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Reprogramming the Palette: Biotech at the Heart of Sensory Innovation

Where the industry goes next is a landscape where the intangible—scent and taste—is made increasingly measurable and programmable.



By modulating olfactory receptors with specific antagonist or agonist molecules, fragrance houses can tailor the bloom and lastingness of a scent within complex chemical bases like laundry detergent or hair care with mathematical accuracy.

The flavor and fragrance industry is undergoing a fundamental transition toward molecular engineering as a key element of the sensory tool box. This represents a restructuring of the palette through advanced biotechnology. Recent strategic moves by Mane and Robertet, alongside coordinated sector-wide manifestos, signal that the industry is moving away from the limitations of nature toward a future of augmented naturality and receptor-level precision.

A primary driver of this evolution is the urgent need for supply chain stability. The traditional model, dependent on volatile botanical harvests and climate-vulnerable regions, is being replaced by biobased discovery and industrial biomanufacturing. A significant example of this is the strategic partnership between bitBiome, Inc. and Tojo Vikas International Pvt. Ltd.

By pairing bitBiome's microbial discovery platform—which reportedly includes the world's largest microbial sequence database—with Tojo Vikas' global commercialization muscle, the alliance aims to scale high-value aroma and taste molecules with unprecedented cost efficiency and sustainability.

This push for scale is echoed by the Advanced Biotech for Sustainability (AB4S) coalition, which includes heavyweights like L'Oréal, BAS and Evonik. The group's 2026 report, *The Molecule Manifesto*, identifies a $1.1 trillion market opportunity by 2040 and highlights four priority molecular families for immediate industrial scaling: terpenes, peptides, non-catalytic proteins and hydroxy acids. Terpenes alone, such as patchoulol and nootkatone, represent a $7–12 billion market where biotech offers built-in stereocontrol



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and natural-identical labeling, finally decoupling the industry from the unpredictability of the field.

Beyond just securing supply, the industry is racing to decode the very biology of human perception. Mane's January 2026 acquisition of ChemoSensoryx marks a pivot toward bottom-up biotech. Rather than relying solely on the artistic intuition of a perfumer or flavorist, Mane is now integrating a platform capable of individually expressing the full range of human chemosensory receptors—specifically G protein-coupled receptors (GPCRs)—in dedicated cell lines. This allows researchers to generate a detailed olfactogram for any compound, mapping exactly how it interacts with olfactory, gustatory and trigeminal pathways.

This receptor-level screening is transforming flavor creation, particularly in taste modulation. By understanding the molecular mechanisms behind sweetness, bitterness and umami, Mane can now identify new agonists and antagonists to block undesirable off-notes or amplify targeted sensory effects. This scientific depth enables the discovery of enhancers that can precisely tune sensations like kokumi or saltiness, creating more intentional and efficient sensory experiences.

The same precision is being applied to functional perfumery. While aesthetic appeal remains central, biotech now allows for the design of fragrances that trigger specific neurological, emotional or physiological responses. By modulating olfactory receptors with specific antagonist or agonist molecules, fragrance houses can tailor the bloom and lastingness of a scent within complex chemical bases like laundry detergent or hair care with mathematical accuracy. This technology even extends to the trigeminal system, where researchers are developing compounds to selectively modulate ion channels like TRPM8 and TRPA1 to deliver longer-lasting freshness or precisely tuned burn and tingle in oral care and beverages.

The move toward lab-grown ingredients is also taking center stage in the topical beauty and health sectors. Robertet's strategic investment in Aethera Biotech marks its official entry into the biotech topical cosmetic active sector, establishing a center of excellence for what the company calls augmented naturality. The centerpiece of this venture is Aethera's multi-patented CROP (Controlled Release of Optimized Plants) platform. This technology uses in vitro plant cell cultures to produce natural phytocomplexes in highly controlled environments.

The CROP platform represents a leap in sustainability and security. By utilizing cell multiplication instead of traditional agricultural methods, Robertet can secure the production of natural extracts regardless of climatic volatility or geopolitical uncertainty. This process significantly reduces the environmental footprint of production while ensuring a consistent supply of high-value active ingredients for global distribution.

Where the industry goes next is a landscape where the intangible—scent and taste—is made increasingly measurable and programmable. The combination of predictive sensory modeling, high-throughput bioassays and plant cell cultures means that the next generation of flavors and fragrances will be more sustainable, more functional and more closely aligned with human biology than ever before.



Ingredients



Green Bite: Avant Organics' Nonadienyl Acetate Delivers Crisp, Juicy Realism

Avant Organics

www.avantorganics.com

trans-2-*cis*-6-Nonadienyl acetate (FEMA# 3952) delivers a crisp, natural green profile with notes of green apple, melon, cucumber and fresh vegetable. Its juicy character is supported by a subtle fatty mouthfeel that adds body, along with a soft nutty nuance for added complexity. Bright, watery top notes provide lift and realism, while the rounded texture enhances authenticity and longevity. Well-suited for fruit, vegetable, and beverage applications, this ingredient offers flavorists a versatile tool to enhance natural character, add dimension and create vibrant, true-to-life flavor systems. Avant Organics provides this material as U.S. natural, kosher and non-GMO. For a free sample please email info@avantorganics.com.



Sublimolide: A Vegan Musk Alternative Delivering Soft Power and Lasting Luxury

MANE

https://www.mane.com/

Designed as a responsible, vegan alternative to natural ambrettolide, SUBLIMOLIDE (CAS# 28645-51-4) offers the perfect balance of sophistication and comfort. The soft, powdery scent boasts excellent diffusion and a lasting trail, adding a touch of luxury and freshness to both fine fragrances and everyday products.



Weatherproof Citrus, Full Impact

BASF

https://www.isobionics.com/global/en/product-finder/natural-nootkatone-70

Isobionics Natural Nootkatone 70 imparts a fresh, grapefruit and woody aroma, and is made from renewable materials using our innovative fermentation process. It is EU and U.S. natural, pesticide-free, kosher and halal certified, and independent of weather and harvest conditions, while delivering an authentic, in-depth sensory profile across many applications.



Turning Indian Pepper Into Pure Impact

Ernesto Ventós S.A

https://www.ventos.com/index.php/en/producto/9657/BLACK+PEPPER+INTENSE+DM/223

Ernesto Ventós S.A's Black Pepper Intense MD is a bold, warm and spicy creation crafted in our production plant, capturing the true essence of premium Indian pepper. Sourced from India, where we've recently established our subsidiary, this product reflects the powerful synergies we are building, combining origin expertise with innovation to deliver exceptional olfactory performance.

Images courtesy of the manufacturers



Woody Elegance Meets Sustainable Fragrance

Symrise

https://www.symrise.com/scent-and-care/aroma-molecules/perfumery-ingredients/#Magnolila

Ysamber K, the woody companion, delivers a clean, woody-amber character with cedarwood facets and subtle fruity nuances. It blends seamlessly, supports woody accords, and lifts citrus top notes with fresh radiance. Its versatility makes it ideal for modern, expressive fragrances—a biodegradable choice for sustainable perfume design.



Juice Booster: Natural Isoamyl 2-Methylbutyrate Delivers Bright Apple-Pear Lift with Candy-Sweet Punch

Axxence USA

www.axxence.com

Natural Isoamyl 2-methylbutyrate (FEMA# 3505, CAS# 27625-35-0) is known for its bright, juicy, and intensely fruity character with prominent apple and pear top notes. At low levels, it delivers a crisp, fresh cut fruit quality with subtle banana and tropical nuances, while higher concentrations bring a sweet, candy-like profile. This material enhances juiciness and ripeness while adding lift and diffusion to fruit systems. EU and U.S> natural, kosher, vegetarian and non-GMO.



A Brighter, Bolder Bergamot

Agrumaria Reggina

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

Bergamot oil decol is initially a powerful burst of juicy and aldehydic grapefruit. The characteristic bitter note settles in over time, creating an essential oil that is bold and infinitely zesty. Obtained through distillation process on the cold-pressed oil, it enhances its citrusy and slightly bitter facets. Ideal for enhancing other citrus notes. It blends well with aromatic ingredients to form bitter-herbal accords. Particularly enhances woody scents, especially vetiver, with its zesty note.



4-Heptanone Natural: Fruity, Creamy and Unmistakably Real

Penta Fine Ingredients

https://www.pentafineingredients.com/

4-Heptanone Natural (FEMA 2546; CAS 123-19-3) from Penta Fine Ingredients delivers a distinctive profile combining fruity brightness with creamy, slightly cheesy undertones and herbal facets. Its versatility makes it well-suited for dairy, fruit and savory flavor systems. In perfumery, its volatile, slightly waxy character imparts a subtle freshness, adding lift and realism to green, fruity and lactonic accords, while enhancing the naturalness of a composition without dominating the blend.



Papaya flavors certainly have no lack of heavy notes, but the base is arguably too simplistic. Higher levels of geranyl isovalerate are needed to introduce significant complexity. Two hundred ppm is just a starting point.



