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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

Sweet As Pie



Why do we crave sweets? Because we find comfort in them.

I have a confession, dear readers: I have a major sweet tooth. It doesn't really matter the time of day or the occasion. I will always be craving something sweet. I take my coffee in the morning with a sweetened cinnamon creamer, and I usually pack a cookie or two in my lunch on my office days. My brother and I will always take a look at the dessert menu when we go out to restaurants (they have a pastry chef on staff for a reason!).

Why do we crave sweets? Because we find comfort in them. They take us back to fond memories from childhood. And, as well all know, nostalgia can be an incredibly powerful tool in a product developer's kit.

I'm not alone in my love of sweets, nor am I alone in wanting my sweet treats to be a bit healthier. The food and beverage industry has taken the trend of permissive indulgences and created products that satisfy consumers' sweet tooth while also providing added benefits. Now we can have ice cream fortified with protein or chocolate bars with ingredients targeted for focus or a canned coffee with added collagen. You could say that today's consumers can have their cake and eat it, too.

And the sweet trend doesn't just live in the flavor industry; more and more sweet, gourmand fragrances are continuing to dominate the conversation. I interviewed Paul Fino, known on TikTok as @PaulReactss, to learn more about this trend. He told me that gourmand scents are about embracing joy, nostalgia and comfort while still evolving. I think his recent launch, Viral Vanilla: Mango Hour is a perfect example of taking the sweet and familiar and melding it with the tropical new. Watching the fragrance industry re-embrace the sweeter side of things has been fun to watch, and I'm curious to see how this trend continues to grow.

I can almost guarantee that as you read this note, I am thinking about the next pumpkin-flavored treat I'm going to bake next while burning a chai latte candle. What can I say? My sweet tooth doesn't take a break during my favorite month of the year.





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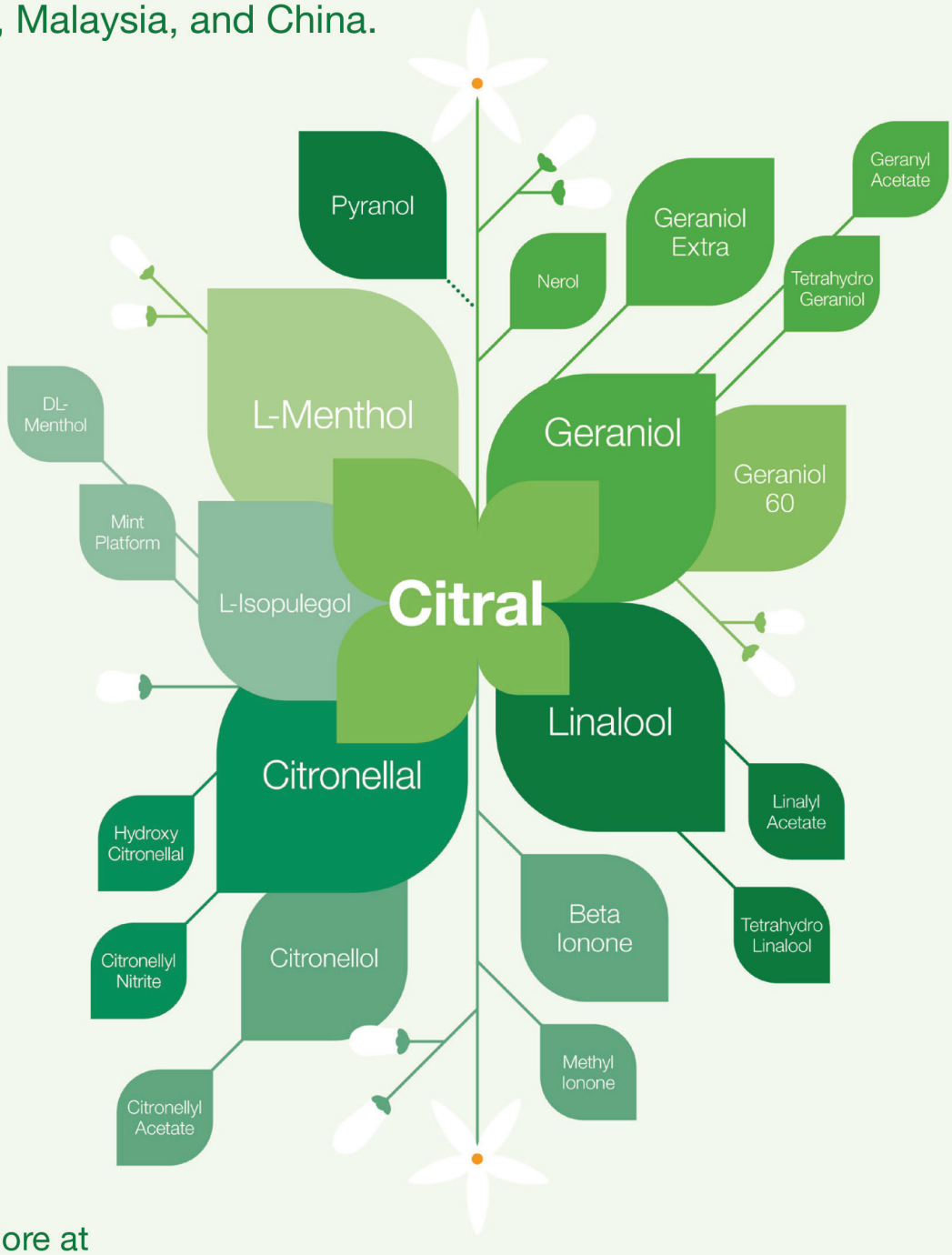
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Ingredients



Velberry

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https://aroma-ingredients.basf.com/global/en/our-portfolio/selected-sensations/velberry

Velberry is an innovative all-purpose superstar, combining freshness with red fruits and a hint of soft and powdery notes. It's a versatile fruity building block offering an excellent blooming effect in all applications, from fine fragrances to personal care products.



2-Oxopropanal, zero formaldehyde (EU Natural)

Xiamen Bestally Biotechnology

http://www.bestally.com/EN/Index.html

Pyruvaldehyde has a characteristic, pungent, stinging odor with a pungent, caramellic, sweet flavor. At 0.1%, its taste characteristics are sweet and caramellic with a dairy, creamy nuance. Suggested applications include condiments, relishes, baked goods, soft candies and frozen dairy products.



2,4,-Decadienal

Axxence USA

http://www.axxence.com/

2,4-Decadienal (FEMA #3135, CAS #25152-84-5) is widely valued for its versatility and distinct fatty, chicken-like odor. In citrus applications, it contributes depth and complexity to orange and grapefruit profiles, enhancing brightness with a natural oily richness. In savory systems, it brings authentic intensity to beef and chicken, adding fried, juicy and fatty nuances that round out the overall flavor. It is also well suited for potato, French fry and roasted applications, where it delivers authentic savory notes.



PRT Enhancer 10X

Avant Organics

http://avantorganics.com/

PRT Enhancer 10X (1058TM) is a specialized ingredient designed to improve the sensory experience of protein-based products. It works by enhancing the overall mouthfeel, creating a smoother and more enjoyable texture, while reducing the unpleasant or gritty sensations often associated with proteins. By optimizing the mouth-feel presence in formulations without interfering with the desired flavor profiles, PRT Enhancer 10X helps product developers achieve a balanced and satisfying consumer experience across a wide range of applications such as protein drinks and baked goods. Avant Organics provides this material as EU Natural, Kosher, and non-GMO.

Images courtesy of the manufacturers

Brewing up BOLD FLAVORS

Cocoal, Natural
FEMA 3199
~ cocoa, chocolate, coffee, nutty

2,5-Dimethyl-3(2H)-furanone, Natural
FEMA 4104
~ caramel, sweet, nutty, roasted, coffee, baked

Natural Pyrazines 10
~ nutty, earthy, roasted, cocoa, coffee

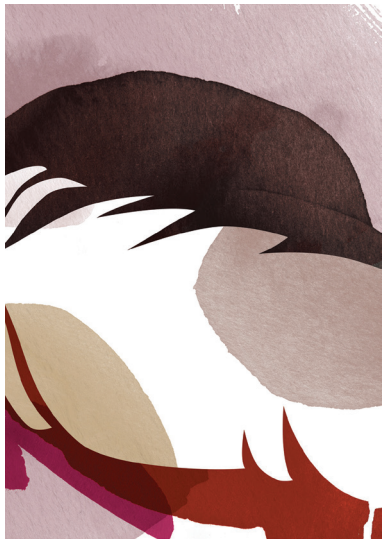
2-Ethyl-4-Hydroxy-5-Methyl-3(2H)-Furanone, Natural
FEMA 3623
~ caramellic, sweet, sugar-like



For sample request, please contact us

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Aurelione

Symrise AG

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

Aurelione is a sensual musk ingredient that adds warm texture and powdery facets. In tiny amounts, it rounds off floral accords. In higher dosages, it imparts a fresh clean fabric effect. It blends very well with salicylates, other musks and soft amber notes. Aurelione is a readily biodegradable musk specialty. Suggest applications include fine fragrance, personal care, and laundry care.



Peach Essenza

Agrumaria Reggina

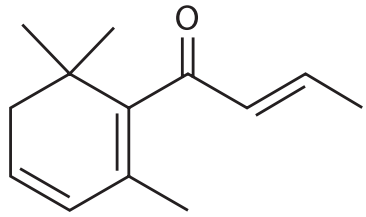
https://www.linkedin.com/company/agrumaria/

Our Peach Essenza extract is made from by-products used in food production. Infused and filtered, the solution is then concentrated to offer the characteristic notes of a just-cut fruit. This Essenza evokes the velvety texture of freshly picked peach skin. The soft, slightly lactonic fruity note of the juicy, sweet flesh immediately emerges. Peach Essenza can singularly illustrate the peach note in a citrus or aromatic tea composition. It can also be used in a modern chypre for a floral-peach skin accord.

Damascenone Total

Hangzhou Grascent Co.

http://www.hangzhougrascent.com/



Damascenone Total (FEMA #3420, CAS #23696-85-7/23726-93-4) is a combination of ingredients:

- Beta Damascenone; 1-(2,6,6-trimethylcyclohexa-1,3-dien-1-yl)but-2-en-1-one; 2-Buten-1-one, 1-(2,6,6- trimethyl -1,3-cyclohexadien-1-yl)-;
- and (E)-1-(2,6,6-trimethyl-1-cyclohexa-1,3-dienyl)but-2-en-1-one. This ingredient has an intensely natural floral, fruity note, with rose, plum, berry and tobacco odor. Suggested applications include fine fragrance, personal care, fabric care and home care.



Methyl Dihydrojasmonate, Natural

Penta Fine Ingredients

http://www.pentafineingredients.com/

This material (CAS #2485-98-7, FEMA #3408) has a sweet floral odor with notes of citrus, lemon and grapefruit, with a woody, jasmine-green nuance with a fruity taste and is used in peach and apricot flavor applications, as well as fragrances. Our material is Natural, Kosher, Halal.

