's face. The atmosphere is surrounded by joy, some energetic music and lots of happiness and laughter. As I enjoyed reveling in all the colors and children were immersed in a world of rainbows I realized, every strike of color was a ray of hope, happiness and peace! It compelled me to think, how easily I can relate colors to fragrances or vice versa. For example, whenever we describe a fragrance with marine or ozonic notes, I easily get transported to the blue water waves near the beach. I easily correlate certain shades of blue with marine fragrance notes. Similarly, if I describe a fragrance as grassy or leafy the first color which comes to my mind is green. Whenever a fragrance has connoted an expression of romance or love, I think of the color red and rose nuances. Comfort or sexy notes in my fragrances are through creamy cashmere notes and goes to the color white. Citrus fragrances are yellow and orange colors, while strawberry and raspberry notes lead to a world of pink and shades of red.

Indian tradition of drawing Rangoli in front of a home is a great source of inspiration. Rangoli is an art form that uses multi-color decorations drawn on the ground in front of a house. It is to welcome guests, a huge part of decorations during most of Indian festivals and celebrations, bring joy and prosperity into homes. Rangoli is almost like a painting illustrating different shapes, expressing emotions with the help of different colors. I am not good when it comes to drawing, however, I appreciate this art and have a lot of childhood memories associated with it. During my youth, for any festival or celebration my mother would draw a beautiful rangoli in our front yard. My favorite design she made had a peacock drawing in it. Now, whenever I see colors of deep blue, coral and turquoise, I associate it with that peacock illustration. I associate oceanic, ozonic



[The Holi festival] compelled me to think, how easily I can relate colors to fragrances or vice versa.

[a]*https://www.perfumerflavorist.com/fragrance/ingredients/article/22578143/agilex-fragrances-agilex-perfumer-seeks-inspiration-from-nature-for-fragrance-formulation*

breezy notes with those peacock colors and have created many beautiful tropical floral fragrances inspired by these colors. Today, whenever I see a home with Rangoli in its front yard it makes me nostalgic. The Rangoli colorful expressions take me back to days and celebrations of my childhood, flooding my memory and senses with essence of sandalwood, jasmine flowers and coconut notes.

Above I wrote about traditional Rangolis filled with many colors, but some modern Rangoli designs have also incorporated flowers and flower petals. A perfect combination of inanimate colors from chalk and paint combines with the beautiful creations of mother nature and adds even more expression to the creation. Whenever I come across such designs, I feel like I'm witnessing a fragrant rainbow! Inanimate objects in amalgamation with the most fragrant creations from mother nature is another source of inspirational ideas helping my creative juices flow and bring a naturalness and depth to my fragrances.

Discovering Florals

I just touched on flowers and colors and would like to now include one of my favorite fragrance families. The floral family, mother nature at her best. Flowers add colors and fragrance to the whole world in the most artistic way! Being born and brought up in India, I have a close association with the floral family. Flowers play a huge role in India tradition. In almost all festivals and celebrations we decorate our homes with flowers. Flowers not only add colors to the celebrations but also infuse the entire atmosphere with a serene fragrant aura which fills up the entire atmosphere with happiness and joy.

Marigold

While growing up, I was surrounded by a variety of flowers. One of my most favorite flowers which I would never imagine any celebrations at my home without is marigold. We would decorate our entire house with marigold strings. This flower is unique. Its color ranges from yellow to orange and it has a very strong fragrant persona. The floral nuances of these flowers are supported by indolic notes (an animalic note). I remember, in my childhood, I would create marigold strings by myself for decorations. These marigold flowers are so fragrant that their aroma lingers on our hands for a long time after they are hung. These flowers have small green stems to them and this green stemmy note adds a special nuance to its aroma. Marigold, in its true glory imparts joy and happiness to all my celebrations with its aroma as well as all its vibrant colors.

Jasmine

Jasmine, a white flower that has a fragrant, intoxicating, rich floral odor is another flower and color that has influenced my childhood. A beautiful white floral fragrance with a distinctive animalic note is its persona. In India, there is a beautiful tradition of ornamenting women hair with strings of flowers. Jasmin wins hearts when it comes to putting these beautiful delicate floral strings into women's hair. These pearl white, delicate flowers add a distinct nuance to celebrations but also somewhere resonate the feeling of calmness, purity, and peace!