BY JOHN WRIGHT
johnwrightflavorist@gmail.com

The Aromatic Heavyweight: Mastering the Nuances of Geranyl Isovalerate

Exploring the versatile taste effects and aromatic harmony of geranyl isovalerate across orchard, berry and floral profiles.

Geranyl isovalerate ((3E)-3,7-dimethyl oct-3,6-dienyl 3-methyl butanoate; FEMA# 2518; CAS# 109-20-6; COE# 448, DG SANTE# 09.453; JECFA# 75) is a very interesting flavor chemical at the higher end of the molecular weight spectrum. It makes a good contribution to the base odor structure of many flavors and also has a significant taste effect. The aroma of geranyl isovalerate is complex, combining an obvious rose character with hints of pear, berry and citrus.

It might seem unexpected that I have not included any citrus flavors in my suggestions, given the profile and the obvious interest of geranyl acetate in this category. Geranyl isovalerate can clearly be quite helpful in citrus flavors, but I suspect that geranyl butyrate may be more influential in this interesting category—it is a matter of choice.

Image by rohappy at Adobe Stock

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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.

Tropical Fruit Flavors

Banana: The dominant esters in banana flavors are fairly volatile and are helped by a counterbalancing ingredient. Geranyl isovalerate blends well, adds interesting complexity and does not contradict the general profile. The ideal level lies in the realm of creativity, as always, but 50 ppm is a suggestion.

Kiwi: Kiwi is, in so many ways, a much more delicate profile than banana, but can still benefit from added depth. Again, 50 ppm is a good starting point.

Lychee: The heavy rose note of geranyl isovalerate is a perfect fit in lychee flavors, adding depth and improved taste effects. Levels can be varied considerably. One hundred ppm is only a starting point—much higher levels can also work well.

Mango: Mango flavors vary by variety and region, but often have a noticeable, slightly harsh, terpene note. A touch, around forty ppm, of geranyl isovalerate can subtly soften this effect and add depth.

Papaya: Papaya flavors certainly have no lack of heavy notes, but the base is arguably too simplistic. Higher levels of geranyl isovalerate are needed to introduce significant complexity. Two hundred ppm is just a starting point.

Passionfruit: The key base ingredient in passionfruit flavors is furaneol. Geranyl isovalerate blends harmoniously with furaneol in this, and other, flavor profiles. Levels of addition range from 50 ppm to 100 ppm.



The heavy rose note of geranyl isovalerate is a perfect fit in lychee flavors, adding depth and improved taste effects.

Pineapple: The same comment in respect of furaneol clearly applies even more strongly to pineapple flavors. Consequently, the ideal level of addition is noticeably higher, ranging from 100 ppm to 200 ppm.

Soursop: Soursop flavors are interesting, and the effect of this ingredient is quite subtle. Quite a range of levels of addition can work well, ranging from ten to eighty ppm.

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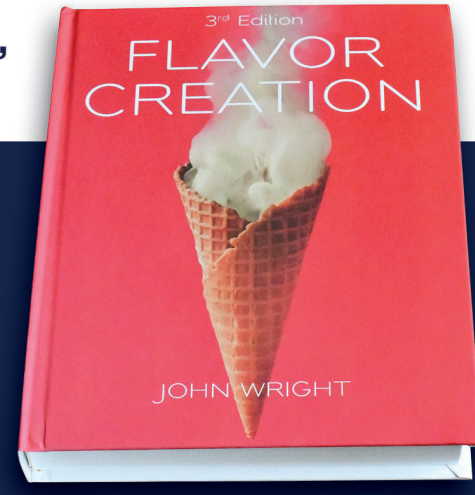


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Orchard Fruit Flavors

Apple: Geranyl isovalerate is clearly an interesting ingredient in all orchard fruit flavors. Fifty ppm helps add depth and interest to all styles of apple flavors, but works particularly well in red apple profiles.

Apricot: Most apricot flavors are led by the floral note of linalool. Geranyl isovalerate blends sympathetically with linalool. Levels of addition vary. Two hundred ppm is ideal for fresh apricot flavors, but much higher levels, up to 1,000 ppm, can boost dried apricot profiles.

Cherry: Cherry flavors vary dramatically in character. Geranyl isovalerate can be helpful in all variants, starting at 50 ppm in flavors dominated by benzaldehyde. Higher levels, up to 200 ppm, are better if authenticity is the target.

Nectarine and peach: Nectarine and peach flavors can be seen together in respect of this ingredient. Both benefit from a moderate level of addition, in the region of 100 ppm.

Pear: Pear flavor may appear to be the least aggressive within the orchard fruit category but they are particularly compatible with geranyl isovalerate. The perfect level of addition is very much a creative choice, but I would go for 600 ppm.



Two hundred ppm of geranyl isovalerate is ideal for fresh apricot flavors, but much higher levels, up to 1,000 ppm, can boost dried apricot profiles.



Blackcurrant flavors, like cherry flavors, range from the cheerfully artificial to the attractively authentic. Geranyl isovalerate can cover the artificiality of buchu oil to some extent at 200 ppm; 50 ppm is better for realism.

Berry Fruit Flavors

Blackberry: There is quite a choice of deep berry notes but, even so, geranyl isovalerate can add welcome complexity to the base notes in any berry oriented flavor. One hundred ppm has a good effect in blackberry flavors.

Blackcurrant: Blackcurrant flavors, like cherry flavors, range from the cheerfully artificial to the attractively authentic. Geranyl isovalerate can cover the artificiality of buchu oil to some extent at 200 ppm; 50 ppm is better for realism.

Blueberry: Like apricot flavors, there is a pronounced floral note to most blueberry flavors. Similarly, 200 ppm of geranyl isovalerate is a good starting point.

Gooseberry: Gooseberry flavors tend to be relatively delicate and driven by lighter esters. Fifty ppm of this ingredient adds a little depth and blends well with the overall profile.

Raspberry: One hundred ppm of geranyl isovalerate adds complexity to an attractive flavor category that already boasts quite a few berry notes.

Redcurrant: Despite the close relationship, redcurrant flavors are much more subtle than blackcurrant flavors. Fifty ppm is an ideal level of addition to boost the berry notes and add a realistic taste effect.

From top: Images by ricka_kinamoto; Дмитрий Березнев at Adobe Stock

Strawberry: Here we see the relationship with furaneol in full force. Levels of addition of geranyl isovalerate can range from one to 200 ppm.

Floral & Other Flavors

Chrysanthemum: The "other flavors" category is obviously dominated by a number of floral flavors, most of which very dramatically in popularity from country to country. Chrysanthemum flavor make good use of high levels of geranyl isovalerate, around 500 ppm.

Cucumber: This flavor category make seem like an unexpected recommendation, but it does make sense. One hundred ppm of geranyl isovalerate adds depth and harmonious complexity to a flavor category that, in my opinion, is in dire need of it.

Elderflower: Good elderflower flavors are heralded by hotrienol. Geranyl isovalerate blends very well into the profile, but the level of addition need only be moderate, around 50 ppm.

Kewra: Realistic kewra flavors are an interesting challenge. Fifty ppm of geranyl isovalerate adds helpful depth and complexity.

Melon, cantaloupe: Geranyl isovalerate is particularly compatible with cantaloupe melon flavors. Levels of addition can be as high as 500 ppm. It also works well in the more fantasy oriented watermelon category, but levels need not be quite so high.

Rose: It is obvious that this ingredient would blend well with geraniol and citronellol in rose flavors. Not quite so obvious is its close harmony with damascenone. Levels are entirely a question of creative choice. I would opt for 1,000 ppm.



Violet flavors are even more subject to creative license than rose flavors. Five hundred ppm of geranyl isovalerate is just a conservative suggestion.

Violet: Violet flavors are even more subject to creative license than rose flavors. Five hundred ppm of geranyl isovalerate is just a conservative suggestion.

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Oral care for prevention, sensitive teeth , and whitening properties are driving activity and innovation. From toothpaste to mouthwash, brands are developing whitening formulas to brighten smiles.



BY AMY MARKS-MCGEE
Founder, Trendincite LLC
amy@trendincite.com

From Mint to Marshmallow: The Sensory Revolution in Modern Oral Hygiene

Consumers' desire for fresh breath and whiter teeth, playful flavors, unexpected collaborations, and functional candy drives oral care innovation.

According to Mordor Intelligence[a], the global oral care market is estimated at $34.36 billion in 2026, and is expected to reach $44.91 billion by 2031, at a CAGR of 4.25%. Toothpaste represented 34.83% of revenue in 2025, while mouthwashes and rinses are forecast to expand at a CAGR of 5.70%. In terms of consumer habits, three in 10 Americans brush their teeth at least once a day (30%), half (51%) brush twice daily, and 10% brush three or more times daily, according to YouGov Profiles[b]. The top five features consumers look for in a toothpaste are: whitening (50%), cavity protection (50%), freshens breath (42%), anti-plaque (33%), and total care/multi protection (33%). The most commonly used product is mouthwash, used by 59% of Americans

[a] *https://www.mordorintelligence.com/industry-reports/global-oral-care-products-market-industry*
[b] *https://business.yougov.com/content/51427-how-often-do-americans-brush-a-look-at-oral-care-habits*

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at least once a week, while teeth whitening strips are used by only 8%. Oral care is being incorporated into individuals' beauty routines, reflecting an interest in the oral microbiome and holistic health. Consumers' desire for fresh breath and whiter teeth, playful flavors, unexpected collaborations, and functional candy drives oral care innovation.