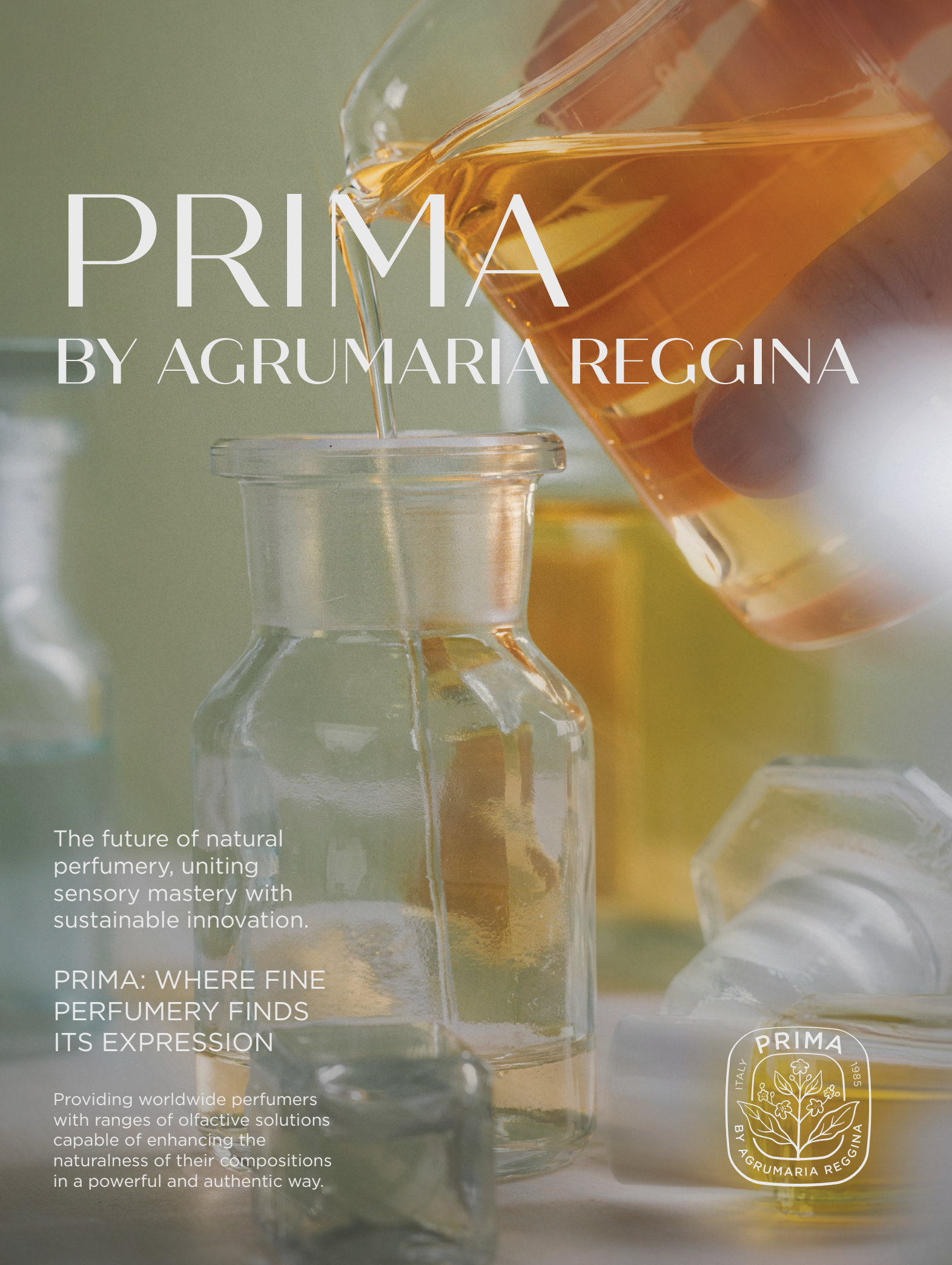


Vanilla PURE JUNGLE ESSENCE

MANE

https://www.mane.com/news/ingredients

Vanilla PURE JUNGLE ESSENCE is crafted through MANE supercritical CO_2 extraction, capturing the bean's full organoleptic profile. Its rich, textured character – gourmand, woody, and subtly spicy, makes it a premium and versatile ingredient, ideally suited for both fragrance creation and flavor formulation.



PRIMA
BY AGRUMARIA REGGINA

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Turpaz Acquires Controlling Stake in Attractive Scent SAS



Attractive Scent SAS develops, manufactures and markets fragrance extracts for the fine fragrance industry, as well as personal care, cosmetics and air care products.

Flavor and fragrance company Turpaz Industries announced the completion of its acquisition of a controlling stake in French fragrance company Attractive Scent SAS. Turpaz purchased 68.6% of Attractive Scent for €24.7 million.

Attractive Scent was founded in 2018 in Grasse. The company develops, manufactures and markets fragrance extracts for the fine fragrance industry, as well as personal care, cosmetics and air care products. Further, the company has a broad customer base across Europe, Asia, Africa, the Middle East and South America. The company operates a production site, which includes a development laboratory and sales center, in the Grasse region.

According to the acquisition agreement, the founders of Attractive Scent, Marc Langasque and Arnaud Fourre, will continue to lead the company and join the management team of Turpaz's fragrance division. The agreement also includes a mechanism to purchase the remaining shares of Attractive Scent based on its business performance.

"We are pleased to welcome Attractive Scent, its founders, management and employees to the Turpaz Group," said Turpaz chief executive officer Karen Cohen Khazon. "This acquisition is a strategic step in expanding the group's fragrance operations and strengthening our position in the global luxury perfumery market, as well as in other segments. This acquisition places Turpaz at the very heart of the perfume industry and enables further expansion of our geographic presence while leveraging the synergies between Attractive Scent and the other companies within the group."

Marc Langasque and Arnaud Fourre added, "We are thrilled to be joining the Turpaz group and to become part of a global leader in the flavor and fragrance industry. This partnership marks a new chapter filled with exciting opportunities to expand our creative reach and grow together. By combining our expertise and shared passion for fine fragrances with Turpaz's global geographic presence, which complements and extends our own, we will enhance our creative excellence, broaden our fragrance offering and reach new markets around the world." p&f+

Image by fotofabrika at Adobe Stock

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Symrise Appoints Michael Friede as Executive Board Member, President of Scent & Care Segment

On July 30, 2025, the supervisory board of Symrise AG announced the appointment of Michael Friede to the executive board. He will also take over as president of the company's Scent & Care segment.

Friede most recently served as the chief executive officer of Brenntag Specialties, leading the life science and material science specialty chemicals segments globally. He has also held executive positions at Akzo Nobel N.V., Covestro AG and Covestro Elastomers SAS. He holds both a master's degree and bachelor's degree in business administration.

"We are very pleased to announce that Michael Friede will join us as a member of the executive board," said chairman Michael König. "He brings many years of broad market knowledge and a high level of industry-specific expertise in various growth areas. Additionally, he has proven international experience, making him an excellent choice for Symrise as a fast-growing, globally operating company."

Symrise's Scent & Care segment includes the company's activities in fragrance applications, aroma molecules and cosmetic ingredients. This segment of the business generates annual sales of approximately €2 billion, according to the company's press release. p&f+



Friede has held executive positions at Brenntag Specialties, Akzo Nobel N.V., Covestro AG and Covestro Elastomers SAS.

Infinity Fragrances Opens New Manufacturing Facility in New Jersey

On August 11, 2025, Infinity Fragrances announced the official opening of its new 25,000 square-foot manufacturing facility in Somerset, New Jersey. The new facility will help the company better serve its growing customer base across various industries.

"Our new production facility is built for high efficiency, full-scale manufacturing and reliable, on-time delivery – ensuring quality meets precision at every step," said vice president of operations and co-founder Wayne Abate.

Infinity Fragrances manufactures high-quality, customized fragrance oils for a wide range of product applications. The company prides itself on cultivating long-lasting customer relationships through creativity, transparency and focus on client success.

The new manufacturing facility will be the third location for Infinity Fragrances and the second in New Jersey. p&f+



Infinity Fragrances manufactures high-quality, customized fragrance oils for a wide range of product applications. pim at Adobe Stock

Courtesy of Symrise

Unilever Opens US Fragrance Lab in Connecticut



The lab will feature a fragrance research and innovation space, a compounding facility and evaluation booths.

On July 25, 2025, Unilever marked the opening of its US fragrance lab, located within its existing R&D facility in Trumbull, Conn. The new lab is a piece of a €100 million investment to build in-house fragrance capabilities.

The new fragrance lab will serve as a collaborative space for perfumers, scientists and product developers. It will include state-of-the-art formulation tools and digital-first capabilities to accelerate the creation of unique scent experiences. The lab will feature a fragrance research and innovation space, a compounding facility and evaluation booths.

"The opening of our US fragrance lab is a bold step forward in accelerating how we innovate," said associate director of the US Fragrance Creative Center Paula Campos. "This milestone strengthens our local expertise in a key market and equips our teams to move faster, combining cutting-edge science, digital technologies and consumer insights to craft more meaningful brand experiences with fragrances that truly resonate."

According to the company's press release, the new site will be digitally enabled end-to-end, including digital modeling, analytics and the use of AI to drive development.

The opening comes off the successful launch of Dove's Garden Tea Party collection. This collection is the first in-house fragrance creation from Unilever, developed by its US-based team.

Courtesy of Unilever

FlavorSum Acquired by Warburg Picnus



Company officials believe this acquisition will foster a new chapter in FlavorSum's growth and development.

Flavor company FlavorSum announced its acquisition by global private equity form Warburg Picnus from its prior owner, The Riverside Company. The transaction is set to close in the third quarter of 2025.

"We recognize the solid foundation we have built with the support of The Riverside Company," said FlavorSum's chief executive officer Brian Briggs. "During the past five years, the FlavorSum team fully integrated four complementary acquisitions and added 35,000 square-feet to our Michigan manufacturing facility. Our team is driving industry-leading growth with a solutions model that delivers operational excellence and an outstanding customer experience. We look forward to partnering with Warburg Picnus and expanding our pure-play flavor platform."

According to the company's press release, FlavorSum will continue to operate independently and the existing leadership team will continue to shape strategy and day-to-day operations. Company officials believe this acquisition will foster a new chapter in FlavorSum's growth and development.

"FlavorSum's integrated business model strategically positions the company to meet the expanding interest in natural solutions across food and beverage categories," said Zach Lazar, managing director at Warburg Picnus. "The company's customer-driven approach unites responsive service with unparalleled flavor and application expertise. Through this partnership, we aim to advance FlavorSum's standout growth and acquisition strategy."

Courtesy of FlavorSum



Takasago Helps Develop Self-Report Scale for Relaxation Effects of Flavors and Fragrances



"By helping people use odors effectively, we can contribute to a future wherein they can manage their emotions appropriately, thereby enhancing their well-being," the paper concludes.

Takasago International Corporation collaborated with University of Tokyo associate professor Kensuke Okada to publish a research paper in Scientific Reports on the links between stress and scent. The researchers developed a scale to measure subjective relaxation effects of certain smells.

"In modern society, there is an increasing demand for the relaxation effects of flavors and fragrances," Takasago stated in a press release. "However, until now, there has been no established psychological scale to measure these effects directly. This research analyzed responses from individuals who experienced various odors, which resulted in developing a new psychological scale with high reliability and validity. By utilizing this scale, we aim to verify the relaxation effects of various odors and contribute to the realization of a well-being society."

In the study, two repeated surveys were conducted among 110 participants, which revealed three-factor structure for relaxation effects: liberation (relief from stress), nostalgia (personal memories evoked by odors) and negative emotions (reduced anxiety, fatigue, etc).

Further, the study compared lemon-lime, strawberry, coffee and vanilla scents to determine their effects on the three factors. Lemon-lime received the highest scores for making participants feel instantly relaxed, while coffee and vanilla had the highest levels of nostalgia.

The researchers believe that the scale can be used in both clinical and practical settings to determine appropriate self-care practices.

"By helping people use odors effectively, we can contribute to a future wherein they can manage their emotions appropriately, thereby enhancing their well-being," the paper concludes.

p&f+

Image by Anna_ok at Adobe Stock

dsm-firmenich Announces Launch of ModulaSENSE Maskers for Plant Protein



The range has been developed specifically for ready-to-mix drinks and protein bars, with plans to expand into other applications in the future.

Flavor and fragrance company dsm-firmenich announced the launch of a new range of ModulaSENSE maskers to complement its Vertis CanolaPRO plant protein. The maskers target bitterness and astringency and can be applied to ready-to-mix drinks and protein bars made with Vertis CanolaPRO.

Vertis CanolaPRO is an upcycled plant protein isolate made from the existing side stream of canola oil production. It contains all nine essential amino acids, is highly digestible and is free from all major allergens. However, the protein still suffers from common sensory challenges in certain applications, such as bitterness and a licorice-like taste.

ModulaSENSE maskers target multiple sensory pathways and block unwanted flavors before they can activate taste receptors, according to the company's press release. This allows for higher volumes of plant protein in applications while maintaining the desired taste profile.

"There is a critical need in the plant protein space – better nutrition without compromise on taste," said Alejandra Camacho, vice president and global innovation leader for dsm-firmenich's Dairy Taste & Plant-based division. "Using our deep molecular understanding of protein structures and interactions, alongside cutting-edge technologies to identify the correct masking ratios, we're facilitating the sustainable protein transition. ModulaSENSE combined with Vertis CanolaPRO unlocks more opportunities for our customers, plus better tasting ,sustainable and functional nutrition for consumers."

The ModulaSENSE maskers are available to dsm-firmenich's North American customers and will be available to European customers in September. The range has been developed specifically for ready-to-mix drinks and protein bars, with plans to expand into other applications in the future.

p&f+

Courtesy of dsm-firmenich

IFF Introduces ENVIROCAP Scent Delivery Technology for Fabric Care



The ENVIROCAP technology works with a wide variety of scents, allowing perfumers more freedom when developing fragrance formulas.

IFF announced the launch of ENVIROCAP, the company's newest sustainable scent delivery system intended for fabric care. The technology is ECHA-compliant, biodegradable and vegan-suitable.