Rose

As I continue this colorful fragrance journey, I cannot forget about the epitome of romance, a flower which is a show of love. This beautiful fragrant flower is none other than the rose. A beautiful fragrant flower, which diffuses into the air its essence of sweet yet fresh floral nuances. My backyard is adorned with rose trees. Even though roses are available in different colors like red, white, yellow and many more hybrid collections, my favorite is red. The red rose has its own beauty and charisma. Rose is an integral part of many of my fragrances, like jasmine it contributes to almost every fragrance category. Fruity notes like strawberry can be made sophisticated and more natural, a touch of fresh rose ingredient like damascone gives strawberry a very fresh natural facet. I always correlate the color red with roses helping me to design some fragrances showing the floral epitome of love with a beautiful romantic saga.

Muget

Another floral family which is an integral part of my creations is muget. I always refer to muget as lily of the valley and describe it as a combination of white and green floralcy with a touch of marine notes. These delicate flowers' aroma invokes a calmness and tranquility. For me, muget accentuates a perfume by enhancing its heart note. Muget notes act as a heart note for many marine and fruity fragrances. The nuances of muget are magic, providing a natural effect to a fragrance making it livelier.

Frangipani

As I continue our journey through this colorful fragrant odor family, I am observing that vibrant flowers are not only adding color to mother nature but also manifesting the beauty of a fragrance. Another flower very close to my heart is frangipani (Plumeria). This flower can be found throughout



As I am writing this article, I am transported back to my hometown where my family and I would regularly visit the flower market especially during festivals.

Hawaii. The many varieties of this fragrant flower fill the Hawaiian air with the smell of gardenia nuances twisted with fruity notes like peaches and creamy lactones This tropical flower can be white, yellow, pink or multi-color. I always get the impression from its color and smell that Frangipani is imparting calming, serene emotions along with a feeling of joy at the same time. Somewhat like the feeling which I experience during a tropical vacation! Olfactively, frangipani flowers are a sophisticated, lush, rich floral character which can be a beautiful fragrance on its own. Frangipani notes have a very strong personality, adding nuances of this note can be the key to turning tropical fruit or coconut fragrances more sophisticated and richer.

Lilac

The floral family is one of my favorite families when it comes to creation. Every flower has a story to tell. One such flower which makes me very emotional is the lilac. Lilacs are highly fragrant flowers with a sweet, pleasant scent. They add color and beauty to the spring landscape every year. Each color has a different meaning: deep purple has a connection to the spiritual world while light purple is symbolic of first love. My favorite and the one which brings emotion to me are the white petals. White lilac is symbolic of divinity, innocence, purity, and new beginnings. For me, the lilac scent is very floral powdery, bringing to mind the scent of baby products. The white lilac meaning with the floral, powdery scent reminds me of the young days of my son when he was a little baby, bringing many loving thoughts and images to my mind.

The Power of Scent

As I am writing this article, I am transported back to my hometown where my family and I would regularly visit the flower market especially during festivals. People would keep colorful, fragrant flowers in wooden carts or cane baskets to sell. It used to be a very aromatic environment with lots of colors. I remember seeing vendors sprinkling some water on flowers at regular intervals to keep the flowers fresh. It was like being on a different planet. Everything was so pure and colorful! That image and smell remain vividly in my memories to this day. In the beginning of the article, I shared experiences of the amalgamation of different colors and fragrance notes. However, whenever I go to a flower market, it's different, floral notes are unified into a single note which still remains fresh in my mind. Today whenever floral creation comes to my mind, I always add some woody and marine notes to that fragrance as it reminds me of the floral market. My memories will always take me back to that flower market full of hustle and bustle, color, festivity and cheerfulness!

I hope you have enjoyed my journey of color and fragrance notes. I tried to share some insight into how I as a perfumer view the world of color and turn those colors into ingredients on my palette. While my palette may have some limitations, it seems mother nature in all her beauty has no limit. May your world be full of color and have no limits too!

PERFUMER NOTES: AUSTRALIAN SANDALWOOD

Pierre Bénard returns to the column to discuss the ingredient he descrribes as an “inexhaustible source of inspiration” for a perfumer.