Confidence Starts with Breath as Brands Target Odor at the Source

A Talker Research and Crest survey[c] found that 65% of Americans question whether they have bad breath at least once a day, while 91% link fresh breath to higher confidence. In response, Crest released a Clean Breath toothpaste that delivers long-lasting freshness. The daily-use toothpaste is formulated to target and neutralize odor-causing bacteria. According to the brand, brushing twice a day provides 24-hour antibacterial protection and helps reduce the need for gum or mints to freshen breath. Listerine unveiled a Citrus Mint alcohol-free mouthwash in a grapefruit and yuzu mint flavor. It is infused with four essential oils, said to kill 99.9% of bad breath germs.

Targeting Generation Z's interest in beauty care and sensorial textures, Hello products by Colgate-Palmolive introduced Whipped Toothpaste in Mellow Mint Dream and Peppermint Stick flavors. It took three years to create and features a chalk-based system with calcium carbonate and three non SLS-based surfactants paired with a system of four new polymers. The whipped formula prevents cavities, freshens breath, strengthens enamel, and is powered by foam fast technology.

From Marshmallow to Violet Crumble, Oral Care Flavors Go Bold

According to NielsenIQ[d], "oral care is being premiumized with skin care-inspired design and influencer collaborations, turning hygiene into a beauty-driven experience." Yet mint remains a flavor staple in toothpaste.

However, brands are innovating and moving beyond mint with sweet and even savory flavors. From collaborations with trendy food and beverage brands to high-end fashion designers, brands are creating playful and novel oral care products.

For example, in November 2025, Los Angeles-based grocery Erewhon, known for creating exclusive, expensive, and viral smoothie collaborations with celebrities,



Targeting Generation Z's interest in beauty care and sensorial textures, Hello products by Colgate-Palmolive introduced Whipped Toothpaste in Mellow Mint Dream and Peppermint Stick flavors; courtesy of Hello products.

influencers, and brands, teamed up with oral care brand Boka. The Mint Condition Smile Smoothie was inspired by toothpaste, and the bright blue smoothie featured organic mint, banana, mango, coconut, and blue spirulina. In honor of Boka's 10th anniversary, the brand launched a Vanilla Cardamom limited-edition toothpaste flavor. It contains the proprietary formula of nano-hydroxyapatite (n-Ha), a biomimetic mineral form of the same ingredient that naturally makes up 97% of teeth's material and 70% of dentin.

Last year, Moon Oral Beauty released a limited-edition Toasted Marshmallow flavored toothpaste "inspired by nostalgic nights by the campfire." Additionally, the brand collaborated with Sprinkles for the bakery's 20th anniversary and Moon's 6th birthday. The whimsical collection features a Moon x Sprinkles Electric Toothbrush and Birthday Cake-flavored Toothpaste. Sprinkles also created a limited-time custom Moon Birthday Bite Cupcake.

Australian-based oral care company Hismile is known for its unexpected, novel toothpaste flavors and its collaborations with consumer packaged goods and Quick Service Restaurants. For example, last year, KFC partnered with Hismile on a limited-edition Fried Chicken-flavored Toothpaste inspired by KFC's 11 herbs and spices, and a matching electric toothbrush. Lucky Charms toothpaste was another fun, limited-edition breakfast cereal-flavored toothpaste collaboration. A recent partnership is with the iconic Australian brand Menz Violet Crumble, a chocolate bar featuring a

[c] *https://massmarketretailers.com/crest-launches-clean-breath-toothpaste-that-promises-long-lasting-freshness/#*

[d] *https://nielseniq.com/global/en/insights/commentary/2025/the-global-beauty-edit-finding-category-growth-beyond-the-mirror/*

Image courtesy of Hello

brittle, honeycomb toffee center coated in milk chocolate. The limited-edition Violet Crumble Toothpaste "combines honeycomb sweetness with chocolate coolness." In February, Hismile teamed up with Reese's on the Reese's x Hismile Peanut Butter Cup toothpaste available in Australia and New Zealand.

Sustainable oral care brand ENML released three new Toothpaste Tablet flavors, inspired by circadian and seasonal rhythms: Lavender for spring, Limoncello for summer, Cinnamon for fall, and its signature Mint for winter. The brand also introduced a Whitening Mint-flavored option. The vegan, fluoride-free formula comes in zero-waste packaging. ENML partnered with select Marriott properties on a pilot guest amenities program, offering water-free mint-flavored tablets in spa retail locations and locker rooms.



Fashion designer Rick Owens and luxury mouthcare company Selahatin partnered on the Rick Owens x Selahatin Oral Care Collection, which includes a whitening toothpaste, mouthwash, oral fragrance dubbed Eau D'Extrait Oral and a handmade toothbrush. The sophisticated flavor includes top notes of verbena, Madagascar vanilla, and Sichuan pepper, heart notes of juniper, dark citrus, and rosemary, and a base of black pepper and peppermint; courtesy of Selahatin.

Fashion designer Rick Owens and luxury mouth care company Selahatin partnered on the Rick Owens x Selahatin Oral Care Collection, which includes a whitening toothpaste, mouthwash, oral fragrance dubbed Eau D'Extrait Oral and a handmade toothbrush. The "minimal and magnetic olfactory silhouette" flavor description for the three products reads like a fragrance: "With top notes of verbena, Madagascar vanilla, and Sichuan pepper, heart notes of juniper, dark citrus, and rosemary, and a base of black pepper and peppermint." The whitening toothpaste is "a four-dimensional rejuvenating whitening process gentle enough for daily use" featuring sodium lauryl sulphate, hydrated silica, hydroxyapatite, and sodium bicarbonate. The formula also contains limonene and edelweiss extract. The mouthwash is formulated with chamomile extract, aloe vera, vitamin E, sodium citrate, and mineralizing cetylpyridinium chloride. The oral fragrance prevents bad breath and features provitamin B5, vitamin E, and aloe vera.

Sensitivity Meets Whitening as Brands Boost Oral Care Performance

Oral care for prevention, sensitive teeth , and whitening properties are driving activity and innovation. From toothpaste to mouthwash, brands are developing whitening formulas to brighten smiles.

Sensodyne introduced Clinical Repair Duo in Whiten & Shine and Fresh Clean formulas. The Whiten & Shine toothpaste blends peppermint and spearmint and is formulated for individuals seeking sensitivity relief and a brighter smile. Fresh Clean is designed for stain removal and highlights peppermint and eucalyptus for long-lasting freshness.

Hismile launched the iD Stain Whitening Mouthwash that "targets the gunk your toothbrush left behind and pulls it into visible clumps you can actually see in the sink." The alcohol-free breath-freshening formula contains hydrogen peroxide to cleanse the mouth, xylitol to support teeth, and thymol and eucalyptus oil to maintain oral freshness, while menthol and methyl salicylate provide a cooling sensation.

Oral Microbiome Becomes the Next Frontier in Wellness

Under holistic wellness, there is a growing interest in oral health. Microbiomes are "a community of microorganisms (such as fungi, bacteria, and viruses) that exist in a particular environment," according to the National Human Genome Research Institute[e]. There are four main types of human microbiomes: digestive, skin, urogenital, and mouth. Consumers' interest in a healthy gut microbiome with a focus on probiotics in food and beverages has been trending over the past several years. As consumers continue their wellness journey, healthy skin microbiomes in scalp care and skin care, including face, body, and deodorant, have taken off. The latest focus is on consumers' oral microbiome. "The

[e] *https://www.genome.gov/genetics-glossary/Microbiome#*

Image courtesy of Selahatin

science of the oral microbiome has moved from academic journals into mainstream health conversations, prompting growing consumer interest in understanding how bacterial balance may influence dental wellness," states Synadentix.

Oral care brands are developing a variety of products targeting the mouth's microbiome, including toothpaste, mouth sprays, strips, and supplements. PerioTrap Microbiome Toothpaste uses patented technology to strengthen gums, selectively target disruptive bacteria, and preserve the mouth's natural balance to support beneficial bacteria.

Ceelike reimagined mouth sprays into a perfume-like experience, packaged in sleek 20 ml portable, pocket-sized sprays with a single color finish and a round top. There are five flavors: Probiotic Oral Spray (mint), Crisp Cucumber & Probiotics, Lively Lemon & Probiotics, Zesty Apple Cider & Probiotics, Zesty Orange & Probiotics. All are alcohol-free and formulated with four strains of probiotics and pearl powder to neutralize odor and balance the oral flora.

Pop On Smiles unveiled the Pop on Whitening Strips with Probiotics, the first U.S. whitening strips infused with Lactobacillus. These strips help reduce bad bacteria, support fresher breath, and healthier gums. The probiotic formula is peroxide-free and contains natural enzymes, including papain from papaya and bromelain from pineapple, as well as hydroxyapatite, coconut oil, xylitol, lemon peel, and peppermint oils.