The ENVIROCAP technology uses a proprietary biopolymer that delivers long-lasting fragrance while reducing environmental impact, meeting consumer demand for sustainability while remaining cost efficient.

"The launch of ENVIROCAP marks a bold new chapter in fragrance encapsulation," said Ana Paula Mendoça, president of IFF Scent. "In 2005, IFF revolutionized laundry care with scent bursts that brought joy throughout the day. Now, we're leveraging our leading nature-based bio innovation capabilities to redefine the power of scent technology in laundry — delivering superior sustainability and performance without compromise. With ENVIROCAP, we aim to support our customers in innovating and bringing true differentiation through elevated sensory impact and sustainability, while delighting consumers with memorable scent experiences."

According to the company's press release, the ENVIROCAP technology works with a wide variety of scents, allowing perfumers more freedom when developing fragrance formulas. Additionally, the technology can be applied to different product types within the laundry category.

Courtesy of IFF

















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Methyl benzoate has a dominant berry note with a subtle hint of balsam.



BY JOHN WRIGHT
johnwrightflavorist@gmail.com

Flavor Bites: Methyl Benzoate

Learn about the diverse range of applications for methyl benzoate.

Methyl benzoate (FEMA#2683, CAS#93-58-3) has an attractive combination of a dominant, deep berry note and a subtle hint of balsam. It conveys an impression of depth rather than freshness and can help to reinforce the base of most berry flavors. Quite aside from the berry category it can also be an interesting contributor to a diverse range 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.

Berry Flavors

Blackberry: Methyl benzoate provides a good background note in blackberry flavors. Fifty ppm is a good level of addition.

Blackcurrant: The same is true for realistic blackcurrant flavors. The level is also similar, 40 ppm. More fantasy, buchu-based flavors can accommodate up to 100 ppm.

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Blueberry: Blueberry flavors need a counterbalance to the bright, floral notes. Methyl benzoate works well at 100 ppm.

Cloudberry: One hundred ppm of methyl benzoate is just a starting point in Nordic cloudberry flavors. Levels can go up to 500 ppm in heavier flavors.

Cranberry, Fresh: This ingredient blends very effectively with 2-methyl butyric acid at levels of addition between 100 and 200 ppm.

Lingonberry: Lingonberry flavors, like cloudberry flavors, can make good use of methyl benzoate at levels as high as 500 ppm.

Loganberry and Raspberry: Both flavors gain depth from between 30 and 50 ppm of this raw material.

Strawberry: Methyl benzoate is not an obvious ingredient in strawberry flavors, but it does modify methyl cinnamate helpfully when added at 40 ppm.

Other Fruit Flavors

Apricot and Peach: Methyl benzoate at a modest level, 30 to 50 ppm, moderates the impact of the gamma lactones and rounds out the profile.

Cherry: In contrast, cherry flavors can use this ingredient at much higher levels to pair with benzaldehyde. One thousand ppm works well in flavors dominated by benzaldehyde.

Grape, Concord: This raw material fits very well into the background character of Concord grape flavors at levels ranging from 50 to 100 ppm.

Grapefruit, Lemon and Orange: This is a tricky ingredient for citrus flavors. At most levels of addition it adds an intrusive note, but at very low levels, around 5 ppm, it has an interesting and authentic effect.



Methyl benzoate can be added to apricot and peach flavors at modest levels.

Guava: The best level for methyl benzoate in guava flavors can vary, mainly depending on the level of methyl cinnamate. Two hundred ppm is a cautious starting point.

Kiwi: Methyl benzoate is very much in the background of kiwi flavors, but 10 ppm can add subtle depth.

Papaya: Papaya flavors benefit from a modest addition of this raw material. Forty ppm works well.

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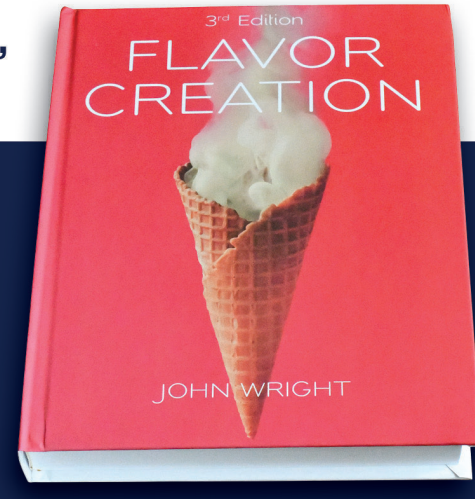


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Macadamia nut flavors are fairly assertive and can make good use of slightly higher levels of methyl benzoate.

Plum: Plum flavors benefit from a moderate addition of methyl benzoate, in the region of 200 ppm.

Starfruit: Methyl benzoate is very important in starfruit flavors, with a major contribution to the profile at 2,000 ppm.

Other Flavors

Asparagus: Asparagus flavors need to counterbalance the obviously volatile sulfur notes. Methyl benzoate is effective at levels ranging from 100 to 200 ppm.

Bacon: Methyl benzoate only makes a modest contribution to brown and savory flavors, but it is nevertheless helpful to round out the profiles and add authenticity. Bacon flavors can make good use of 10 ppm.

Chocolate and Cocoa: The same profile smoothing effect at low levels of addition applies to both chocolate and cocoa flavors. The ideal level is also 10 ppm.

Coffee: Coffee flavors also fit into this general brown flavor category. Ten to 20 ppm is a good range of addition.

Hazelnut: Ten to 20 ppm also works well in hazelnut flavors. Methyl benzoate is an interesting minor addition to all nut flavors.

Honey: Honey flavors vary considerably, but methyl benzoate has a place in all of them because it blends so well with 2-phenyl acetic acid. Five hundred ppm is a good place to start.

Jasmine: Benzyl acetate is a very effective fruity note in jasmine flavors and can be added at quite high levels, assisted by methyl benzoate to smooth the impact. One hundred ppm is a good level.

Macadamia Nut: Macadamia nut flavors are fairly assertive and can make good use of slightly higher levels of methyl benzoate, around 30 ppm.

Olive: Methyl benzoate adds useful complexity and authenticity to olive flavors at 10 ppm.

Peanut: Peanut flavors can vary in respect of the level of roasted character and, in consequence, ideal levels of methyl benzoate range from 10 to 30 ppm.

Pistachio and Almond: The ideal level of addition in these two categories of nut flavors is very low, 10 ppm and below.

Tamarind: Methyl benzoate blends harmoniously into all tamarind flavors. High levels can be used but tend to result in a flavor that is too heavy. One hundred ppm is a good compromise.

Walnut: In the nut flavor family, methyl benzoate is probably most compatible with walnut flavors. Ideal levels range from 30 to 50 ppm. p&f+

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FLAVOURS
BY CAMILLE
& CHARLOTTE
× MANE

The organoleptic palette crafted for our flavourists is boundless. From universal tastes to those of a single land, we offer gustatory journeys to delight every palate. These sensory experiences spring from a blend of unexpected recipes and innovative solutions delivering authentic, unforgettable tastes, each a symphony of flavour, a feast for the senses.

Camille & Charlotte are the winners of the Capture What Moves photo competition held by MANE.

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Modern consumers crave extraordinary experiences, and the hunger for novelty has made chocolate confectionery the perfect canvas for flavor experimentation.



BY AMY MARKS-MCGEE
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Forward Thinking: Unwrapping Confectionery Trends

Innovation in the candy aisle is fueled by novel tastes, textures, collaborations, and functional ingredients.

According to the National Confectioners Association (NCA)[1], confectionery sales totaled $54.2 billion in 2024. Chocolate accounted for $28.1 billion, followed by non-chocolate candy at $21.7 billio, and gum at $4.4 billion. In 2024, Valentine's Day, Easter, Halloween, and the winter holidays made up 62.3% of all confectionery sales.

The latest trend is Summerween, where brands sell Halloween-themed candy early. The NCA suggested it as a potential fifth major candy holiday. Walmart reports that 1 in 3 shoppers begins their Halloween shopping between June and August[2]. Similarly, Mars' second annual *Tricks, Treats and Trends* report found that 1 in 5 American Halloween celebrants plan for the holiday early (two months or more in advance). Gen Z (1.5x) and millennials (1.6x) are more likely to get a head start on the season[3].

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And Americans are buying more candy, according to the NCA, with annual dollars spent per buyer increasing 4%. They use these purchases as permissive indulgences, with possible health benefits on the horizon for the category. In fact, 62% of participants said that they believe better-for-you candy exists. Innovation in the candy aisle is fueled by novel tastes, textures, collaborations, and functional ingredients.

Taste& Texture

Like other categories, consumers are demanding, and brands are vying for their attention and looking to engage and maintain them. Flavor and texture are two key components of the candy-eating experience. Textures can range from crunchy to chewy to smooth and airy. According to a Collage Group survey[4], 63.4% of Gen Z respondents enjoy soft textures in sweet snacks, while 58% love chewy ones. Furthermore, 41.5% of participants favor crispy experiences. Candy brands are experimenting with unique flavors and textures to appeal to this audience.

Candy is often associated with youth and nostalgia. Fun, playful, and interactive gummies are becoming increasingly popular, driven by social media. Peelerz by Amos blew up social media because of its interactive nature. Shaped and flavored like fruit, the candies are "peelable fruit gummies made with real fruit juice, featuring a dual texture - a soft, bouncy outer layer and a solid gel center." The Mango variant went viral and in 2024 was awarded the Most Innovative New Product Non-Chocolate Candy at the Sweets and Snacks Expo. Other flavors include Banana, Grape, Kiwi, Lychee, Orange, Peach, and Pineapple.

Gupperz by Velondi Brands Inc. are "designed to captivate consumers with innovative flavors, shapes, textures, and exciting liquid centers." For example, the Gupperz Poppin Pickles are a sweet, pickle-flavored 3D-pickle-shaped gummy filled with a juicy sour pickle flavor that bursts in your mouth. Other 3D filled gummies include Boba Tea Blast with four flavors: Matcha, Milk Tea, Strawberry, and Vanilla, Confetti CakeSplosion (birthday cake with strawberry inside), Sour Squirt Grenade (sour apple) and Strawberry Milk Splash (strawberry). This summer, Rockin' Root Beer Float (root beer) and Ripe Fruit Rush with four flavors: Blue Raspberry, Grape, Strawberry and Watermelon, joined the lineup.

Stuffed Puffs added Gummy Fuzions to its portfolio, described as "a mixture of different layers - bold coatings, fusions of flavor, and a burst of gummy in every piece." The Gummy Fuzions are available in Chili Mango, Fruity Punch, Mixed Berry, Sour Berry and Sour Watermelon flavors. Each candy highlights a sour, fruity



Gupperz creates 3D gummies in innovative flavors, shapes, and textures filled with liquid centers.

center covered in a soft gummy candy and then wrapped with either a crunchy or sour coating.

In the UK, Chupa Chups added Pinkis, a new variant to its jellies line. Pinkis are bright pink with a jelly-like consistency and strawberry flavor. Retired NFL athlete Tom Brady launched GOAT Gummies, a line of organic, vegan gummy snacks in three varieties: Sweet Rush, Sour Burst and Tropic Fusion. The gummies are manufactured in France, made with real fruit, and contain no artificial sweeteners, dyes, or flavors. GOAT gummies are available exclusively through Gopuff.

Like gummy candies, freeze-dried candies have taken the internet by storm and exploded in 2024. According to Grand View Research[5], the global freeze-dried candy market is expected to reach $2.4 billion by 2030 at a compound annual growth rate (CAGR) of 8.5%. Freeze-dried candy provides a novel texture and intense flavor experience, and brands are taking notice.

Sow Good, Inc., a pioneer in freeze-dried candies, launched in 2023. At the 2025 Sweets& Snacks Expo, Sow Good, Inc., introduced Freeze Dried Caramel and Raw Caramel varieties. Jolly Rancher launched its signature flavors, Blue Raspberry, Green Apple and Watermelon, into a Freeze Dried range. The "light,

Courtesy of Velondi Brands Inc.

ultra-crunchy bites puff up in size and deliver a punch of flavor with every bite."

This year in the UK, United Food Brands launched Tasty Vibes, a freeze-dried candy line in two varieties: Sweet Mix and Sour Mix. 1UP Candy debuted its Crunchy (Freeze-Dried) Sour Strip range in four flavors: Blue Raz, Green Apple, Rainbow and Strawberry at the Sweets& Snacks Expo. The "chewy sour treat is transformed into a crispy snack that delivers a dynamic sour pop followed by a smooth, fruity melt." For Kool-Aid's 2025 Spooktastic Halloween Candy Box, Hilco added two new flavors inspired by its Ghoul-Aid juice. The Kool-Aid Ghoul-Aid Mouth Bites are described as "crispy, crunchy popping candy bites" offered in Ominous Orange, Goulish Grape and Rotten Green Apple flavors, while the Kool-Aid Ghoul-Aid Popping Candy is available in Zom-Berry.