BY PIERRE BÉNARD, creative perfumer



Pierre Bénard



If we plunge our nose into the extracts of logs or roots, living or dead, the olfactory descriptors are differentiated. For the logs, the smell is certainly rich and woody with phenolic accents, rubbery like guaiac wood, warm and spicy like nutmeg,

Sandalwood enhances floral accords. It gives voice to silent flowers like lily of the valley.

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In this month's edition of "Perfumer Notes," perfumer-creator Pierre Bénard joins *Perufmer & Flavorist+* (*P&F+*) to discuss the nuances of formulating with Australian sandalwood. You can find Bénard's notes on tuberose[a] in the November 2022 issue.

***P&F+*: What comes to mind when first experiencing the material?**

Pierre Bénard [PB]: There are materials, such as olibanum resin, popularized under the name "incense," whose scents cross the minds and, throughout history, humanity. Beyond all religious beliefs, sandalwood soothes your mind.

My first contemplation of its essential oil was during my training as a student perfumer in 2006 in Grasse. The volatile extract invited me to these motionless journeys—not those who transport you in your memories—rather, those who bring you to the doorstep of your imagination.

Transcended by this new smell, my vision was nomadic like the flight of a boomerang over arid lands of dust and spices.

A common interpretation to that of Michel Roudnitska, imagined for his multisensory show *Un Monde en Senteurs* which I discovered during the 9th Perfume Day in Grasse in 2007. This certainly contributed to my interest in olfactory scenography in the field of culture.

***P&F+*: How is this material sourced? Is it easy to find/acquire?**

PB: *Santalum spicatum* is native to the semi-arid regions of southern and western Australia. It is the oldest living fragrant species of Santalum, said to be some 13 million years old. Aboriginal people venerate this wood and crown it under the name of "Dutjahn."

There are other species endemic to the largest country in Oceania, such as *Santalum obtusifolium*, l*anceolatum*, *preissianum*, *murrayanum* and *acuminatum* species.

The perfume industry essentially exploits three species of sandalwood (Santalum). Two of which are *spicatum* and *album*, which are native to India, and *austrocaledonicum* which is found in New Caledonia and Vanuatu.

Sources of many commercial exchanges, the "austral sandalwoods" (as I like to call them) have been overexploited. In the 19th century, colonial frigates even bore the name "santaliers." They were loading their holds to barter it for tea.

In 1893, José-Maria de Heredia wrote in his book *The Conquerors of Gold*, "The coast was lowering, and the sandalwoods exhaled their fragrant breezes over the sea."

[a] *https://perfumerflavorist.texterity.com/perfumerflavorist/november_2022/MobilePagedArticle.action?articleId=1830625#articleId1830625*

> "Far from being a substitute, Australian sandalwood is a lover, an exalter that brings other materials to the top."

Since the 1990s, people in Australia have been repairing and regenerating their forests.

***P&F+*: What have you used/what would you use this material in?**

PB: Guarantor of knowledge and an olfactory experience, the perfumer becomes a "scent-seï." When I was working for a raw materials and compositions company in Grasse, in the presence of my Japanese trainee, we were designing fragrances for incense typical of her country. It was then necessary to integrate into the design of the finished product, sandalwood powder which, in addition to its smell, served as a fixed base.

Fragrant or architectural, this wood will serve as a scented framework for a perfume or a temple. Over time, measure of luxury, the essential oils of this tree will refine a fragrance.

***P&F+*: Could you touch on this material's versatility?**

PB: We know that the aromatic profile of the essential oil from the same plant varies according to numerous parameters—its geolocation, according to the soil, according to the meteorology, particularly the rate of precipitation, if the harvest comes from a plantation or if it is uncultivated.

Regarding the essential oil of Australian sandalwood (*Santalum spicatum*), its versatility is deeply rooted in the different parts of the tree.

If we plunge our nose into the extracts of logs or roots, living or dead, the olfactory descriptors are differentiated. For the logs, the smell is certainly rich and woody with phenolic accents, rubbery like guaiac wood, warm and spicy like nutmeg, There is this empyreumatic sensation, vivacious as heated flint. A certain minerality like that of gunflint aroma that we identify in certain Riesling, Chablis or Sancerre wines. More puzzling is the bold, green, floral effect of a rose, just waiting to pair with the flower.



Dry essential oil's essence is present when distilling this oil from "dead wood" harvested from wild trees that have existed for years in the desert.