Synadentix is a chewable nighttime dental health supplement designed to support oral bacterial balance. Formulated to support the oral microbiome, it contains hydroxyapatite, lactoferrin, lactoperoxidase, key enzymes and guava fruit powder.

Next Generation Functional Candy

Trendincite's *Perfumer & Flavorist*+[f] "Forward Thinking: Unwrapping Confectionery Trends" October 2025 article highlighted growing consumer interest in functional candy. Breath-freshening functional candy is emerging as the next-generation oral care innovation.

Swedish brand Aléló introduced sugar-free, vegan, and gluten-free breath-freshening strips that dissolve instantly on the tongue. The Certs brand was introduced in 1956 and derived its name from being "certified" fresh and minty by *Good Housekeeping* magazine[g], and was discontinued in 2018.

Acquired by Reboot Brands, Certs has relaunched in two classic flavors, Peppermint and Spearmint. Cinnamon and Wintergreen are in the pipeline and will join the lineup. This year, the company plans to grow the brand into related oral care categories, including toothpaste, mouthwash and mouth rinse.

Milliways gum is plastic-free, plant-based, biodegradable, sugar-free, aspartame-free, non-GMO, and formulated with xylitol. It's available in six flavors: Bubblemint, Mighty Mint, Peppermint, Spearmint, Strawberry, and Watermelon. Functional candy brand breathROX offers sugar-free popping candy breath mints with zinc. The popping helps stimulate saliva, while the crystals help scrub the mouth, and zinc helps neutralize odors. In 2025, Blue Raspberry breathROX was awarded "Most Innovative Gum & Mint Of The Year" by the National Confectioners Association and "Best New Mint" by Convenience Store News. Chili Lime Mango made with Tajin is the brand's newest flavor. This flavor is the first to be packaged in breathROX's proprietary "shake shot" bottle. The products are available



Ceelike reimagined mouth sprays into a perfume-like experience, packaged in sleek 20 ml portable, pocket-sized sprays with a single color finish and a round top. Flavors include Probiotic Oral Spray (mint), Crisp Cucumber, Lively Lemon, Zesty Apple Cider, and Zesty Orange; courtesy of Ceelike.

Image courtesy of Ceelike

[f] Page 19; *https://perfumerflavorist.texterity.com/perfumerflavorist/library/page/october_2025/19/*
[g] *https://sporked.com/article/what-are-certs/*

online at *breathROX.com* and sold at pharmacies and dentists, Circle K and other convenience stores, as well as gift shops and candy stores.

Oral Care Evolves at the Intersection of Beauty Wellness and Tech

Oral care is becoming more sophisticated and borrowing cues from personal care. Consumers are embracing holistic health and incorporating oral care into their beauty routines, making the mouth's microbiome a key focus. As GLP-1 drug adoption rises, some users are experiencing dry mouth and bad breath. These symptoms have been nicknamed "Ozempic mouth" or "Ozempic breath." Expect new oral care products targeted at consumers experiencing these symptoms.

For example, Young Innovations and Umayana partnered on Murnia Mouth Spray, which is designed to provide natural moisture and soothing comfort through a patented formula featuring hyaluronic acid and betaine. According to CareQuest[h], over 25 million Americans are affected by persistent dry mouth, which is expected to increase significantly due to aging populations, medication use, and lifestyle factors.

Another interesting product developed by researchers at King's College London is a keratin-based toothpaste that may naturally regenerate tooth enamel and repair early decay. The innovation uses biological waste to produce a non-toxic, durable alternative to conventional dental resins. "The Oral Care industry is undergoing a radical redefinition," states VML. "Confined for decades to cavity prevention and minty freshness, the category now stands at the intersection of wellness, beauty, and technology."

The future of oral care shines brightly. While fresh breath and whiter teeth anchor oral-care concerns, holistic health is inspiring innovation with playful flavors, unexpected partnerships, and functional candy formats. Brands, flavorists, and product developers will need to meet consumers where they are and look to food, beverage, and beauty for inspiration outside of the oral care aisle.

Flavor and Product Development Checklist: Oral Care Innovation

- **The microbiome-first formulation shift:** Development is moving away from scorched-earth antibacterial methods toward prebiotics and postbiotics that selectively inhibit pathogens like S. mutans while supporting beneficial bacteria.
- **Expansion of the sensory palette:** Oral care flavor profiles are moving beyond basic mint to include botanical-forward and culinary-inspired notes such as black pepper, cardamom and yuzu to appeal to Gen Z and Alpha consumers.
- **Trigeminal and haptic innovation:** Beyond taste, developers are focusing on the trigeminal system to create tingling, warming or effervescent sensations that signal functional efficacy and high-performance cleaning.
- **Clean-label and natural sourcing:** There is an escalating demand for high-purity, North American-grown peppermint and spearmint oils to ensure supply chain transparency and meet consumer expectations for natural and sustainable products.
- **Hybrid beauty-meet-oral-care claims:** Product developers should prioritize ingredients that allow for "skinification" claims, such as hyaluronic acid for gum hydration or antioxidants for anti-aging oral care.



Functional candy brand breathROX offers sugar-free popping candy breath mints with zinc available in five flavors: Blue Raspberry, Chili Lime Mango, Cinnamon, Mint, and Watermelon; courtesy of breathROX.

Image courtesy of breathROX

[h] *https://carequestinnovation.com/smile-health/murnia-case-study/*







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NEXT-GEN MINT: CRAFTING FLAVORS FOR EVERY PALATE AND GENERATION

BY SHANYN SEILER, product marketing manager, global mint, ADM



Shanyn Seiler, product marketing manager, global mint, ADM

The flavor harmony of mint and citrus is a staple in many cultural cuisines, including the Caribbean, Southeast Asia, the Mediterranean and the Middle East.

From top: Courtesy of ADM; Image by r3chip at Adobe Stock

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Across the food and beverage industry there is escalating demand for flavors derived from natural sources. Mint oil is an excellent example of authentic flavor derived from plants; specifically, peppermint (*Mentha piperita*), native spearmint (*Mentha spicata*), Scotch spearmint (*Mentha cardiaca*) and cornmint (*Mentha arvensis*)[a]. Notably, most of the world's peppermint and spearmint is grown in North America. Domestic sourcing helps shorten the supply chain and can minimize environmental impact—another factor of concern among today's consumers.

Elevating distinct mint profiles to captivate consumers requires sensory artistry and scientific precision. Natural mint blends and flavors are hand-crafted by experts who rectify oils to ensure consistent flavor, aroma and quality and capture the full spectrum of desirable mint characteristics. Flavorists might create a peppermint oil with green, earthy and sweet mentholic properties; another with enhanced chocolaty characteristics; and still another with bold, herbaceous notes. Each of these taste profiles helps define a memorable taste experience that will keep consumers coming back for more.

[a]Want to get formulationg? Be sure to read "A Flavorist's Guide to Mint"; *https://tinyurl.com/zkn853ra*



Lavender and spearmint provide a soothing combination for bedtime gummies.



The traditional clean and cool mint profile resonates most strongly with baby boomers, Gen X and millennials, especially in the gum and mints category.

A Fresh Take on Classic Mint: Personalizing Flavor for Boomers to Gen Alpha

Understanding generational expectations can help flavorists and product developers hit the right note with consumers. The traditional clean and cool mint profile resonates most strongly with baby boomers, Gen X and millennials, especially in the gum and mints category. Gen Z is setting new expectations for mint, seeking botanical, green and breezy flavors rather than sharp and icy sensations. And to please the youthful taste palates of Gen Alpha, playful and fruity or sweet combinations, like cherry mint or bubblemint, are preferable to mint flavor profiles they might perceive as too spicy, cold or bitter.

In North America, 77% of millennials are daring to try new flavors[b]. Globally, younger consumers (particularly Gen Z) are emboldened to ask more from the eating experience. They want modern colors, exciting textures and intentional expansion into new categories. Mint is evolving from a background note into a personalized flavor profile that can signal mood and identity.

[b]Consumer insights throughout this story courtesy of: DM Outside Voice, Global Lifestyles Survey, 2025

From top: Image by Pixel-Shot; courtesy of Viktor

Exploring Third Culture Cuisine: Mint Without Borders

Consumer palates are becoming more globally informed with increased exposure to world cuisines, authentic ingredients and cultural curiosity. In this new era of food, creativity, heritage and identity resonate in ways that feel both deeply personal and universally exciting. Discovering the different ways mint is used across regions and various countries of the world can be a delicious adventure.

For example, chewing gum with floral notes like rose and jasmine is popular in Japan, while the distinct woodsy or root beer-like flavor of wintergreen (*Gaultheria procumbens*) is most frequently found in U.S. confectionery. Fusion flavors deliver unexpected complexity and break culinary boundaries, like a Middle Eastern kebab with Irish stout-marinated beef and creamy basil-mint yogurt sauce.