Craving Chocolate

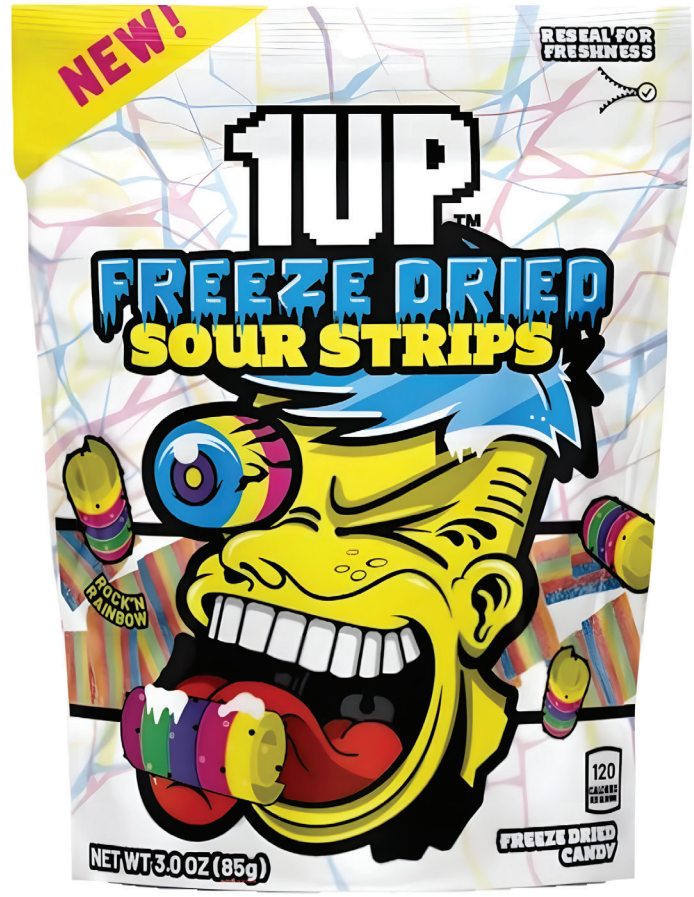
In addition to non-chocolate candy introductions, chocolate brands are launching new flavors inspired by cookies and desserts. Earlier in the year, Butterfinger dropped a Salted Caramel Butterfinger, the first new flavor in a decade. It "keeps the same iconic crispety, crunchety, peanut-buttery core, now wrapped in a salted caramel-flavored coating." This summer, Butterfinger rolled out a new Marshmallow flavor, which is similarly wrapped in a marshmallow-flavored coating. Next year, a French Toast flavor is expected to launch.

Twix unveiled a Snickerdoodle flavor, which features its signature crunchy cookie, caramel, and milk chocolate combined with a cinnamon-sugar swirl of snickerdoodle-flavored caramel. Hershey's introduced a limited-edition Milk Chocolate Caramel bar as well as Cinnamon Toast Crunch-flavored Hershey's Kisses, which blends smooth white creme with swirls of cinnamon sugar and graham-flavored cookie bits. In Europe, Cadbury released the Cadbury Dairy Milk Summer Edition Bars in four limited-edition cold-activated





Butterfinger introduced Salted Caramel, followed by Marshmallow, the first new flavors in a decade.



1UP Candy Freeze-Dried Sour Strips come in four flavors: Blue Raspberry, Green Apple, Rainbow and Strawberry. Rainbow flavor shown; courtesy of 1UP Candy.

wrappers. When stored in the refrigerator, the wrappers change to a deep blue color and reveal hidden designs like deck chairs, umbrellas, kites and inflatables. Within this collection, Cadbury also introduced a new Iced Latte flavor.

Candy Collabs

Collaborations seem to be taking over limited-edition food and beverage launches, and candy is no exception. Limited-time offerings add excitement and a sense of urgency for consumers.

For the first time, two iconic brands, Trolli and Mountain Dew have joined forces for an unexpected collaboration: Trolli x Mountain Dew Sour Brite Crawlers gummies and Mountain Dew Zero Sugar x Trolli Cherry Lemon. The Mountain Dew Trolli Sour Bite Crawlers come in three Mountain Dew-inspired flavors: Original Citrus, Original Citrus Blue Raspberry and Original Citrus Cherry. Similarly, in July, Baskin-Robbins and Sydney Sweeney teamed up on the Sweet on Sydney Menu, which featured an

From top: courtesy of 1UP Candy; The Ferrero Group

ice cream and beverage offering. Sydney's Signature Scoop highlighted Rainbow Sherbet in a chocolate-dipped waffle cone with rainbow sprinkles and gummi bear minis. Sydney's Signature Fizz blends Rainbow Sherbet with Starry lemon lime soda, topped with gummi bear minis.

Goetze's Candy Co., Inc. and Guinness Open Gate Brewery Baltimore brought back Caramel Creams Ale. Not a collaboration, but a notable new soda brand, Candy Lips, released five candy-inspired flavors: Bubble Gum, Cotton Candy, Peach Rings, Sour Gummy Worm and Watermelon Gummy Slices.

In partnership with Sony Pictures Television's game show *Wheel of Fortune*, Dylan's Candy Bar created seven collectible confections with a variety of different flavored gummies and chocolates. For example, the Snacktime Sweetness Paint Can features Fruity Gummy Pizza Slices, Cola Gummy Bottles, and Fruity Gummy Hot Dogs, while the Wheel-y Good Mega Coin contains an 8-inch, 10-ounce solid milk chocolate coin stamped and wrapped in a gold metallic wrapper with the "Something Sweet Is Spinning" tagline.

Tony's Chocolonely and cookie dough brand Hot Take Dough partnered on the limited-edition Tony's x Hot Take Dough S'more Cookie Pack. The bake-at-home cookies blend Tony's S'mores Lil Bits (100% traceable milk chocolate, marshmallows, and graham cracker pieces) and Hot Take Dough's organic cookie dough (grass-fed butter and cage-free eggs). Seattle's Best Coffee branched out with Coffee Roast Mallows, a limited-edition variety pack of four coffee-inspired marshmallows in Light Roast, Medium Roast, Dark Roast and S'mores flavors crafted in partnership with XO Marshmallow. The marshmallows come with a full-size bag of Seattle's Best Coffee Campfire S'mores Flavored Ground Coffee.



In partnership with Sony Pictures Television's game show Wheel of Fortune, Dylan's Candy Bar created seven collectible confections.

From top: courtesy of Dylan's Candy Bar

Functional Candy

Functional food and beverages are on the rise, as consumers seek healthier lifestyles, as addressed in Trendincite's *Perfumer & Flavorist+*[6] "Forward Thinking: Functional Food& Beverage Developments" article, which appeared in the August 2021 publication. To satisfy consumer demand, candy and chocolate brands are incorporating functional ingredients like caffeine, vitamins, and protein into their formulas.

Lifestyle gamer brand Razer and Mars formed a joint venture to expand the Respawn by Razer product line featuring gum and mints co-created with gamers, designed to enhance gaming experiences. The gum is available in three flavors: Cool Mint, Pomegranate Watermelon and Tropical Punch, and is formulated with Vitamin B and green tea extract to maintain mental focus. The mints come in Blackberry Vanilla Vibe, Mango Habanero Fire and Watermelon Guava Rush flavors.

Neuro Gum unveiled a limited-edition collab with brand ambassador and investor Steve Aoki. The Neuro x Steve Aoki Energy& Focus Strawberry Cake Mints contain 20 mg of natural caffeine, L-theanine and B vitamins (B6 and B12) to enhance cognitive function and boost energy production. The UK brand Ruly launched two caffeine-infused lightning bolt-shaped candies in Berry Delicious and Tropical Crush varieties. "Designed to offer a sustained energy boost without the jitters often associated with sugary energy drinks," each pack contains 80 mg of caffeine, guarana and B vitamins.

The Functional Chocolate Company added the FunCho Kids collection in four varieties: Brainy, Carefree, Painfree and Sleepy, to its portfolio. The chocolates are specially crafted with ethically sourced ingredients and kid-friendly botanicals such as ginkgo biloba, rhodiola, bacopa, lemon balm, passion flower, chamomile, bromelain, turmeric and MSM to support focus, calm, energy and restful sleep. The chocolates are plant-based, gluten and cholesterol free, and made without artificial sweeteners, flavors, additives or preservatives.

Protein snack bar brand ONE partnered with Hershey's on the ONE x Hershey's Double Chocolate protein bar. The decadent bar features 18 g of protein and 1 g of sugar. Hormbles Chormbles "is not a protein bar but rather a candy bar that happens to have protein and includes whey crisps." The candy bar is 100 calories and features 10 g of protein and no sugar. It is formulated with a protein blend of whey protein isolate and milk protein isolate with allulose, modified plant fat (EPG), palm kernel oil, cocoa mass, Dutch process cocoa powder, natural flavor, sunflower lecithin, salt, monk fruit extract and steviol glycosides.



The FunCho Kids collection of chocolates is specially crafted with ethically sourced ingredients and kid-friendly botanicals to support focus, calm, energy and restful sleep.

Sweet Future

Consumers enjoy chocolate, non-chocolate candy and gum as a treat. In 2024, 98% of households purchased confectionery at least once. Holidays drive consumer interest in chocolates and candy; 9 in 10 consumers like seasonal treats to reflect the holiday's shapes, colors, flavors, characters, and/or packaging[1]. Often nostalgic, candy is fun, playful, and a multisensory experience. Consumers of all ages, particularly the younger demographic, seek interactive experiences with bold flavors, various textures, and unique formats.

According to Innova Market Insights[7], modern consumers crave extraordinary experiences, and the hunger for novelty has made chocolate confectionery the perfect canvas for flavor experimentation. Gummies, freeze-dried candies, chocolate bars, and limited-edition and seasonal collaborations deliver the immersive experiences consumers crave. As consumers seek healthier lifestyles, functional candy will rise in popularity. Expect more novel, bold flavors and textures, and functional ingredients in a variety of formats to meet consumers' evolving needs.

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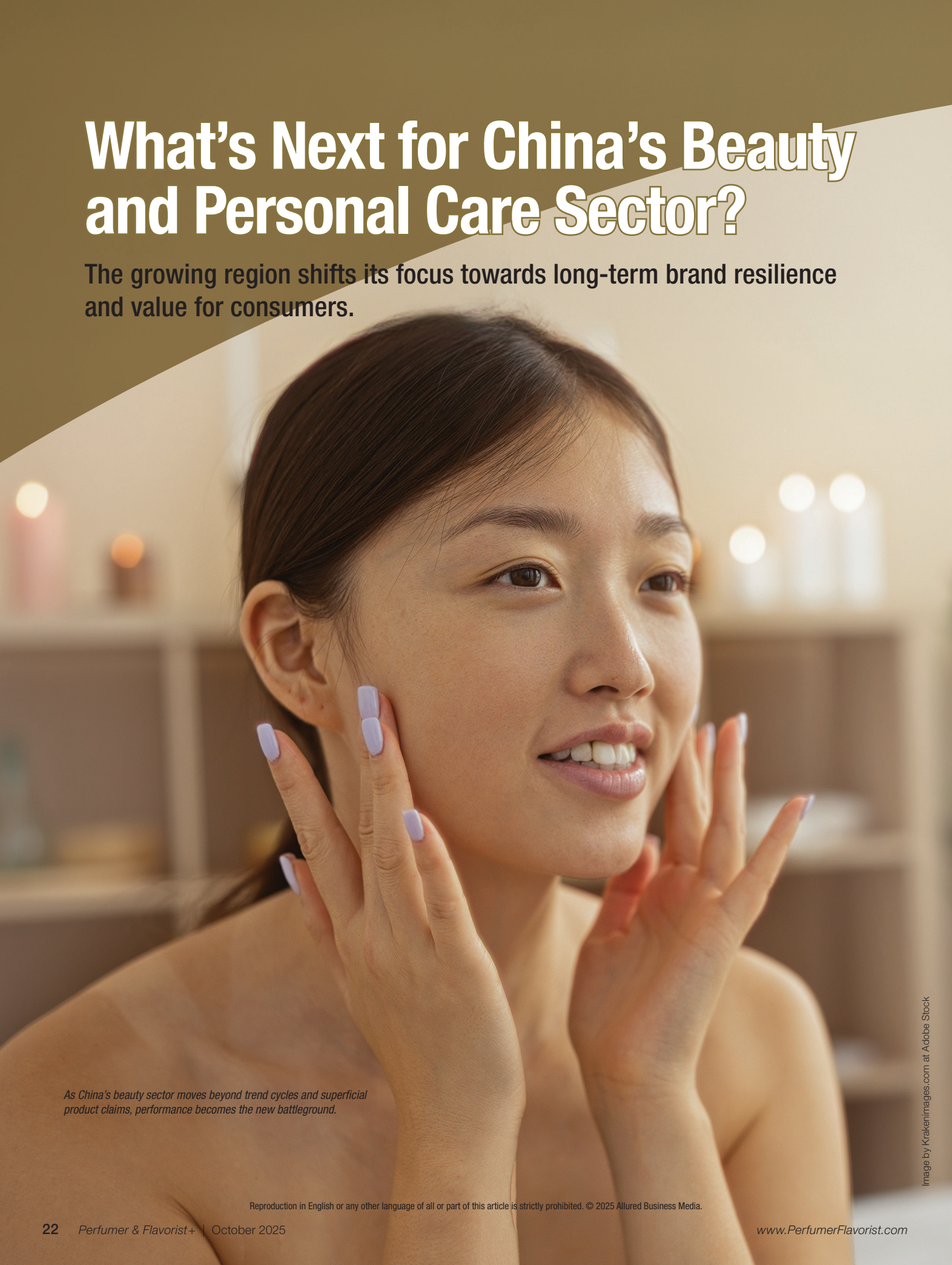
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SCAN TO LEARN MORE

What's Next for China's Beauty and Personal Care Sector?