A certain dryness is often noticed in sandalwood. These dry woody notes come from α-santalene, α-santalol and α-santalal molecules. By distilling the roots and butts of the tree, they are made slightly more vetiver and much creamier. At low concentrations, pyrazines are their charms, their intense odors cause effects of pepper, hazelnut or toasted sesame.

Another discovery is that of the essential oil called Desert Dry. It would be logical to think that after the death of a living being, its soul releases. However, the essence is present when distilling this oil from "dead wood" harvested from wild trees that have existed for years in the desert.

***P&F+*: In what types of formulations could it be used as a star? Or even as a supporting role?**

PB: These multiple facets make Australian sandalwood (*Santalum spicatum*) an inexhaustible source of inspiration for the perfumer-creator.

Sandalwood enhances floral accords. It gives voice to silent flowers like lily of the valley, with which it shares the same molecule iso-β bisabolol. Invisible to the nose, with its heart, the essential oil takes care of your roses and touches them. By co-distillation to obtain the attars, it infuses them in an archetypal accord.

In the various scent composition *Santalum*



spicatum, much like *Amyris balsamifera*, has often been given a secondary role, mainly replacing Indian sandalwood, *Santalum album*.

Historically, many of us perfumers have found this essential oil too racy, but new processes allow us to carve this wood, to refine it. By eliminating hydrocarbon compounds and others, fractional distillation will reveal santalol, this fraction of various alcohols such as vetiverol for vetiver.

Far from being a substitute, Australian sandalwood is a lover, an exalter that brings other materials to the top. Its exquisite complexity reveals new and unprecedented accords.

***P&F+*: Is this material reminiscent of anything you've worked with in the past? If yes, how so?**

PB: The smell of sandalwood takes me back to the memories of my olfactory study trip to Japan. It reminds me of my discussion about perfume with a geiko (a woman of art), during a spectacular meal in Kyoto. Her fan was infused with the scent of those traditional short sticks of incense. She carried no other scents.

Sandalwood reminds me of my trip to the island of Awaji which is known for the Koh Shi which translates to "masters of perfume." I encountered makers on this island who create sticks composed of materials with precious scents, mainly woods and spices from elsewhere such as kyara (the highest grade of aloeswood).

Before visiting the factories, my olfactory initiation begins at the water temple, a Buddhist sanctuary, designed by the architect, ex-boxer, Ando Tadao. The entrance is through the roof of the building crowned with an oval pond of water lilies. A concrete staircase guides me to a lower space, underground, where an atmosphere of tranquility pervades me. The bright red woodwork is revealed by the light. Barefoot, I settle in front of the cencer and Buddhist icons.

I sprinkle a powder of a mixture on the charcoal and disperse with my hand the smoke and the perfume which materializes towards my nose. The slightly pyrogenic scent is made up of sandalwood and an amber accord. I meditate.

***P&F+*: What makes this material unique?**

PB: The essential oil contained in aromatic plants can also have the function of refracting light and protecting them from ultraviolet rays. That of sandalwood harmonizes our scented compositions. Milky or animal, it is like a second skin.

In many social and spiritual rituals, sandalwood powder protects our envelope. It is part of the composition of the "thanaka" used in Burma or the Madagascan "masonjoany" to cover the face and defend against the sun's rays. This makeup is sometimes applied to the skull during prayers. It is soothing and participates in meditation.

For me, the essential oil of this native Australian sandalwood is like Aboriginal body paint. Its white color is like the color of spirits. Aboriginal people say that drawing the sacred patterns on the chest of the child is to transfer discipline, self-respect and respect for others.

Perfume opens the mind and an olfactory education brings respect and tolerance. My paintings are invisible.



Through the science of aromachology, functional fragrance makes you smell good and can unlock your subconscious, making you feel calmer, happier and less stressed.



BY ANA PRIETO, product manager, Quintis Sandalwood

Linking Scent and Well-being Through Functional Fragrance

Looking into the new generation of alluring mood-boosting scents steeped in wellness.

Smell and memory are intrinsically linked because of the brain's anatomy, which is why smelling something beautiful can evoke feelings of empowerment, pleasure and calm. Our memories are also stored here, so a favorite scent can help us recall long-lost moments and treasured people and places.