In the beverage category, citrus and mint are a timeless pairing. From lemon mint tea and lime mint sparkling water to ready-to-drink (RTD) cocktails that pair pink lemonade and mint, these beverages balance the sharp brightness of citrus fruits with the refreshing sweetness of mint. The flavor harmony of mint and citrus is a staple in many cultural cuisines, including the Caribbean, Southeast Asia, the Mediterranean and the Middle East.

Innovating with Modern Mint Profiles: From Indulgence to Wellness

Mint flavor is deeply rooted in culinary traditions, and it's ready to flourish in new spaces. During product development, flavorists are tasked to align authentic mint profiles with generational and regional interests while also considering the unique end goals for foods, beverages and confectionery.

Consumers are increasingly drawn to indulgent eating experiences, especially when small bites have big impact. Craft cocktails and cocktail-inspired items are reviving the grasshopper, a creamy mint treat with vibrant green coloring popular in the U.S. market. For Gen Z and other consumers looking to minimize alcohol consumption, grasshopper-flavored



Craft cocktails and cocktail-inspired items are reviving the grasshopper, a creamy mint treat with vibrant green coloring popular in the U.S. market. For Gen Z and other consumers looking to minimize alcohol consumption, grasshopper-flavored RTD mocktails and protein drinks might have greater appeal.

Image by Brent

[From the Editors] Beyond Chemesthesis: New 'Super-Synergy' Data Elevates Common Trigemin-Actives to Potent Anti-Inflammatory Agents

Capsaicin and menthol are the standard-bearers of chemesthesis—the "burn" and the "cool" that drive sensory excitement. But new research from the Tokyo University of Science suggests these materials may soon be valued as much for their bioactivity as their organoleptics.

A study published this week in *Nutrients* has identified a massive synergistic effect between capsaicin and menthol (as well as 1,8-cineole) that amplifies their anti-inflammatory potency by up to 700-fold.

For the F&F industry, this is a formulation game-changer. It suggests that trace, sub-threshold levels of these materials—levels that won't distort a flavor profile or cause irritation—can deliver powerful functional benefits.



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The Data: A 700-Fold Multiplier

The study examined the suppression of TNF-α (a primary inflammation marker) in macrophage cells. While capsaicin is a known anti-inflammatory agent, its effective dose (EC50) is typically high. However, when researchers introduced menthol into the matrix, the results were exponential rather than additive.

- Capsaicin + menthol: Reduced the effective dose by 699-fold.
- Capsaicin + 1,8-cineole: Reduced the effective dose by 154-fold.

This "super-synergy" indicates that the materials are unlocking different biological "locks" simultaneously, allowing for therapeutic efficacy at nanomolar concentrations previously thought to be biologically inert.

The Mechanism: TRP Channel Crosstalk

The findings offer a fascinating glimpse into the molecular mechanics of common F&F materials:

- The Agonist: Menthol and 1,8-cineole function as expected, activating TRPM8 (the cold receptor).
- The outlier: Surprisingly, the study suggests capsaicin's contribution to this synergy is TRP-independent, likely bypassing TRPV1 to target metabolic enzymes (specifically PKM2-LDHA).

By engaging a receptor-based pathway (TRPM8) and a metabolic pathway simultaneously, the combination overwhelms the inflammatory response in a way neither molecule can achieve alone.

Formulation Implications: The "Trace" Advantage

The "flavorist's dilemma" in functional products has always been dosage. To get the anti-inflammatory benefit of a bioactive, one usually has to dose it at levels that destroy the palatability of the product (i.e., making a beverage unacceptably spicy or bitter).

This research solves that problem. By leveraging this synergy, formulators could theoretically create "functional" profiles using organoleptically negligible amounts of capsaicin and menthol.

"Specific combinations of plant-derived functional components can markedly enhance efficacy," the authors noted. For the industry, this opens the door to a new class of "high-function, low-impact" ingredients—where the value lies not in the sensory impact, but in the hidden biological cascade.

Image by Drobot Dean at Adobe Stock

RTD mocktails and protein drinks might have greater appeal. Reduced sugar, chocolate mint frozen desserts, pastries and parfaits in mindful portions may be nostalgic delights for older generations who are also monitoring their weight or glucose levels.

One of the biggest opportunities for mint is within the functional food and beverage sector. ADM research shows 76% of millennials in North America agree the foods and beverages they consume impact their mental and emotional wellness. The same is true for 67% of Gen X, 63% of Gen Z and 62% of baby boomers in North America. Energy-focused products are in high demand, as "energy, consistent everyday vitality and performance" is among the top five health areas for improvement identified by North American consumers. Gum and mints are going beyond oral care to include caffeine or vitamins, RTD coffees feature chocolate Java mint flavor and energy drinks tap yerba mate or green tea as sources of caffeine, paired with mint and açai or watermelon for juicy sweetness.

At the other end of the spectrum, many consumers are seeking snacks and sips to support stress relief. Sleeping well is a key focus area for global consumers, including 54% of those in North America, and emotional balance is a priority for about a third of surveyed consumers. Lavender and spearmint provide a soothing combination for bedtime gummies, herbal mint and strawberry cake bites can offer comforting nostalgia and botanical-forward mint flavor plays well with cilantro and parsley in feta-herb crackers.

Maxxing Mint Experiences

The taste appeal and cultural relevance of mint has spread across the globe and spans generations, and its versatility enables endless innovation. High-quality mint extracts and oils derived from natural sources help product developers and flavorists create foods and beverages that are perfectly balanced and strike the right note with consumers of all demographics.

Mint: the Flavorist & Product Development Playbook

- **Leverage natural and locally sourced mint**—Peppermint, spearmint and cornmint grown in North America provide authentic flavors, shorter supply chains, and reduced environmental impact, appealing to sustainability-conscious consumers.
- **Customize mint profiles by generation**—Traditional cool mint resonates with boomers, Gen X, and millennials, while Gen Z prefers botanical, breezy flavors, and Gen Alpha favors playful, fruity combinations. Personalization drives engagement and loyalty.
- **Explore global flavor inspirations**—Mint's use varies worldwide, from floral notes in Japan to wintergreen in the U.S. Fusion pairings (e.g., mint with citrus, herbs or international cuisine) can create distinctive, culturally informed products.
- **Integrate functionality with indulgence**—Mint works in functional foods and beverages, from energy-boosting RTDs to calming bedtime snacks. Consider caffeine, vitamins or botanical blends to meet evolving wellness-focused consumer demands.
- **Innovate across categories**—Mint's versatility supports confectionery, beverages, frozen desserts, snacks and cocktail-inspired treats. High-quality extracts enable consistent flavor, texture and aroma, empowering products to balance indulgence, nostalgia and modern trends.



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Fiber is the New Protein. That Has Implications for Flavor and Product Development.



Consumers are already DIY-ing multifunctional recipes on TikTok, combining fiber with beauty-adjacent ingredients like collagen and biotin.

Image by Maridav at Adobe Stock

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For the last decade, protein has enjoyed superhero status in the nutrition world. According to Mintel's GNPD[a], the number of global food and drink products featuring high or added protein claims has doubled over the past 10 years. In contrast, fiber claims have remained relatively flat, despite a significant global fiber gap where most people consume far less than the recommended 25–30 g per day.

However, a shift is underway. Data from Spate[b] shows that fiber is experiencing a 44.5% combined year-over-year growth in popularity across search and social platforms. For product developers and flavorists, the future lies in moving away from a protein vs. fiber mindset and toward an approach that pairs up key ingredients, balancing muscle-building with digestive benefits and more.

- *Related: Flavor Challenges in a Protein-Centric Market*

Fiber's Flavor Problem: The Hidden Challenge in Functional Nutrition

Protein has historically been positioned as powerful and action-oriented, building muscle, repairing tissue and supporting recovery. Its benefits are tangible and immediate, making it an easy sell for weight management and fitness.

Fiber, on the other hand, works behind the scenes to regulate blood sugar, support the microbiome and ensure digestive order. While protein represents vitality, fiber represents the dependability and balance necessary for long-term health.

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[a]*https://www.mintel.com/insights/food-and-drink/rise-of-fiber-how-brands-can-win/*

[b]*https://www.spate.nyc/reports/the-fiber-opportunity-is-fiber-the-new-protein*



Protein has historically been positioned as powerful and action-oriented, building muscle, repairing tissue and supporting recovery. Its benefits are tangible and immediate, making it an easy sell for weight management and fitness.

Image by ChayTee at Adobe Stock

The solution, per Spate, lies in combining fiber benefits with protein and other key functional ingredients to offer holistic solutions.

To illustrate the concept in action, WK Kellogg Co spotlighted fiber for the 2026 National Cereal Day, showcasing how cereals like All-Bran, Kashi Go, Raisin Bran and Frosted Mini-Wheats, all designed to help close the fiber gap for nearly 95% of Americans who fall short of daily recommendations.

Collaborating with dietitians Amy Shapiro and Mandy Enright, Kellogg's launched easy, high-fiber recipes—ranging from no-bake cookies to trail mixes and cereal-topped fruit bites—that paired cereals with protein sources like nut butters, seeds and fruit, delivering both fiber and protein in convenient, flavorful formats.