The growing region shifts its focus towards long-term brand resilience and value for consumers.



As China's beauty sector moves beyond trend cycles and superficial product claims, performance becomes the new battleground.

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BY PCHI (Personal Care and Homecare Ingredients)

The beauty conversation in China is changing. Efficacy, science-backed claims and ingredient transparency are now front and center. As consumer expectations continue to evolve, companies offering more than just products—those bringing advanced know-how, innovation and credibility—are well-placed to tap into a market entering its next phase of growth.

While headlines may no longer speak of explosive expansion, China remains one of the world's most dynamic beauty and personal care markets. According to statistics from the China Flavor and Fragrance Cosmetics Industry Association (CAFFCI), China's cosmetics market recorded a total transaction volume of RMB 1.07 trillion ($147.6 billion) in 2024—marking a steady year-on-year increase of 2.8%. Behind these numbers, a deeper transformation is underway.

The industry is shifting from a volume-driven model to one defined by value creation, where brand trust, product efficacy and technical capabilities are key differentiators. That means for companies looking to grow in this market, the opportunity lies not just in scale, but in the chance to align with an increasingly sophisticated ecosystem.

From Hype to Substance

As China's beauty sector moves beyond trend cycles and superficial product claims, performance becomes the new battleground, defined by verifiable results, science-led formulation and high-quality ingredients. Domestic brands are scaling up their technical capabilities, while multinationals are being challenged to show more than just global branding. They must now demonstrate true product superiority and local relevance.

Increasingly, consumers are asking sharper questions and demanding greater transparency. They scrutinize ingredient lists carefully, and expect every claim to be backed by evidence. As a result, brands that fail to substantiate their promises are steadily losing ground to those that can.

A Maturing Regulatory Environment

As consumer expectations rise, regulatory standards are evolving in tandem. Recent reforms have tightened requirements for safety, efficacy, and transparency, bringing China's framework closer to international norms. This shift is creating a more level playing field and driving the industry toward more responsible, sustainable innovation.

Earlier this year, China's National Medical Products Administration (NMPA) introduced its *Regulations on Supporting Innovation of Cosmetic Raw Materials*. These measures streamline the classification system and technical requirements for the registration and filing of new raw materials. They also encourage simultaneous submissions of new raw materials and related products—a move aimed at fostering greater innovation across China's cosmetic ingredients sector.

Where speed to market once defined success, the focus has shifted to long-term resilience. The brands that endure will be those that integrate compliance into their innovation strategy and view regulatory rigor not as an obstacle, but as a springboard to build credibility.

Staying Competitive in a Changing Landscape

China remains a key player in the global beauty supply chain. From raw materials and active ingredients to formulation and packaging, the country plays a vital role in driving speed, efficiency, and product diversity.

Businesses must therefore build deeper technical capabilities and market insight in order to remain competitive in this evolving landscape. The most successful companies will be those that can anticipate shifts, adapt quickly, and co-develop solutions that resonate with a more discerning and diverse consumer base.

In this landscape, trade shows like Personal Care and Homecare Ingredients (PCHi) are taking on greater strategic importance. Visitors attend to not only source, but also seek formulation inspiration, regulatory updates, and cross-border collaboration. With a strong focus on knowledge exchange and innovation, PCHi offers unmatched opportunities to connect with industry leaders and stay ahead of emerging trends—making it an essential venue for navigating change.

The next edition of PCHi will take place from March 18 to 20, 2026 at the Hangzhou Grand Convention and Exhibition Center.

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BEYOND THE SPRITZ

How skin-first formats are reshaping fragrance for beauty and personal care.



There's a new philosophy emerging in fragrance, and it starts with the skin.

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BY ABBY WALLACH, chief executive officer, Scentinvent Technologies



Courtesy of Abby Wallach



Abby Wallach, chief executive officer, Scentinvent Technologies

I've spent my career immersed in the worlds of media, beauty and innovation interviewing thousands of insiders, icons and next-gen creators. From celebrity red carpets to backstage beauty labs, I've seen how trends are born, how consumers and behavior shifts, and how products earn their place in our daily rituals.

Today, fragrance is undergoing a thrilling transformation. We're not discarding the bottle; we're expanding the universe around it. The fine fragrance spritz isn't going anywhere. What's changing is how fragrance shows up in our lives: more touchable, wearable, layerable, and personal than ever before.

It's no longer just the finishing touch. Fragrance is becoming part of the routine designed to move with us, fit in your pocket or travel bag and create moments of joy all day long. We're talking about fragrance not as the last step, but as a part of the essential beauty routine. Functional. Emotional. Sensorial. And fun. All day, every day.

Scent as Skin Ritual

There's a new philosophy emerging in fragrance, and it starts with the skin. I call it"skin-scenting", a modern evolution that prioritizes clean, alcohol-free formulas designed to nurture the skin while delivering scent that wears close, soft and personal. It's less about announcing your arrival, more about inviting intimacy.

These new fragrance formats serums, shimmers, balms and sticks are alcohol-free and made with skin-loving ingredients. They're formulated for reapplication offering a new experience to a generation that values transparency, modernity and sensory connection above all. From my perspective, it's a return to something ancient, something soulful and intimate. Scent as energy. As emotion. As identity. Use it, wear it, love it and live in it.

New Gestures, New Play

What excites me most is how fragrance is breaking free from the bottle. We're seeing a whole new language of gestures emerge: swipe, dab, tap, melt, mist. Sticks, shimmer serums, towelettes, perfume chips. It's no longer just spray and go. It's layer, blend, repeat.

These textures invite creativity. They invite play, and they meet the consumer where they are: in their bag, on their vanity, backstage, in their dorm room or at the airport gate.

As someone who's spent years developing beauty content and launching innovations from the studio to the shelf, I see this shift as more than novelty. It's a necessity. Today's beauty and fragrance fans want experiences that multitask. Products that are portable, purposeful, and polished. And yes, social-ready. That is a BIG one!

Made for the Feed

So let's talk about social. TikTok has changed everything from how beauty is discovered to how it's worn. Fragrance, once elusive and invisible, is now making itself visible through gesture, texture and storytelling. Think candy-colored sticks, glossy balms, tactile textures. Fragrance is becoming visual, experiential, and shareable.

What's especially thrilling is how younger consumers are engaging with scent like they do with makeup: by collecting, experimenting, layering and storytelling. Whether it's dessert-inspired perfume sticks, a mood mist or a scent primer that boosts longevity, fragrance is now the conversation across all channels. Not just in beauty boardrooms, but in beauty aisles, bedrooms, bathrooms and For You pages. These aren't just products; they're camera-ready experiences. Viewers watch them swipe, smell and shimmer in real time. This engaging interaction and connection make scent feel close, personal and crave-able.



Innovative fragrance formats, such as sticks and balms, are growing at a faster rate than traditional perfumes.

Personalization Meets Portability

The new era of fragrance is wearable every day, in every way whether you're at the gym, on the go or on a red eye to Paris. Modern scent is flexible. It's made to move. We're seeing customizable scent systems, stacking sticks, and pocket-sized minis that invite users to create their own fragrance identity.

To me, this is a beautiful democratization of scent. Fragrance isn't one-size-fits-all. It never

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was, but now we're finally designing for that truth. According to *Cognitive Market Research (May 2025)*, the global solid fragrance market is growing at a projected 11.5% compound annual growth rate (CAGR) from 2024 to 2031, more than double the rate of the broader fragrance category. Valued at $1.35 billion in 2024, this market is expected to nearly triple by 2031. Solid formats like sticks, balms and compacts are not just rising; they're redefining how scent fits into our daily lives. And from a product development standpoint, portability is no longer an afterthought. It's part of the brief and the future.



Modern scent is flexible and is made to be portable.

Emotional Utility: The Return of Ritual

Here's something I believe deeply: fragrance isn't just about smelling good. It's about feeling something. And today's best scent products deliver on that. They calm. They energize. They transport. They anchor us to moments, people, and memories.

Whether it's a citrus mist that brightens your morning, a warm vanilla balm that feels like comfort or a woody serum that grounds you after a long day, fragrance is being used as emotional utility. It's self-care in a swipe. Confidence in a shimmer. A reset in a towelette. And because it lives in formats that invite reapplication, we're seeing scent take its rightful place throughout the day.

Clean, Conscious, and Culturally Connected

As someone who's worked closely with ingredient developers and brand founders, I can tell you that the bar is higher than ever. Today's consumer demands clean, safe, inclusive formulations and fragrance is catching up fast. From alcohol-free and vegan to globally compliant and dermatologically tested, modern fragrance must do more than delight the nose. It must serve the skin, respect the environment and reflect the diverse stories of the people who wear it. Even the notes themselves are shifting toward food, nostalgia, emotion. Scent is storytelling, and storytelling is power. It is visual and transportive.

What's Next: Fragrance as Beauty Standard

At *MakeUp in Paris* this past summer, I had the chance to watch beauty insiders, retailers and creators experience these new formats in real time. Watching their eyes light up as they touched a shimmer serum or swiped on a solid skin-loving scent stick in color. They weren't just smelling; they were engaging. They were excited and the conversation was electric, full of imagination. The textures, the gestures, the playful discovery. It was fragrance as beauty, as ritual, as fun.

You could see the wheels turning: "I'd carry this in my bag." "I'd layer this with my favorite scent." "This feels so good on my skin."

Future Outlook: Content. Commerce. Community. Connection.

Fragrance is everywhere, and it's only just beginning, but the biggest shift will be in connection. The future of fragrance is story-driven, multi-sensory and built across all channels. It's not just about wearing your favorite fragrance; it's about living in it. Every day. All day. On your skin. In your world. And if you ask me? That future is already here.

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Crafting Confections: INNOVATING FOR FLAVOR, FUNCTIONALITY AND FUN

How flavor modulation can help create tasty treats that meet consumer demands.

Image by Rainister at Adobe Stock

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Confectionery and candies are playful by design, making them the perfect category to push the boundaries of what's possible.

Courtesy of ADM



Sudarshan Nadathur, chief flavorist, ADM



Amanda Zadroga-Cantada, principal scientist, ADM

BY SUDARSHAN NADATHUR, chief flavorist, ADM; AMANDA ZADROGA-CANTADA, principal scientist, ADM

Experience is everything in the world of confectionery. Imaginative, multisensorial taste adventures become irresistible, deepening enjoyment for consumers of all ages. And while indulgence has long been a companion of the self-care movement, these days, chocolate bars, gummies, caramels and chews are nearly as likely to be labeled dietary supplements as confectionery.

On the journey to well-being, consumers expect flavor and functionality, all wrapped up in a convenient bite. As a result, brands and formulators are increasingly required to strike the right balance between making offerings consumers perceive as "better-for-you" while maintaining traditional confectionery standards.

Modulating for Flavor and Functionality

The task of reformulating or creating new confectionery items to address evolving consumer preferences presents both opportunities and challenges. Whether reducing sugar, using dairy alternatives, adding fiber or incorporating plant proteins, biotics or botanicals, prioritizing the sensory experience remains crucial. Navigating these complexities requires a comprehensive understanding of the formulation, along with sophisticated technologies, quality ingredients and technical expertise.