The appeal of perfume is sentimental and seductive and, for many, a luxurious step in dressing each day. It's also good for you. Just a sniff can boost your mood and elevate your day making perfume the ultimate in self-care.

Fragrance has been used to create ambience for self-care for centuries. The Romans used essential oils to create atmosphere during sumptuous banquets, the ancient Egyptians scented the wings of doves and incense is still burned in religious ceremonies today. Now, thanks to modern science, we know how our brains read different scents and tap into our emotions.

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Welcome to the world of functional fragrance—a new generation of alluring mood-boosting scents steeped in wellness. Through the science of aromachology, functional fragrance makes you smell good and can unlock your subconscious, making you feel calmer, happier and less stressed.



Aromatherapy strictly uses natural oils and extracts from plants and herbs for inhalation and massage to improve your sense of well-being and health and for their positive effects on mood and emotion.

Scent's Power

A recent study[a] revealed that smell triggers up to 75% of our daily moods, affecting our temperament, stress levels, and cognitive function. Because of this, we are 100 times more likely to remember something we smell over something we see, hear or touch.

Other research shows that there is a 40% improvement in mood after being exposed to pleasant scents.[1] These are impressive statistics, but not surprising given smell is the only sense with a direct connection to three parts of the brain. These are the orbitofrontal cortex, which plays a key role in emotion; the hippocampus, which is linked to memory; and the amygdala, a pair of small almond-shaped regions deep in the brain that regulates emotion and encodes memories. When activated, it releases neurochemicals that can alter our emotional state.

Aromachology & Aromatherapy

While aromachology and aromatherapy sound similar, they are very different. Aromatherapy strictly uses natural oils and extracts from plants and herbs for inhalation and massage to improve your sense of well-being and health and for their positive effects on mood and emotion, while aromachology is interested in how the brain deciphers scents and translates them into emotions which impacts our moods and feelings.

Another notable difference is that aromatherapy has been around for centuries and can be dated back to ancient Egypt, while aromachology is a relatively new exploration, with the term covering both natural and synthetic scents.

When the concept of aromachology started to develop, and tests were undertaken to understand how different scents evoked different emotions and senses, and this was quickly noticed and adopted by the cosmetics industry where companies and formulators began marketing products according to their psychological benefit and the functionality of fragrance.

What is in a functional fragrance?

Skin is the largest organ, so whatever we put on it is absorbed into the bloodstream.

Its composition of natural essential oils and synthetics utilizes the therapeutic benefits of botanicals to provide various forms of well-being, from stress release and increased libido to more energy and lower blood pressure. When applied to the skin, the plant oil's physical molecules enter our body through our bloodstream, impacting our physiological,

[a] *https://us.moodmedia.com/scent/scent-research/*

emotional, and psychological responses, alleviating stress responses and prompting neurological responses that can improve our health.

The effectiveness of functional fragrance lies not in the quantity of its particular ingredients, but in how you register and respond to its scent.

Knowing what is in a functional fragrance is essential as in any wellness product. The right essential oil or blend can heighten your senses and alter your mood. For example, the scent of bergamot and lemon can be energizing while peppermint essential oil is used to improve focus, concentration and overall mental clarity.

The Power of Sandalwood

Sandalwood has been used for millennia to calm the mind, relieve anxiety and reduce signs of ageing and skin inflammation. Its golden warmth has spiritual significance but is also used as a popular fixative in fragrances, ensuring they last longer on the skin.

In aromatherapy, sandalwood's benefits have long been a time-honored tradition. Burning Indian sandalwood incense during worship is believed to be able to elevate the spiritual awareness that brings Buddhists closer to enlightenment, so much so that when Buddha, Siddhartha Gautama, died in 543 BC his body was cremated on sandalwood.

The spiritual benefits of Indian sandalwood include purifying the mind, enhancement to meditation and a connection to the divine while having the ability to evoke nostalgia.

A functional fragrance composed of wellness-evoking notes and sandalwood means not only are you spritzing yourself with scent, but you are also smelling it all day, which is integral to enjoying a functional fragrance's benefits.

Clean, sustainable, and mindfully formulated, functional fragrance taps into the mood-boosting benefits of aromachology while smelling as complex and beautiful as your favorite perfume.

Because why just smell great when you can feel good too?