The initiative reinforced cereals as a versatile, enjoyable way to boost fiber intake throughout the day while also providing satisfying protein for satiety and balanced nutrition.



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But while fiber is trending in the marketplace, working with the material comes with a catch.

"High-fiber products are no longer confined to the cereal aisle," says Pierre Battu, managing director, Asia, OSF Flavors. "Today, fiber fortification spans protein bars, dairy alternatives, prebiotic beverages, RTD teas, nutritional powders and even indulgent snacks positioned for digestive wellness and metabolic support. Yet from a formulation standpoint, incorporating fiber is rarely the true challenge. The real technical hurdle lies in managing taste."

Fiber Goes Viral: Functional Drinks, "Fibermaxxing" and the Rise of Targeted Wellness

The most explosive growth in the fiber space is occurring in functional drinks, surging 430.2% in popularity, per Spate. Consumers are already DIY-ing multifunctional recipes on TikTok, combining fiber with beauty-adjacent ingredients like collagen, probiotics or biotin.

This points to white space for ready-to-drink (RTD) and mix-in formats that deliver these benefits with less effort. Flavorists will need to mask the often-gritty or viscous textures of high-fiber loads with refreshing profiles like citrus, cucumber, and botanical blends.

Drink mixes should prioritize low-effort integration, offering easy mix formats that work in both hot and cold applications without compromising the sensory experience of the base product.

Elsewhere, there is significant growth in fiber supplements (up 61.7% year-over-year) and fiber-forward snacks.

Consumer intent is also shifting from broad wellness to problem-specific outcomes. Spate reports that fiber interest is increasingly tied to concerns like colon cancer (126.1K search increase), polycystic ovary syndrome (PCOS; 57.4K search increase) and hemorrhoids (39.6K search increase).

This signals that brands and product concepts should move beyond regularity claims to highlight satiety, blood sugar management and chronic inflammation.

Finally, per Mintel, consumers are embracing "fibermaxxing," a social media trend that is making high-fiber diets trendy, with creators aiming for 30–40 g of fiber per day. However, the daily recommendation is 25–30 g, and rapid intake can cause bloating and gas.

That said, developers should focus on palatable, easy-to-digest fibers and encourage gradual intake. Pairing fiber with hydration-focused claims is a key cross-over opportunity, per Mintel, as 39% of U.S. consumers are currently concentrating more on hydration.

Image courtesy of Kellogg's



Pairing fiber with hydration-focused claims is a key cross-over opportunity, per Mintel, as 39% of U.S. consumers are currently concentrating more on hydration.

Fiber 2.0: The Formulator's Secret Weapon for Taste, Texture & Health

To enhance the product innovation process, a growing number of companies are introducing a new generation of dietary fibers that deliver a dual advantage—combining clinically supported health benefits for consumers with improved sensory performance and formulation flexibility for developers.

For instance, Givaudan's OatWell leverages oat beta-glucans to support microbiome health, glycemic control and cardiovascular wellness, while also aligning with strong consumer perceptions of oats as natural, nutritious and trustworthy.

At the same time, solutions such as IFF's Litesse polydextrose expand formulation flexibility by enabling sugar and calorie reduction, supporting satiety through GLP-1 stimulation, and acting as a well-tolerated prebiotic.

Critically, many of this generation of fibers actively enhance product quality through water binding, emulsification and bulking, while improving mouthfeel, clarity and even flavor delivery by smoothing off-notes often associated with high-intensity sweeteners or fortification.

The result is a new formulation toolkit where fiber not only elevates health positioning but also helps create more indulgent, better-tasting products that meet rising consumer expectations for both efficacy and enjoyment.

Meanwhile, by connecting fiber sources to their plant origins and emphasizing biotech-driven purification, brands can transform the nutrient into a high-performance functional staple.

High Fiber, High Flavor: The Sensory Science Behind Success

For fiber to follow protein's path to mainstream success, flavorists and developers must prioritize the sensory experience. Mintel suggests that addressing taste concerns through clear communication of positive flavor attributes is the key to unlocking high-fiber categories like breakfast foods and snacks.

"Insoluble fibers—such as cereal brans, fruit peels and citrus fiber—are structurally valuable for bulking and texture," says Battu. "However, they frequently introduce pronounced bitterness and astringency. Citrus fiber, for example, may carry phenolic residues and residual flavonoids that amplify harsh notes. Bran fibers can accentuate dryness and prolong bitter perception on the palate."

Battu adds, "Beyond simple bitterness, these fibers create a temporal problem: the bitterness often emerges late, lingering in the aftertaste and flattening top-note brightness. In beverages, insoluble fibers may also scatter aroma perception, muting delicate flavor nuances."

Image by Pormezz at Adobe Stock



"Astringency is often misidentified as bitterness, when in fact it is a tactile phenomenon," says Pierre Battu, managing director, Asia, OSF Flavors.

He explains that advanced taste-modulation technologies are helping overcome the sensory challenges associated with fiber fortification by improving overall flavor balance. These systems include bitterness masking solutions that work at the receptor level to reduce perceived intensity, sweetness enhancers that boost natural sweetness without adding sugar, and top-note rebalancing approaches that restore aroma and brightness often muted by fiber-rich formulations. Together, they enable better-tasting, more appealing products without compromising nutritional goals.

Vegetal off notes are also a problem.

"Equally challenging issues arise with added soluble fibers used in industrial processing—particularly inulin and pea fiber," says Battu. "These ingredients often introduce vegetal, earthy or beany back notes. In protein bars and dairy alternatives, these notes can be magnified by heat treatment or storage."

He adds, "Inulin may contribute subtle metallic or slightly fermented nuances, especially under acidic conditions. Pea fiber can intensify green, leguminous aromatics that clash with sweet flavor profiles such as vanilla, chocolate or fruit."

Suppliers are also trying to solve the challenge at the source. For instance, Roquette's Nutralys Pea 850F is a pea protein isolate designed to eliminate the vegetal off-notes that have traditionally limited plant-based product appeal, aligning with surging demand for high-protein diets and functional beverages.

By addressing flavor challenges from the start rather than relying on masking systems, Nutralys Pea 850F is claimed to enable simpler labels and supports the industry's move toward more transparent, experience-driven product development.

Beyond improved taste, the pea protein reportedly offers strong solubility and emulsification, making it well-suited for fast-growing formats like RTDs and protein sodas.

If vegetal off notes are present, however, Battu recommends a number of solutions, including the deployment of "blocker-masking technologies targeting off-notes, specifically calibrated for vegetal and earthy tonalities."

He also recommends "sweetener enhancement systems to restore perceived roundness" and "temporal profiling tools, ensuring that early sweetness, mid-palate body and late-stage finish are harmonized."

"Fiber interactions with high-intensity sweeteners add another layer of complexity," says Battu. "Certain fibers modulate sweetness curves, exaggerating lingering or metallic effects from stevia or other non-nutritive sweeteners. Our modulation systems are therefore designed with full matrix awareness—considering pH, heat exposure, shear and shelf-life stability.

As mentioned earlier, the texture-flavor challenge is a key sensory variable in the high-fiber space.

"Insoluble particles increase mouthdrying and chalkiness; soluble fibers alter viscosity and flavor release kinetics," says Battu. "Astringency is often misidentified

Image by EdNurg at Adobe Stock

as bitterness, when in fact it is a tactile phenomenon."

He continues, "In pilot trials, we have observed prototypes that gelled unexpectedly overnight due to fiber hydration dynamics, dramatically shifting flavor diffusion. Conversely, certain fibers 'scalp' volatile compounds, stripping brightness from fruit systems."

In conclusion, Battu says, "Successful formulation requires synchronized design: flavor systems must be built to withstand processing realities while delivering consistent performance over time."



"Pea fiber can intensify green, leguminous aromatics that clash with sweet flavor profiles such as vanilla, chocolate or fruit," says Pierre Battu of OSF Flavors.

Flavor & Product Development Playbook for High-Fiber Applications

Shift from Protein vs. Fiber to the Pairings

The industry is moving away from a protein-centric focus toward a holistic approach that pairs protein's muscle-building with fiber's digestive and metabolic balance. While protein claims have doubled over the last decade, fiber is now seeing a 44.5% year-over-year growth in popularity. Developers should create products that combine these benefits to meet consumer demand for comprehensive wellness.

Capitalize on Functional Mixology and RTDs

The fastest-growing fiber category is functional drinks, which have surged 430.2% in popularity. There is significant opportunity for ready-to-drink (RTD) and easy-mix formats that replace DIY TikTok recipes.

Developers should use refreshing profiles like citrus, cucumber and botanical blends to mask gritty or viscous textures.

Products must be engineered to work in both hot and cold applications without overnight gelling or shifting flavor diffusion.

Align with Targeted Wellness and "Fibermaxxing"

Consumer intent has shifted from broad health to specific outcomes like blood sugar management, satiety, and chronic inflammation.

Fiber interest is increasingly tied to specific issues such as PCOS and colon cancer

With the "fibermaxxing" trend pushing consumers toward 30–40 g of fiber daily, developers must focus on easy-to-digest fibers to prevent bloating and gas.