The Challenge: Vegan Confections

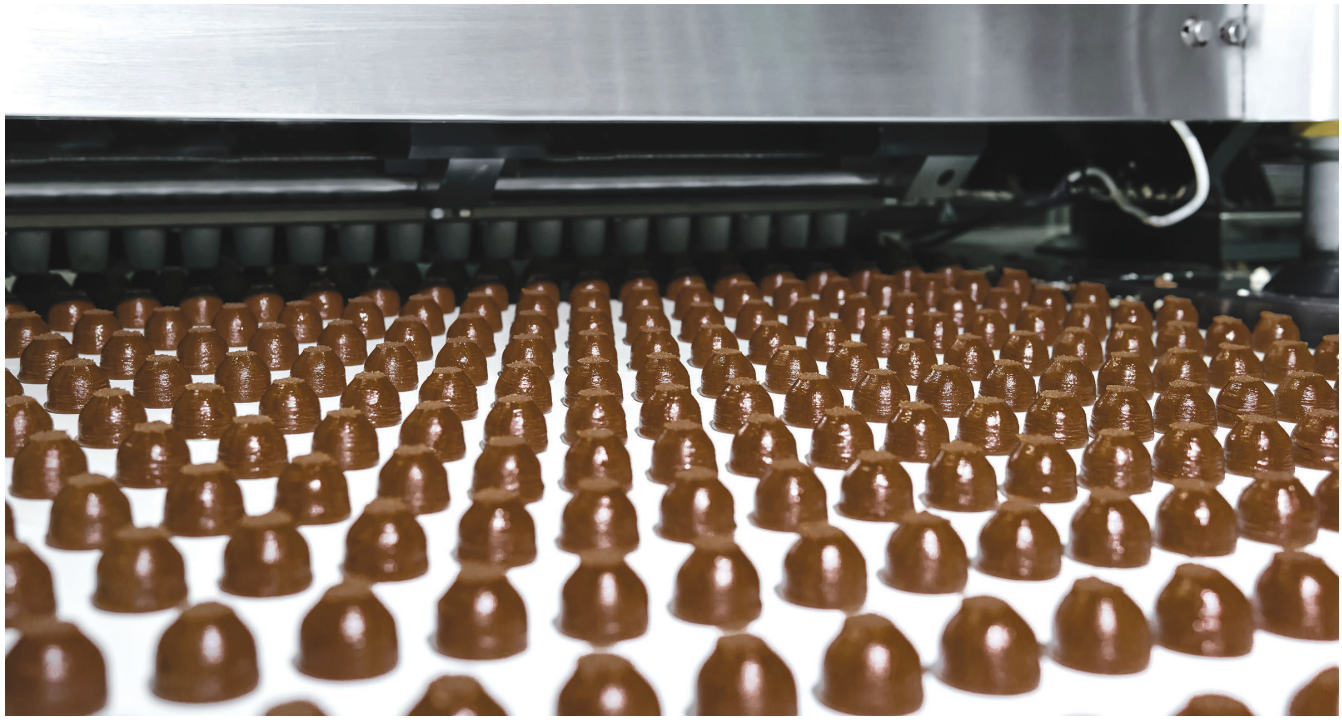
Many confections rely on milk for both taste and functionality. As consumer demand for vegan and dairy-free options continues to grow, manufacturers are increasingly challenged to replicate the sensory and technical qualities of traditional favorites like milk chocolate and caramel. To successfully develop vegan versions of these treats, dairy alternatives must deliver comparable functionality and flavor.

For a high-protein, plant-based caramel, consider swapping dairy with soy protein. Soy is considered a complete protein, containing all nine essential amino acids necessary for human nutrition, with a Protein Digestibility-Corrected Amino Acid Score (PDCAAS) of 1. As another alternative, oat powder is often used in dairy-free chocolates due to its relatively neutral flavor and superior mouthfeel compared to other alternatives. The use of oat can add nutty cereal notes but may also leave a lingering bitterness, which requires flavor masking technology to mitigate.

Flavor modulation tools play a key role – not only in masking undesirable off-notes often associated with plant-based ingredients, but also in restoring the mouthfeel that dairy traditionally provides. With a clean, neutral base established, layered flavor systems can be introduced to elevate the final product. To recreate the rich, creamy characteristics typically delivered by dairy, flavor solutions may include profiles such as cooked dairy, caramelized sugar or buttery notes. Additional indulgent flavors – like vanilla, coffee or maple – can be added to enrich the overall sensory experience.

The Challenge: Cocoa Alternatives

As global cocoa prices continue to rise, requests for cocoa replacements in chocolate products have become increasingly common. These replacements often target both cocoa butter and non-fat cocoa solids. To offset costs or address supply challenges, manufacturers have long turned to cocoa butter alternatives such as cocoa butter equivalents (CBEs), replacements (CBRs) and substitutes (CBSs). CBEs



Chocolate's signature flavor profile is the result of complex chemical reactions during fermentation and roasting.

Image by Evgeny at Adobe Stock

offer the closest match in functionality and are compatible with cocoa butter, while CBRs and CBSs are more process-friendly but can impact mouthfeel and texture. These alternatives fall outside the U.S. standard of identity for chocolate and may require adjustments to formulation and processing.

Unlike cocoa butter alternatives, non-fat cocoa solids replacements have only recently gained traction. Historically, carob – naturally sweet and rich in fiber – was the most common substitute, though it lacks cocoa's complexity. Successful use requires careful formulation and flavor modulation to replicate cocoa's taste and functionality. Emerging technologies now explore fermentation and roasting of alternative ingredients such as oats, sunflower seeds, nuts and grains to recreate the nutty, roasted flavor notes of cocoa. These innovations offer promising avenues for developing chocolate-like products without traditional cocoa.

Regardless of the source – carob, grains, legumes or seeds – flavor modulation is essential to recreate the rich and layered sensory experience of traditional chocolate. Chocolate's signature flavor profile is the result of complex chemical reactions during fermentation and roasting, which produce a balance of bitter, sweet, fruity, nutty, roasted and even slightly acidic notes. When cocoa is removed or reduced, these elements must be carefully rebuilt using a combination of natural flavors, masking agents, enhancers and texture modifiers. Ultimately, successful cocoa replacement is not just about cost savings or ingredient swaps – it requires a holistic approach to rebuilding flavor, texture and consumer satisfaction in every bite.

The Challenge: Sugar Reduction

Sugar reduction remains one of the most frequent requests across confectionery. As consumer demand grows for not only lower sugar content but also clean label-ingredients, new solutions continue to emerge, including allulose, stevia and monk fruit. These sweeteners aim to replicate the taste and performance of full-sugar products with fewer calories and reduced or no added sugar. However, sugar contributes more than just sweetness—it also provides bulk, which is critical to both formulation and functionality. Since high-intensity sweeteners (often 200–600 times sweeter than sucrose) offer no bulk, additional ingredients are required to replace sugar's role in a formulation.

Sugar reduction strategies often depend on the degree of reduction desired. For example, a 25% reduction might combine reduced-sugar glucose syrup with soluble corn fiber and flavor modulation. A clean-label, low-sugar formulation could feature a blend of soluble corn fiber, allulose, stevia leaf extract and targeted flavor modulation to maintain sweetness perception and mouthfeel.

Beyond bulking and sweetness, sugar influences overall flavor and texture – factors that are critical to consumer satisfaction. Reformulation efforts must consider these attributes by replacing, rebuilding, and rebalancing components. Sweetness can be rebalanced using both high-intensity sweeteners and flavor modulators that recreate the layered sugar experience: delivering upfront, mid-palate and lingering sweetness while restoring mouthfeel and characteristic sugar flavor.

In some cases, reduced sugar can enhance specific sensory notes. For example, in chewy sour candy strips, lowering sugar levels may intensify sour and acidic components. Flavor modulation can then help round out the profile, rebuilding sweetness and mouthfeel. Incorporating colors from natural sources and finishing with globally inspired flavors – such as Asian citrus fruits like pomelo and calamansi – can keep better-for-you confections exciting and on-trend.





Flavors can be loud, limited edition, uncommon combinations, globally inspired and so much more.

The Challenge: Functional Ingredients

With more consumers proactively incorporating wellness goals into their daily routines, they are becoming more intentional about buying products with functional ingredients – even decadent confections that are better-for-you in disguise. The addition of botanical ingredients in chocolates is especially popular with consumers, such as guarana as a natural source of caffeine to support energy and focus or acerola to deliver vitamin C in support of immune function.

However, some botanical and plant extracts may add bitterness or astringency to a formulation, and a flavor masking system is crucial to reduce any undesirable off-notes. It takes a flavorist's keen understanding of the source of an offending note to determine how to counter it with appropriate flavor modulation. For example, the bitterness from pea protein is different from bitterness presented by grapeseed extract, and fiber can impart astringency into a formulation. Fruit flavors help offset bitter compounds with sweet and juicy characteristics, and fruit inclusions are plentiful in chocolate confections.

For another functional boost, clinically studied postbiotic strains may be incorporated to provide support for digestion, weight management, women's health or other areas of wellness. Postbiotics are ideal for confectionery, because they contain inactivated microorganisms that can withstand tough formulation conditions – like temperature, water or high-pressure processing – without losing efficacy. Prebiotic fiber is another microbiome-supporting ingredient that can be added to confectionery, helping to nourish intestinal flora and maintain a healthy intestinal tract environment. Additionally, most biotics are virtually undetectable from a sensory standpoint, with little to no impact on taste, aroma, mouthfeel, due to low inclusion levels. Nevertheless, when biotics react with flavor systems, sweeteners or other active ingredients within a formulation, flavor modulation might be needed to balance the final product's taste profile.

Possibilities Flourish in Next-Generation Confections

Besides opportunities in format and formulation, emerging confectionery trends indicate the entire sensory experience is open to reinvention. Innovation will challenge conventional shapes, textures, colors and flavors to maximize joy for all consumers. This "newstalgia" will deepen connections between generations, as trustworthy and timeless confections are reborn to come alive and thrive.

Image by G-Media at Adobe Stock

Sensory Theater Experiences

Texture is the elevated hero of experiential eating, combined with interesting shapes, intense flavors and vivid colors to stimulate, amuse and amaze. Super-sour candy takes center stage, delivering fizz and tingle on the tongue from chewy bites, strips and shreds. Fantasy flavors are popular here, like blue raspberry and rainbow, as well as a wide range of citrus, tropical and forest fruits. Sour plum is poised to be the next-gen sour cherry flavor, and with a punchy purple color, it's sure to have visual appeal.

Adventurous Flavor Pairings

Flavors can be loud, limited edition, uncommon combinations, globally inspired and so much more. One trend to watch is "swicy" (sweet + spicy) confectionery. Think chamoy and chili pineapple, tajin watermelon, spicy guava passionfruit, cinnamon cayenne, honey ginger, spicy tamarind, even wasabi cotton candy. Swedish gummies are also having a moment, in playful shapes like sneakers and soda bottles and fun flavors like strawberry vanilla and sour lemon fizzy pop.

Irresistible Temptations

Nothing takes indulgence over the top like rich, comforting flavors of chocolate, coffee, toffee, vanilla, brown sugar and toasted pecan. The famous Dubai chocolate bar features layered textures and flavors, including creamy pistachio filling and crunchy kataifi (shredded phyllo dough) encased in decadent milk chocolate. This trending flavor combination has inspired several iterations, from cookies to ice cream to tarts. Another approach to reimagine indulgence pairs sweet flavors with savory or salty notes. Miso salted caramel paved the way – up next, we anticipate flavors like salted cream cheese, charred coconut, salted butterscotch, garam masala snickerdoodles and honey mustard ice cream.

Spark Joy Through Taste and Texture

Confectionery and candies are playful by design, making them the perfect category to push the boundaries of what's possible – and what consumers are willing to try. Yet it takes more than imagination and successful execution of this creativity to enliven the senses and hold consumers' attention. Flavorists and formulators also must be technical experts with experience in advanced technologies and apply quality ingredients that consistently deliver delicious confections. As consumers increasingly expect these treats to provide wellness benefits – like support for sleep, focus, digestion or women's health – leveraging flavor modulation technology to master the delicate balance between functional ingredients and formulation requirements will go a long way to creating the types of confectionery that inspires fond memories.

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WHY THE FRAGRANCE INDUSTRY NEEDS TO REPLACE HEXANE AS AN EXTRACTION SOLVENT

Regulatory momentum and health concerns are making manufacturers look a bit more closely at their solvents.