References

1. How do you feel when you smell this? Optimization of a verbal measurement of odor-elicited emotions, Elsevier, 2010, Porcherot C, Delplanque S, Raviot-Derrien S, Le Calvé B, Chrea C, Gaudreau N, Cayeux I.

p&f+

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Mushroom absolute's woody and earthy aspect would fit nicely in savory and reaction flavors or for use in roasted vegetables including corn, potato and green bell pepper for leathery background notes.



BY CYNDIE LIPKA
Principal flavorist,
Bell Flavors and Fragrances

Flavor Materials Report

Flavorist panel evaluates betaine, mushroom absolute, gentian infusion and other materials.

Organoleptic Evaluation Panelists

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

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(-)-a-Bisabolol

Source: MilliporeSigma
FEMA# 4662, CAS# 23089-26-1
Naturally occurring in chamomile.
Odor: @ 1%. Slightly floral, heavy pleasant, slightly woody, warm spice linger, somewhat clove like and terpenic.
Taste: @ 10 ppm. Bitter, floral, woody, earthy, some tongue tingle, numbing, drying, spicy, oily, terpenic, mild cooling.
Taste: @ 20 ppm. Very bitter, waxy, brown, spicey, more noticeable cooling, numbing.
Possible applications: This optically active alcohol would lend itself to spice profiles like spice drops, chai, clove, vanilla and pumpkin spice. Some of the panel detected a mild numbing similar to Jambu. Certainly would also work in bitters profiles.
➤**MilliporeSigma:** *www.sigmaaldrich.com*

e,z-2,6-Nonanediol

Source: Bedoukian
FEMA# 2780, CAS# 28069-72-9
Naturally occurring in cantaloupe, cornmint, cucumber, violet leaves, watermelon.
Odor: @ 0.01%. Sweaty, tea, slightly earthy, floral, green, slightly fatty, sweet, cucumber, green melon, coriander leaf, fishy on the dry out.
Taste: @ 0.01 ppm. Slightly pulpy, tea-like floral, green, soft, melon rind, slightly fatty, mouthfeel, fresh, vegetal.
Taste: @ 0.05 ppm. Pulpy fatty, green, cucumber, rindy, distinctly melon and cucumber, fresh. Robust and not offensive!
Possible applications: The soft approach of this nonadienal relative was very much appreciated by the panel. What was sort of interesting was the dry-out and we mentioned matcha and mandarin because of that effect. However, other named uses included all melons, cucumber, pear, apple, all the stone fruits, kiwi, strawberry, guava, papaya, mango, and green bell pepper. For savory thoughts salmon, tuna, and roe or caviar were mentioned.
➤**Bedoukian:** *https://bedoukian.com/*

Betaine

Source: MiliporeSigma
FEMA# 4223, CAS# 107-43-7
Naturally occurring in roots and shoots from: Artichoke, barley, beet, carrot chicory, corn, oat, orange, pea, bell pepper, peppermint, soybean, spinach, tomato, wheat.
Odor: @ 100%. Vegetative, musty, animalic, earthy, and perhaps putrid.
Taste: @ 20 ppm. Slightly musty, slightly savory.
Possible applications: It was apparent to the panel that the material needed to be a somewhat higher dosage to get an appreciation for its use. Most gravitated towards an asparagus description. It certainly is found in quite a few places, and with the structure of the material, we felt it might bring unification to those named profiles or also be used in reaction flavors.
➤**MilliporeSigma:** *www.sigmaaldrich.com*

Eucalyptol, Organic

Source: Excellentia
FEMA# 2465, CAS# 470-82-6, natural
Naturally found in allspice, anise, basil, bay leaf, bergamot, bilberry, blueberry, cardamom, carrot, cassia bark, cinnamon bark, clary sage, eucalyptus, fennel, galangal, ginger, laurel, lavendin, lavender, lemon verbena, lemongrass, distilled lime, marjoram, orange bigarade, oregano, peppermint, rosemary, sage, savory, spearmint, thyme, yuzu.
Odor: @ 0.1%. Slightly medicinal, slightly sweet, fresh, pine, cooling, camphoraceous, subtle spice, refreshing.
Taste: @ 0.05 ppm. Woody, mild cooling, low, fresh, light eucalyptus, camphor.
Taste: @ 0.1 ppm. Herbaceous, rosemary, sage, minty, sweet, fresh, cooling, woody, herbal, camphoraceous.