Finally, pairing fiber with hydration-focused claims is a major opportunity, as 39% of U.S. consumers are now prioritizing hydration.

Master the Temporal and Texture Flavor Challenges

Incorporating fiber is often less about the formulation and more about managing complex sensory hurdles:

- Late-onset bitterness: Insoluble fibers like cereal brans and fruit peels often introduce bitterness and astringency that emerge late and linger in the aftertaste.
- Aroma "scalping": Some fibers can strip volatile compounds, muting delicate fruit flavors and brightness.
- Textural misidentification: Astringency is often misidentified as bitterness; however, it is a tactile phenomenon characterized by chalkiness and mouth-drying.

Solve Vegetal Off-Notes at the Source

Soluble fibers like pea fiber and inulin can introduce earthy, beany or metallic nuances, particularly in dairy alternatives and protein bars.

- Ingredient selection: Utilize next-generation isolates designed to eliminate vegetal off-notes at the start rather than relying solely on masking.
- Masking systems: For existing vegetal notes, use blocker-masking technologies specifically calibrated for earthy tonalities and temporal profiling tool to harmonize sweetness from the early to late-stage finish.

Image by Samo Trebizan at Adobe Stock



Good Chemistry has launched solid perfumes for $9.99 at Target. The alcohol-free, skin-loving formula—enriched with cocoa butter and jojoba oil—is designed specifically for pulse-point layering and on-the-go refreshes.

Image courtesy of Good Chemistry

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The 2026 Fragrance Agenda: Mood Boosters, 'Lickable' Gourmand and Beyond

From "lickable" gourmands to mood-boosting science are redefining the fragrance category.

The 2026 fragrance landscape is increasingly defined by scent layering, edible gourmands, portable formats, self care rituals, an emerging Gen Alpha consumer still developing its own habits and tastes, and a Middle East that is increasingly influential in setting trends. To understand what that means for perfumers, fragrance developers and product developers in fragrance, beauty and personal care, we broke down recent launches and market data for actionable takeaways.

The Rise of the Edible Gourmand and 'Lickable' Perfume

The gourmand category has moved beyond simple vanilla notes into a space that Spate data defines as "edible perfume." (That said, vanilla perfume enjoys high popularity[a], per Spate data, with consumer interest increasing more than 24% between January and December 2025.) Also known as "lickable" perfume, these formulas are designed to be experienced through both scent and taste. While still emerging in the popular imagination, the trend has exploded by 936.5% year-over-year, per Spate, driven almost entirely by TikTok, which holds an 83.8% popularity share.

Brands like Skylar are capitalizing on this edible scent movement. Its recent launch, Pomegranate Princess, pairs juicy pomegranate and strawberry with a soft base of whipped frosting.



Brands like Skylar are capitalizing on the edible scent movement. Its recent launch, Pomegranate Princess, pairs juicy pomegranate and strawberry with a soft base of whipped frosting. Pictured is Skylar's chief creative officer, Leah Kateb, who gained fame on Love Island.

Image courtesy of Skylar

[a]Spate's proprietary Popularity Index "measures a trend's share of voice across platforms, focusing on Google Search and TikTok. By analyzing trends and their popularity on both, the report provides a clearer picture of what's truly driving the beauty conversation." Some details contained in this report were derived from Spate's recent analysis: *https://www.spate.nyc/reports/2026-fragrance-report-key-trends-brands-and-scents*.

This shift indicates a consumer desire for fragrances that feel indulgent and delicious, moving the category closer to a culinary experience. Despite the high engagement (4.5%), per Spate, consumer sentiment remains mixed (6.7/10), suggesting that while the lickable concept is a powerful marketing hook, the industry still has a hurdle in convincing the broader public of its everyday utility.

Middle Eastern Influence and the 'Inspired-By' Luxury Gap

A significant theme in 2026 is the embrace of Middle Eastern scent philosophy and heritage. Kayali, founded by Mona Kattan, recently expanded its Eden Collection with Sweet Peach | 35 and Plush Pear | 23, utilizing vibrant lacquered glass bottles inspired by traditional Middle Eastern oud bottles. The numbers on the bottles—such as 35 or 23—specifically denote the rounds of formulation required to achieve the "perfect juice," a nod to the region's focus on meticulous craftsmanship.

Simultaneously, the industry is seeing a sophisticated entry of Middle Eastern brands aimed at closing the gap between luxury quality and mass-market accessibility. Match Perfumes, founded in Saudi Arabia by Sara M. Alrajhi, recently debuted in the U.S. market with a collection of 40 "inspired-by" fragrances.

Unlike previous dupe houses, Match Perfumes argues it uses a vertically integrated approach, controlling everything from in-house formulation to final bottling. By engineering oils that achieve a 90% match rate to world-famous designer scents while maintaining an elegant identity, the brand says it is challenging the traditional luxury markup. Match Perfumes' foundational philosophy—that all fragrances can be traced back to just seven original scent origins—is intended as a direct challenge to the exclusivity narratives of prestige houses.

Gen Alpha: The Next Growth Frontier

While Gen Z has been the focus of marketers in recent years, 2026 marks a moment when Gen Alpha tweens are increasingly viewed as a core growth opportunity. PDC Brands recently launched Sunryz, a fragrance-forward brand specifically designed for this demographic, highlighting a generationally significant theme: "trend meets trust."

Sunryz's products are dermatologist-tested and more than 90% naturally derived, per the brand, addressing parental concerns about what young skin absorbs.

The collection includes "Whipped Body Cream" and "Shimmer Body Oil," satisfying Gen Alpha's desire for the lush textures they see in shareable social media routines.



Kayali, founded by Mona Kattan, recently expanded its Eden Collection with Sweet Peach | 35 and Plush Pear | 23, utilizing vibrant lacquered glass bottles inspired by traditional Middle Eastern oud bottles.



Match Perfumes, founded in Saudi Arabia by Sara M Alrajhi, recently debuted in the U.S. market with a collection of 40 "inspired-by" fragrances.



PDC Brands recently launched Sunryz, a brand specifically designed for Gen Alpha, highlighting a generationally significant theme: "trend meets trust."

From top: Images courtesy of Kayali; Match Perfumes; Sunryz

Scents like Amber Sol (black amber plum and vanilla woods) and Golden Sugar (pistachio and salted caramel) mirror prestige gourmand trends but are priced at an accessible $7.97, allowing for the creation of a fragrance wardrobe and layering rituals.

The Portability Revolution: Solid Perfumes and Sticks

According to Spate, the popularity of Solid Perfume has grown 132.3% year-over-year, remaining a relatively under-the-radar trend that is gaining traction. This format addresses the messiness of traditional balms while tapping into the consumer desire for portable fragrance rituals.

Brands like Glossier and Diptyque lead search interest, with Sol de Janeiro currently dominating the TikTok conversation via its jelly balm format. Launched in February 2026, the Jelly Perfume Balm range comprise pocket-sized, alcohol-free fragrances that, according to the brand, "glide on smooth, and melt into the skin for a delicious experience that feels as good as it smells."

Outside the more established brands, Good Chemistry has democratized the format, launching solid perfumes for $9.99 at Target. Its alcohol-free, skin-loving formula—enriched with cocoa butter and jojoba oil—is designed specifically for pulse-point layering and on-the-go refreshes.

The surge in search interest for the perfume stick format (850 average monthly searches) suggests that consumers may be moving away from tins in favor of twist-up applicators that offer even greater convenience and hygiene.

Cultural Indulgence and Heritage Storytelling

Storytelling has become the a key differentiator in a crowded market. Maesa's new incubator brand, Scents Unearth'd, exemplifies this by building a portfolio rooted in off-the-beaten-path scent stories. Each fragrance serves as an olfactive homage to specific cultures:

- Vanilla Crown: Sourced from Papantla, Mexico.
- Royal Milk: Inspired by Egyptian heritage, featuring almond milk and blue chamomile.
- Jasmine Candy: Derived from Madurai, India, with candied bergamot and jasmine absolute.

This trend moves beyond travel-inspired scents toward authentic representation, filling an unmet consumer need for heritage-based connection through scent.



Maesa's new incubator brand, Scents Unearth'd, has built a portfolio rooted in off-the-beaten-path scent stories. Each fragrance serves as an olfactive homage to specific cultures.

Fragrance Meets Mood-Boosting Science

No discussion of 2026 fragrance trends can overlook the role of wellness. This year, Elizabeth Arden's Eternal Aura—its first flagship launch in eight years—was co-created using IFF's Science of Wellness.

Launched in 2021, the process incorporates natural ingredients scientifically proven to enhance energy, self-esteem and happiness. Specifically, it guides the creation of fragrances that deliver emotional, cognitive, and physical benefits for consumers. It also combines



This year, Elizabeth Arden's Eternal Aura—its first flagship launch in eight years—was co-created using IFF's Science of Wellness.

From top: Images courtesy of Scents Unearth'd; Elizabeth Arden

scientific studies and perception data to understand how scents affect wellbeing.

The platform employs IFF's in-house AI (developed in 2006) and other digital tools to generate innovative fragrance ideas. It also gives perfumers access to a curated palette of ingredients and advanced formulation technologies.