BY ANNE-CÉCILE SIGNORET, regulatory and public affairs director, Ecoxtract



In the flavor and fragrance industries, hexane has traditionally been used to extract aromatic compounds and natural concretes from botanical raw materials.

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Hexane, a petroleum-derived solvent, has been a cornerstone for extracting plant-based raw materials across the food, cosmetics and fragrance industries for decades. Valued for its strong solvating power, low cost and ease of recovery, hexane has enabled the creation of many high-quality natural extracts used worldwide. It was long assumed hexane was fully recycled or evaporated during processing, leaving no trace in finished products. However, evolving science and societal concerns about health, safety and sustainability invite a careful re-evaluation of its use. This article explores the reasons driving the industry's gradual transition away from hexane and the opportunities it offers.

What is Hexane?

Hexane is not a single molecule, but a mixture of hydrocarbon isomers, with its composition depending on the crude oil source and refining process. Its main component is *n*-hexane, though it may contain other substances such as benzene or toluene.

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Hexane is a non-polar solvent with strong solvating power, and it has long been the standard for industrial-scale extraction thanks to its effectiveness, global availability and low cost. In the flavor and fragrance industries, it has traditionally been used to extract aromatic compounds and natural concretes from botanical raw materials. These techniques have enabled the creation of high-quality extracts used in fine perfumery and food applications. Over time, the sectors have adapted and continue exploring alternative extraction methods to maintain product quality and technical performance while addressing growing concerns about safety and sustainability.

Safety Concerns and Public Health Risks

n-Hexane is a well-documented neurotoxicant. In Europe, it is classified as STOT RE 1 (H372) by the EU's classification, labelling and packaging regulation (CLP), indicating it can cause damage to the nervous system through repeated exposure. Cases of peripheral neuropathy have been reported among workers exposed via inhalation. It is also classified as



Alternatives to hexane exist, and several companies within fragrance, flavor and related sectors have successfully begun adopting safer extraction methods.

a suspected reproductive toxicant (Category 2, H361f) by the CLP. These classifications are supported by robust toxicological data, particularly on its metabolite 2,5-hexanedione, which causes axonal damage.

Hexane's flammability is a well-known industrial hazard. Historical incidents, including explosions in Copenhagen (1980), Bordeaux (2018) and Dieppe (2018), underline the importance of strict safety measures. Industrial safety standards and handling procedures have significantly evolved since then, greatly reducing such risks.

Moreover, hexane is classified as hazardous to the aquatic environment (H411). Its volatility contributes to the emission of volatile organic compounds (VOCs), which affect atmospheric pollution and ozone formation. Hexane's fossil-based origin also exposes supply chains to price volatility and geopolitical tensions, impacting industry resilience.

Regulatory Momentum in Europe

Although residual solvent levels are regulated in food, consumers remain unaware of hexane's use in production, as regulations do not require disclosure of solvents used during extraction. Yet the process leaves measurable residues in finished products, contributing to population-wide exposure.

Two regulatory pathways are currently underway under the European Food Safety Authority (EFSA) and the European Chemicals Agency (ECHA).

EFSA has taken up the issue due to the variable composition of hexane and the fact that existing residue limit (1 mg/kg in oils, set in 1996) is not based on a safe dose and is now deemed insufficient. In a technical report published in September 2024, EFSA's technical report highlights concerns about potential exposure levels to hexane residues, especially in vulnerable groups such as young children, and calls for a reassessment of safety thresholds. EFSA is currently reassessing the safety of hexane as a food extraction solvent, based on toxicological data, composition analyses and exposure information submitted during calls for data. EFSA's final scientific opinion is expected by November 22, 2027.

In parallel, under ECHA's jurisdiction, n-hexane has been classified as STOT RE 1 (H372) for its effects on the nervous system. This classification becomes mandatory

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by May 2026. Furthermore, in February 2025, n-hexane entered the Registry of Intention for Substances of Very High Concern (SVHC). Once a substance is identified as an SVHC, it is added to the Candidate List, triggering enhanced transparency obligations throughout the supply chain, including the communication of safety information to downstream users.

The most significant regulatory consequences result from the inclusion on the Authorization List (Annex XIV) under the REACH regulation, or Registration, Evaluation, Authorization and Restriction of Chemicals. Once listed, companies wishing to continue using the substance must submit a comprehensive authorization dossier demonstrating that risks are adequately controlled or that the socio-economic benefits outweigh those risks. If granted, this authorization is time-limited and must be periodically renewed. This process strongly encourages industry to shift toward sustainable and safe solutions, ultimately aiming to phase out the use of the most hazardous substances.

National Action in France

In March 2025, Bill No. 1078 was introduced in France with the aim of banning the use of hexane and requiring mandatory health warnings on certain finished products. The key measures include:

- **Transparency:** Hexane residues, currently classified as "processing aids" and thus exempt from labelling, would require a mandatory " *may contain hexane*" statement.
- **Phasing-out:** The bill proposes to initially restrict use for vulnerable populations, starting with baby food, medicines, cosmetics, and nutraceuticals, followed by a gradual nationwide ban under the precautionary principle.
- **Support:** Farmers and SMEs willing to transition would receive financial aid, funded by a tax collected on producers and importers of hexane-extracted goods or animal products from hexane-treated feed.

Benefits and Challenges of Transitioning

Alternatives to hexane exist, and several companies within fragrance, flavor and related sectors have successfully begun adopting safer extraction methods. The use of hexane is explicitly banned in EU organic food production and under the COSMOS Organic standard for cosmetics. Transitioning away from hexane presents multiple benefits:

- **Improved safety:** Alternatives present significantly lower risks than hexane, particularly in terms of neurotoxicity and long-term exposure. This enhances worker safety and reduces occupational health concerns.
- **Lower environmental impact:** Alternatives avoid the use of fossil resources and help reduce the carbon footprint of extraction processes.
- **Brand and reputational protection:** Transitioning to safer alternatives reinforces a brand's commitment to health, transparency, and sustainability.
- **Stronger alignment with corporate sustainability goals:** Transitioning away from hexane supports green innovation, Environmental, Social and Governance commitments, and evolving regulatory expectations.
- **Access to premium positioning:** Alternatives support "hexane-free" claims and enable the development of organic, clean-label, or higher value-added products, offering differentiation in a competitive market.

However, the transition is complex, requiring collaboration across the supply chain, significant R&D investment and process adaptation. Maintaining product quality and technical performance while implementing new solvents or methods is critical to success.

To conclude, while hexane continues to be widely used due to its technical performance and economic viability, growing concerns about its potential impact on human health and the environment have prompted some companies to transition toward alternative extraction methods. These early movers demonstrate that it is possible to maintain high product standards while adopting safer and more sustainable technologies.

At the same time, others are now initiating or accelerating their own shift, encouraged by innovation, changing consumer expectations and the emergence of new regulatory frameworks.

This ongoing industry-wide transformation reflects a shared interest in responsible innovation and long-term sustainability. Its success will depend on close collaboration with suppliers, investment in R&D and forward-looking strategic planning. By proactively engaging with these changes, companies can ensure continuity, strengthen trust with stakeholders and contribute to more sustainable value chains. p&f+



NATURAL INGREDIENTS ARE NO LONGER OPTIONAL IN PERSONAL CARE

Essential oils provide solutions for all-natural labeling and clear ingredient demands.

BY CLAUDIA GUTULEAC, Marketing Manager; MATTHIEU GIRARD, General Manager, Sensient Essential Oils

A key takeaway from the 2025 Cosmetic Global Exhibition was that consumers want their personal care products to go "all natural, all the time." While the preference for all-natural products is not new, the trend has gone from a desire to a demand. Consumers have confirmed that commitment by putting their money behind their mandate, prompting personal care product developers to make the switch to all-natural formulations.

In short, natural ingredients are no longer optional. Moving forward, natural, sustainable, simple ingredients are a baseline expectation of consumers, and labels need to reflect that. Research by Euromonitor confirms that essential oils are viewed as eco-friendly, natural alternatives to synthetic fragrances.

Essential oils offer a range of solutions for helping product developers meet clean-label goals while also appealing to consumer preferences for a simpler lifestyle with meaningful connections to products from source to shelf.

Aligning Labels with Trends

While the term clean label can mean slightly different things in different situations, an emerging goal for personal care products is to provide a "clear label." A clean label includes as many natural ingredients as possible. A clear label uses easy-to-understand verbiage and clearly identifies ingredients that resonate with consumer priorities and expectations.

Essential oils enable labeling with easily recognizable plant names. Rosemary essential oil appears in the ingredient list as *Rosmarinus officinalis* leaf oil; lemon essential oil as *Citrus limon* peel oil. These names are simple to interpret and understand, innately evoking the natural source rather than a synthetic chemical.

These easily identifiable ingredients also correlate to functional associations. Aromatherapy and essential oils are increasingly being used for their perceived benefits in promoting relaxation, reducing stress and enhancing mood. For example, lavender is known to create calm and aid sleep while lemon is considered refreshing and energizing.

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By creating a label that is more accessible and easier to interpret, brands are empowering consumers to choose products that match their values

Image by polinaloves at Adobe Stock



Claudia Gutuleac, marketing manager, Sensient Essential Oils



Matthieu Girard, general manager, Sensient Essential Oils

Furthermore, consumers are demanding products that not only deliver on performance but also prioritize environmental responsibility. According to Mintel's 2025 Beauty& Personal Care Trends, a new wave of brands are embracing green chemistry and use sustainably sourced botanicals to ensure that efficacy isn't sacrificed for sustainability. At Sensient Essential Oils, for example, we source locally to build strong relationships and trusted partnerships with farmers over time to manage inventory and ensure eco-friendly agricultural practices.

By creating a label that is more accessible and easier to interpret, brands are empowering consumers to choose products that match their values.

Benefits of Essential Oils for Labeling

In addition to aligning product labels with market trends and consumer preferences, there are a variety of benefits when formulating with essential oils that speak to both clean-label and clear-label goals:

- **Match your branding to your label.** The all-natural aspect of essential oils means brands can use images of the plant or botanical on packaging to reflect the fragrance and ingredients.
- **Show transparency and model integrity.** Vertical integration is an important tool to help control every step of the process from cultivation to harvest through distillation and processing. This vertical system allows full batch traceability from field to finished oil, supporting claims like "farm-to-formulation." Your essential oils partner should be able to provide a Country of Origin certificate to validate the brand story.
- **Use clear, understandable language.** Increasingly, consumers want to be able to read and relate to each ingredient. Essential oils enable a natural connection from source to ingredient label.
- **Share your sustainability story.** All-natural ingredients like essential oils provide the traceability to confirm your sustainability claims.
- **Meet regulatory standards.** Make it easier to meet regulatory standards around all-natural claims with essential oils.

Challenges and Considerations

When working with essential oils, it is important to partner with an experienced company with experts who can anticipate potential challenges and provide an array of solutions.

Some of the things developers should explore and understand when working with essential oils in product formulations include:

- **Maintaining consistency in the face of natural variations**

  Challenge: Since essential oils are derived from plants (flowers, leaves, seeds and so on), their chemical profiles are influenced by geographic origin, climate and seasonal variation, harvest timing, soil composition, processing methods and timelines. This variability creates challenges in maintaining consistent quality and efficacy across production batches.

  Solution: Standardization techniques help create consistent quality. Creating essential oils natural compositions allow formulations to stay within defined ranges and specifications for scent profile,

L to R: images courtesy of Sensient Essential Oils;

color and other parameters. By understanding the complexities of natural variability and leveraging standardization techniques, product developers can harness the power of nature without compromising on quality, consistency or performance.

- **Managing the innate hue of natural sources**

  Challenge: Some essential oils naturally carry a distinctive color due to pigments of their source plants, which can affect the aesthetics of the final product, especially clear gels, lotions or serums. For example, thyme oil can range from pale yellow to reddish-brown.

  Solution: Essential oil experts use a process called rectification to remove color-creating components. In the thyme oil example, rectification yields a more refined and colorless version called white thyme oil, which is suitable for light-colored or transparent formulations.

- **Minimizing sensitivity to high concentrations**

  Challenge: Since essential oils are so pure and highly concentrated, some people can experience skin sensitivity.

  Solution: There are techniques for mitigating sensitivity by reducing specific molecules that could cause allergies.

- **Managing price variation**

  Challenge: Essential oil prices fluctuate due to factors like harvest quality and global demand, making it difficult for personal care producers to maintain consistent product costs. These variations can disrupt budgeting and affect pricing strategies.

  Solution: Producers can manage risks by using essential oil natural compositions without compromising quality and ensuring consistency in every batch.