(-)-a-Bisabolol would lend itself to spice profiles like spice drops, chai, clove, vanilla and pumpkin spice.

Possible applications: Well, let's just get this one out of the way and mention the use of eucalyptol for mint and oral care profiles. But the slightly sweet profile lends itself to berries, especially cranberry, blueberry, and blackberry. Savory profiles that were named were more oriented towards herbs such as rosemary, sage, thyme and to a more limited extent basil. There were other mentions of use in chicken and pork as well. One added note is that 1,8-cineole provides lift at very low levels to fruit and profiles where freshness is desired.

➤**Excellentia:** *https://excellentiainternational.com/*



At higher levels gentian infusion can be used in bitters, Aperol, gin, Campari profiles.

4'-Hydroxyacetophenone

Source: MilliporeSigma

FEMA# 4330, CAS# 99-93-4

Naturally occurring in coffee, cranberry, mango, orange, sherry.

Odor: @ 1%. Floral, slightly benzoate, musty, slightly animalic, medicinal, slightly plastic.

Taste: @ 0.5 ppm. Too low for the panel.

Taste: @ 1 ppm. Slightly salty, slightly woody, floral after taste.

Possible applications: Looks like we needed to check this out at a higher level, however, I use FEMA levels as guidelines for setting up dosages. The panel thought that this might be fine for use in cherry, cranberry, grape, sherry, wine or port flavors.

➤**MilliporeSigma:** *www.sigmaaldrich.com*

Mushroom Absolute

Source: Robertet

CAS# 84649-97-8l

Odor: @ 1%. Dry, beefy, roasted, corny, earthy, brown, chocolate, dried fruity, musty, cooked, savory.

Taste: @ 0.5 ppm. Meaty, roasted, brown.

Taste: @ 1 ppm. Meaty, roasted, brown, earthy, mushroom, mild, sweet, dried fruit, bitter.

Possible applications: When the panel smelled this material, we were delighted that there were so many other aspects to this other than mushroom so that it could be molded into other flavors with little effort. So, this is certainly not as strong as mushroom concentrates, and so the panel felt that this would work well in dried fruit such as raisin, date, prune and tamarind. The woody and earthy aspect would fit nicely in savory and reaction flavors or for use in roasted vegetables including corn, potato and green bell pepper for leathery background notes. Sweet flavors included both chocolate and maple

➤**Robertet:** *https://www.robertet.com/*

Isobornyl Isobutyate

Source: MilliporeSigma

FEMA# 4146, CAS# 85586-67-0

Naturally occurring in German chamomile and myrrh.

Odor: @ 1%. Floral, brown, slightly musty, slightly musky, woody, soft, slightly minty, cooling, camphor, pine, herbal, fresh, dry.

Taste: @ 1 ppm. Woody, fir needle, slightly medicinal, cedar, musk, slightly floral aftertaste.

Taste: @ 2 ppm. Resinous, woody, fir needle, tea, heavy, herbal, balsamic, musk, pine, fresh, green sweet.

Possible applications: This gem of a compound is really delicious to me. Typically, I find isobornyl compounds to be too earthy to find enjoyable. Anyway, the panel recommends this in root beer,

vanilla, wood fired flavors and toasted marshmallow or s'mores profiles. The floral earthiness makes it amenable to be added to dark berry flavors and even lime or carrot. Some panelists felt this to be a good fit in barrel aged tequila or gin and maybe even for bitters and ranch water profiles. The woody character would lend depth to sage, thyme and rosemary.

➤**MilliporeSigma:** *ww.sigmaaldrich.com*

Gentian Infusion, 25% Natural

Source: Robertet

FEMA# 2506, CAS# 72968-45-7

Odor: @ 100%. Woody, slightly chocolate, herbal, tea-like, sweet, slightly tobacco, brown, earthy, clean, dried fruit, molasses, dried flowers.

Taste: @ 1 ppm. Very slight woodiness.

Taste: @ 2 ppm. Slightly woody, bitter, tea-like, cardboard, astringent.

*Possible application*s: Gentian is primarily known for its bitterness. So, the panel believes that in metered doses gentian would add to dark chocolate, tea, coffee, cranberry, and grapefruit profiles. At higher levels this beauty can be used in bitters, Aperol, gin, Campari profiles.

➤**Robertet:** *www.robertet.com*

Nopol

Source: MilliporeSigma

FEMA# 3938, CAS# 128-50-7

Naturally occurring in carrot, orange bigarade, rosemary.

Odor: @ Neat: Vegetal, slightly minty, terpenic and slightly minty, woody, camphoraceous, piney, lime, earthy, floral.

Taste: @ 1 ppm. Woody, cooling, slightly soapy, pine, root-like

Taste: @ 2 ppm. Woody, musty, cooling, oily, soapy, pine, terpenic, lime, slightly bitter.

*Possible application*s: So, the actual name of this material is 10-hydroxymethylene-2-pinene. This sure lends some insight into the mentions of pine, woody and cooling notes. The panel thought this would find a home in gin and tequila. There were several mentions of berries, specifically dark berries and then some spices such as thyme, rosemary, oregano and turmeric. I saw this as a unifier for asparagus, and rooty things such as carrot, turnip and ginger.

➤**MilliporeSigma:** *www.sigmaaldrich.com*

α-Methylbenzyl Isobutyrate

Source: MilliporeSigma

FEMA# 2687, CAS# 7775-39-5, natural

Not naturally occurring.

Odor: @ 1%. Sweet, tart, grapey, berry, rhubarb, plastic, green, bright, fruity, jammy, tropical, burnt yeast, acrid, cooked.

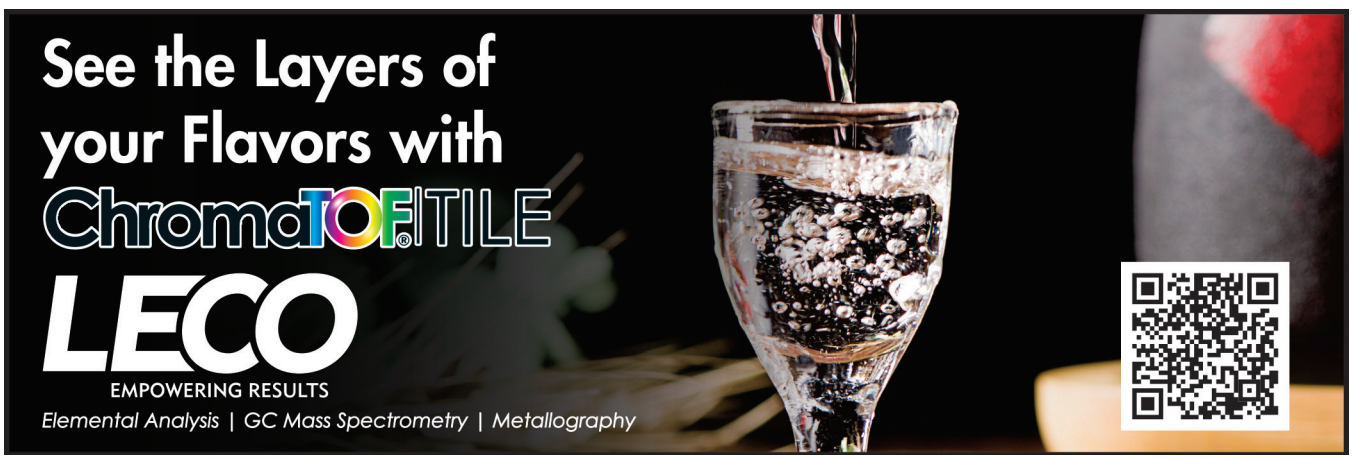
Taste: @ 1 ppm. Green, floral, berry, grapey, vegetative, stemmy, fruity, slightly floral, sweet, cooked, roasted, woody, yeasty.

Taste: @ 2 ppm. Slightly acidic, waxy, berry, green, rhubarb, plastic, sweet, fruity, floral, cooked yeast, beef, soy.

*Possible application*s: Perhaps not nearly as well known as styrallyl acetate, styrallyl isobutyate also can find a home in rhubarb! But could also play a role in strawberry, raspberry, and other berries, grape, and cherry. Other fruits mentioned were tropical profiles such as guava and mango, cooked pineapple, and pear. Our savory guy thought that this would add cooked notes to meat flavors and grilled fruits.

➤**MilliporeSigma:** *www.sigmaaldrich.com*

p&f+



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