- **Ensuring transparency and integrity**

  Challenge: You can find different levels of quality of the essential oils on the market, and some of them lack clarity in product communication and documentation that may lead to mistrust among consumers in the long term.

  Solution: Work with an essential oil company that has a long-standing reputation for their knowledge, expertise, exceptional quality and integrity.



Image by Caseyjadew at Adobe Stock

One of the best ways to capitalize on the benefits of essential oils is to share the story behind your ingredients.

Experienced companies like Sensient Essential Oils place a priority on quality control, transparency and product safety.

Unique Opportunities for Growing Share of Market

Personal care product reviews and endorsements are some of the most popular segments for social media influencers. Modern brands understand the need to capture the attention of both consumers and those centers of influence.

One of the best ways to capitalize on the benefits of essential oils is to share the story behind your ingredients. Essential oils help create that vibrant visual of a product's origin story. For example, rosemary essential oil was culled from rosemary grown in the Mediterranean countryside, thriving in sun-drenched fields and harvested at peak potency. This origin story helps consumers find products they connect with based on their own personal priorities and values.

When brands highlight the origin of their ingredients, they invite consumers on a journey – a journey that often includes cultural heritage, sustainable farming practices or empowerment of local communities. This narrative can create emotional depth in brand communication, connecting with consumers' growing desire for transparency and authenticity.

Interestingly, there is a growing industry focus on measuring the emotional impact of scents and fragrances. Rather than simply incorporating a pleasant scent in a personal care product, brands should be looking to evoke an emotion or arouse a memory related to a delightful experience the consumer wants to relive or recreate. Spur a festive feeling or promote relaxation based on an aroma recall-and-response.

The slow-and-simple-living trend is an everyday example of an emotional response to clean labeling. Consumers are looking for ways to simplify life in a complicated and overwhelming world. Easy-to-understand ingredients like essential oils help create a short, simple, clear-and-clean label that aligns with consumer values and speaks to their desire for a more basic approach to living.

Natural Consequences

Brands with all-natural labeling goals should consider essential oils as they simplify formulations and ingredient labels. Essential oils enable all-natural product claims and meet regulatory requirements with transparency and integrity, building trust with your brand audience.

Essential oils create emotional connection with consumers who want a slower, simpler lifestyle that helps them envision the origin story of their personal care products in a way that feels truly personal and special. They tap into multiple senses to evoke stronger associations with the functionality of personal care products.

An experienced partner can help product developers maximize the advantages of essential oils while avoiding common challenges that come with converting formulations to meet all-natural labeling goals. All-natural is no longer a unique product category; it's a baseline expectation across the personal care product market.

What creates differentiation moving forward is the ability to bring all-natural products to market with functional ingredients, sustainable sourcing practices, and a back story that evokes an emotional connection.

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SWEET Treat

Solutions





Baguette Note (1048RF)
fresh, crusty, bread

Homofuraneol (FEMA 3623)
brown sugar, sweet, caramel, fruity

NEW

Cocoaguette Note 1.0 (1070RF)
creamy, chocolate, nutty

Cocoaguette Note 2.0 (1071RF)
roasted, cocoa powder, toffee

Sweetness Enhancer (1072TM)
maximize sweetness in sugar free formulation

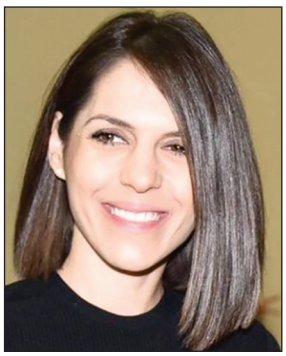
Avant SweetMax 2.0 (1075TM)
enhance sweetness, reduce sugar

AVANT
ORGANICS

For sample request please contact info@avantorganics.com
or visit our website www.avantorganics.com



The panel evaluated materials from flavor company Advanced Biotech.



BY MARIA PALASSAROU
Flavorist, Givaudan

Flavor Reports: EU Edition

Our panel from the British Society of Flavorists evaluates materials for their use in flavor applications.

Organoleptic Evaluation Panelists

- **Andrea Albertino, Ph.D.,** Senior Flavorist, Esarom
- **Aine Walsh,** Principal Flavorist, Keurig Dr Pepper
- **Bimal Karmakar, Ph.D.,** Principal Flavorist, Givaudan
- **Britta Nobis,** Senior Flavorist, Silesia
- **Jack Nicol,** Flavorist, IFF
- **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 we evaluate ingredients from Advanced Biotech, a biotechnology company based in Totowa, New Jersey. Advanced Biotech is recognized as a leader in natural flavor and fragrance ingredients, offering a huge variety from natural flavoring substances to essential oils and pyrazines.

Gamma Undecalactone Chiral, Natural

Synonyms: Aldehyde C-14; (R)-4-Hydroxyundecanoic acid γ lactone.

FEMA#3091, CAS#104-67-6/74568-06-2

Odor Descriptors@100%: Lactonic, creamy, fruity, peach notes, fatty, waxy, soapy, coconut, slight nutty.

Taste Descriptors@5ppm: Lactonic, waxy, soapy, fatty, creamy, milky, coconut, peach skin, fruity, slight tonka, nutty, cardboard, metallic notes.

Possible applications: Its dominant creamy, fatty note would complement all dairy flavors, like cream, milk and cheese, while it would also be a great addition on creamy vanilla profiles, like French vanilla. The fruity, lactonic element would fit well on stone fruit flavors like peach and apricot, on various red fruit profiles like strawberry, and also on tropical fruit tonalities. The intense lactonic, waxy character would provide complexity to all coconut profiles, whereas the fatty note might be a great addition to savory flavors, like chicken. Lastly, the nutty, fatty element would blend well on various nut profiles, like pecan, macadamia and pistachio.



The panel noted that alpha ionone chiral, natural can be used in floral applications, such as orris.

Alpha Ionone Chiral, Natural

Synonyms: (R)-(+)-(3E)-4-(2,6,6-Trimethylcyclohex-2-en-1-yl)but-3-en-2-one; (R)- (+)-(E)-Alpha-Ionone

FEMA#2594, CAS#24190-29-2/127-41-3

Odor Descriptors@100%: Floral, violet, woody, cedarwood notes, orris, powdery, sweet, amber notes, fruity, berry, perfumery notes.

Taste Descriptors@5ppm: Floral, violet, woody, slight cedarwood, powdery, candy, tobacco notes, fruity, berry, amber, Davana oil notes, orris, musk, perfumery note.

Possible applications: Its characteristic floral, woody note would complement all violet flavor profiles, like Parma violet. In combination with its powdery element, it would blend well on other floral profiles, like orris. The fruity, amber, Davana oil-type character would make it a great addition on various berry tonalities like raspberry and blackcurrant, red fruit profiles like strawberry, tropical fruit tonalities like papaya, but also Tutti Frutti and fantasy flavors for energy drinks. Lastly, its woody, tobacco note would provide complexity to dried fruits profiles, like plum, raisins and fig.

Nootkatone 98%, Natural

Synonym: (+)-5,6-dimethyl-8-isopropenyl bicyclo(4.4.0) dec-1- en-3-one.

FEMA#3166, CAS#4674-50-4.

Odor Descriptors@100%: Grapefruit notes, woody, albedo, pithy, spicy, peppery, fatty, peely, citrus pomelo, sulfurous notes.

Taste Descriptors@2ppm: Grapefruit, woody, albedo, pithy, peppery, rubbery, soapy, peely, floral, pomelo and yuzu notes, tropical, sulfurous, perfumery note.

Possible applications: Its dominant woody, albedo, peely note would complement most of the citrus tonalities, like grapefruit, orange, blood orange, yuzu and pomelo. The fruity, floral, woody elements would make it a great addition on grape profiles, but also provide complexity on stone fruit tonalities, like peach. Lastly, its sulfurous character would blend well on tropical fruits profiles, like passionfruit.

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Gamma Heptalactone, Natural

Synonym: (S)-(-)-dihydro-5-propyl-2(3H)-Furanone
FEMA#2539, CAS#105-21-5/31323-51-0

Odor Descriptors@100%: Hay, coumarinic, tonka, lactonic, sweet, burnt sugar notes, powdery, creamy, milky, slight woody, waxy, coconut milk, slight metallic.

Taste Descriptors@2ppm: Coconut, tonka, hay, lactonic, coumarinic, sweet, creamy, milky, woody, burnt sugar notes, slight metallic, waxy, nutty.

Possible applications: Its sweet and creamy character would make it a great addition to various dairy profiles, like milk and custard, but would also fit well on sweet vanilla tonalities, like French vanilla. The lactonic, waxy element would blend well on all coconut note profiles, like pina colada, whereas its tonka, sweet, woody character would complement brown flavors like caramel and toffee, burnt sugar profile flavors like marshmallow, and barrel-aged spirits like rum and brandy.

Alkyl Pyrazine mix 007, Natural

Pyrazine mixture: 2-Ethyl-3,5-dimethyl-pyrazine, 2-Ethyl-3,6-dimethyl-pyrazine, 2,3,5-Trimethyl Pyrazine, 2-Ethyl-6-Methyl Pyrazine, 2-Ethyl-5-Methyl Pyrazine, 2,3,5,6-Tetramethylpyrazine
FEMA#3149, 3244, 3919, 3154, 3237, CAS#27043-05-6, 36731-41-6, 13925-03-6, 14667-55-1, 1124-11-4

Odor Descriptors@1%: Nutty, roasted, toasted, brown, burnt, cocoa, slight tonka, earthy, wet wood notes, coffee, popcorn notes.

Taste Descriptors@2ppm: Nutty, roasted, toasted, bread crust, caramel, brown notes, slight tonka, burnt, popcorn notes, coffee, cocoa, wet wood.

Possible applications: Its complexity on nutty and roasted notes would complement all nut tonalities, like walnut and pecan, whereas its additional sweet, earthy character would make it a great fit to various brown flavors, like caramel, cocoa, chocolate and coffee. Lastly, the roasted, burnt, tonka notes would provide additional complexity to various toasted profiles, like bread crust, corn chip and popcorn flavors.

Coriander Oleoresin

Extraction information: Extracted from coriander seeds.
FEMA#2333, CAS#84775-50-8

Odor Descriptors@100%: Brown, caramellic, woody, sweet, bready, fenugreek notes, earthy, nutty, cocoa notes, spicy, fatty.

Taste Descriptors@50ppm: Sweet, caramellic, brown, nutty, earthy, cocoa, fenugreek notes, spicy, fatty, seedy, slight citrus.



The tonka, woody notes of gamma heptalactone can be used in rum and brandy flavors.

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Truffle sulfide, natural was described as having alliaceous, garlic notes.

Possible applications: Its intense sweet, nutty character would complement all brown flavors, like cocoa and chocolate, whereas its spicy undertone would make it a great addition to spice mix profiles, from chai latte to more savory Indian cuisine spice blends.

(E,Z)2,6 Nonadienal 1% PG, Natural

Synonym: cucumber aldehyde

FEMA#3377, CAS#557-48-2

Odor Descriptors@100%: Waxy, fatty, green, cucumber notes, ethereal, aldehydic, watermelon, melon, savoury notes.

Taste Descriptors@2ppm: Waxy, fatty, green, cucumber notes, watermelon, melon notes, soapy, juicy, slightly earthy, savoury meaty, vegetable notes.

Possible applications: Its dominant waxy, green, ethereal character would provide complexity to all refreshing and watery tonalities, like melon, watermelon and cucumber. It would also complement orchard fruit profiles, like green apples and pears. The green, melon character would make it a great fit on tropical fruit tonalities, like mango Alphonso type. Lastly, the waxy, fatty element might blend well on a variety of savory flavors from cheese to chicken, and seafood.

Truffle Sulfide, Natural

Chemical Name: 2,4-Dithiapentane, Bis-(Methylthio) methane

FEMA#3878, CAS#1618-26-4

Odor Descriptors@0.001%: Alliaceous, garlic notes, sulfurous, metallic, mushroom notes, horseradish, cabbage notes, burnt rubbery.

Taste Descriptors@50ppt: Alliaceous, garlic, sulfurous, metallic, burnt rubbery, horseradish, onion, truffle mushroom notes, pungent, blue cheese notes, savoury meaty, gassy.

Possible applications: The dominant alliaceous note would complement all sulfurous vegetable tonalities, like garlic, onion and cabbage, whereas its additional characteristic metallic element would provide complexity to truffle mushroom profiles. The pungent, metallic note might also fit well on cheese tonalities, like blue cheese flavors, and its intense sulfurous, alliaceous character might provide complexity to tropical fruits like durian.

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