Eternal Aura's accompanying Eternal Aura Body Balm further emphasizes the fragrance-as-body-care theme, using shea and cocoa butter to improve skin elasticity while maintaining the scent profile. This launch signals a broader industry move toward measurable emotional outcomes, where a fragrance is becoming a mood-lifting wellness experience.

Key Strategies for Fragrance & Product Development Teams

- With edible perfume popularity surging 936.5% year-over-year, there is a massive white space for truly food-safe formulas or edible-smelling gourmands featuring notes like whipped frosting, wild cherry and vanilla bean.
- Consumer interest in solid perfumes and perfume sticks is growing rapidly (up 132.3% year-over-year) to address the messiness of traditional balms; developers should focus on spill-resistant, alcohol-free formulas using cocoa butter and jojoba oil for easy pulse-point layering.
- Gen Alpha and their parents demand a specific balance of prestige-inspired scents and high safety standards, requiring formulas that are dermatologist-tested and primarily naturally derived.
- Fragrance is moving beyond aesthetics toward measurable emotional outcomes; teams should leverage biotechnology and co-distillates that are scientifically proven to enhance energy, self-esteem and happiness.
- As "inspired-by" Middle Eastern brands achieve high match rates to designer scents at accessible price points ($30–$48), prestige developers must emphasize proprietary heritage storytelling and in-house production to justify higher margins.





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A distinctive terroir meets contemporary agricultural, production and organizational processes.



Zalabí leverages its unique Mediterranean terroir—characterized by Sierra Nevada snowmelt aquifers and extreme thermal shifts—to deliver expressive, technically reliable oils like Spanish red thyme, marjoram and sage.

Courtesy of Zalabi

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"The Zalabí Valley, located beneath the Sierra Nevada in Southern Spain, offers a distinctive Mediterranean terroir defined by contrast: high solar radiation, mineral soils, cold winters and significant day-to-night temperature variation," says Ramon Fernandez, managing director of Zalabí.

As the fragrance and flavor industries increasingly demand transparency and environmental accountability, the traditional, fragmented naturals supply chain is being challenged by a new, integrated agroindustrial model. Zalabí, an essential oil producer located in the semi-arid Zalabí Valley of Southern Spain, is taking on this structural reset. By shifting from a transactional model to one defined by direct agronomic control, automated in-house distillation and lot-level traceability, Zalabí seeks to shift production toward a modern risk-management strategy.

Zalabí leverages its unique Mediterranean terroir—characterized by Sierra Nevada snowmelt aquifers and extreme thermal shifts—to deliver expressive, technically reliable oils like Spanish red thyme, marjoram and sage. From the operationalization of circularity through biomass valorization to a horizontal collaboration framework that aligns with UEBT principles, Zalabí offers one possible roadmap for a technically modern and regulatory-ready Mediterranean production origin.

Iberian Aromatic Essentials for Fine Fragrance and Flavor

"The Zalabí Valley, located beneath the Sierra Nevada in Southern Spain, offers a distinctive Mediterranean terroir defined by contrast: high solar radiation, mineral soils, cold winters and significant day-to-night temperature variation," says Ramon Fernandez, managing director of Zalabí. "The region is semi-arid and historically cultivated through controlled irrigation systems that create localized agricultural microclimates within a dry landscape. These natural stress conditions influence aromatic intensity and chemical expression."

He adds, "Irrigation and distillation water originate from Sierra Nevada snowmelt aquifers, characterized by high purity and low mineral interference—an important factor in steam distillation quality. We cultivate across multiple microzones within the valley, including both irrigated and dryland plots. This geographical diversity allows us to balance seasonal variation rather than depend on a single location."

Courtesy of Zalabí

Zalabí replaces variable outcomes with a precision-based approach to batch building, Fernandez argues. Every harvest is analyzed in the company's in-house laboratory, where lots are constructed according to specific technical and olfactory standards. Fernandez believes this methodology ensures consistent quality and allows for custom alignment with specific client requirements.

"Distillation operates under automated process control, ensuring stable steam parameters and reproducible extraction curves," he explains. "This precision protects aromatic clarity and minimizes degradation. For perfumers and flavorists, this means oils that are expressive, technically reliable and scalable—while maintaining a clear sense of origin."



As an emblematic endemic species of southeastern Spain, Thymus zygis is positioned as a signature material for high-end perfumery.

Spanish Red Thyme (*Thymus zygis*)

As an emblematic endemic species of southeastern Spain, *Thymus zygis* is positioned as a signature material for high-end perfumery.

- Agronomic profile: Naturally occurring in dry, high-radiation landscapes, the species is highly sensitive to temperature fluctuations and water balance.
- Production innovation: Historically difficult to harvest, current production utilizes controlled mechanization and optimized field management to ensure efficiency and quality.
- Market positioning: Produced under organic certification, this material is primarily targeted at fine fragrance and premium perfumery.



A native Iberian species, Thymus mastichina offers a distinct regional character that differentiates it from other marjoram varieties.

Spanish Marjoram (*Thymus mastichina*)

A native Iberian species, *Thymus mastichina* offers a distinct regional character that differentiates it from other marjoram varieties.

- Olfactive profile: Characterized by a camphoraceous-fresh and highly aromatic profile, it provides more structure than standard varieties.
- Applications: The balance of freshness and structural integrity makes it ideal for functional formulations, fragrances and flavors requiring a natural lift without excessive harshness.
- Sourcing context: Organically produced, the oil reflects the specific dry-climate aromatic intensity typical of southern Spain.

Spanish Sage (*Salvia lavandulifolia*)

Historically associated with the Iberian Peninsula, this species offers a refined alternative to common sage.

- Chemical profile: Unlike many Salvia varieties, *Salvia lavandulifolia* features a softer aromatic structure with lower thujone levels.

Courtesy of Zalabi

- Quality development: Grown in semi-arid Mediterranean conditions, the plant develops a concentrated yet balanced profile.
- Versatility: Its refined nature makes it suitable for both complex perfumery compositions and precision flavor applications.



Unlike many Salvia varieties, Salvia lavandulifolia features a softer aromatic structure with lower thujone levels.

Terroir and Tech: Mastering the Aromatic Intensity of the Zalabí Valley

Recently, *Perfumer & Flavorist+* spoke with Fernandez about how the company is replacing transactional sourcing with a seed-to-drum system defined by direct agronomic control and automated in-house distillation. By leveraging the unique, high-stress terroir of the semi-arid Zalabí Valley and a circular operational framework, the company is looking to move beyond essential oil production toward a role as a structurally compliant, technically modern and commercially dependable Mediterranean origin.

***P&F+*: Zalabi represents a shift toward a traceable, circular agroindustrial model. What does that look like operationally—and how does it differ from the traditional Spanish essential oil supply chain?**

Fernandez: At Zalabí, traceability and circularity are … structural design decisions. From the outset, we integrated cultivation, distillation and commercialization into one coordinated system, ensuring traceability from seed to drum. Operationally, this means:

- Direct agronomic control over our core hectares
- Integrated in-house distillation in a facility designed to industrial-grade standards for durability, hygiene and process stability
- Automated process control ensuring stable steam parameters and reproducible results
- In-house laboratory analysis and batch-level quality control
- Lot-level traceability throughout the entire process
- Organic certification covering both cultivation and distillation



By leveraging the unique, high-stress terroir of the semi-arid Zalabí Valley and a circular operational framework, the company is looking to move beyond essential oil production toward a role as a structurally compliant, technically modern and commercially dependable Mediterranean origin.

Courtesy of Zalabi

Circularity, for us, is measurable and operational. Everything that enters the distillery remains within a controlled cycle:

- Post-distillation biomass is fully valorized—processed into controlled fuel or returned to the fields to improve soil structure and moisture retention
- Steam is generated through a biomass boiler equipped with high-efficiency particulate filtration, significantly reducing emissions

- Electrical operations and irrigation are powered by on-site solar energy
- Rainwater is recovered and reused
- Hydrosols are reintegrated into agricultural or operational use

Traditional fragmented models often separate cultivation, distillation and commercialization. Resource management, emissions control and documentation standards vary, and traceability weakens as intermediaries increase.

Zalabí was designed to remove that fragmentation. Beyond our own hectares, we operate under a horizontal collaboration framework with growers and partner distillers. Rather than purely transactional purchasing, we align agronomic practices, documentation standards and production planning in advance. These collaborations are structured under the framework and principles of UEBT, reinforcing biodiversity protection, ethical sourcing and transparent value distribution across the chain. We did not reinvent steam distillation. We rebuilt it to a higher structural standard.



"Spain's essential oils sector is entering a necessary phase of professionalization," says Fernandez. "One of the first visible drivers has been increased fiscal enforcement and documentation scrutiny. As transparency increases, real production costs become visible, and this is gradually reshaping the competitive landscape."

***P&F+*: Spain's essential oils sector is entering a period of structural change. How is Zalabi positioning itself amid this reset?**

Fernandez: Spain's essential oils sector is entering a necessary phase of professionalization. One of the first visible drivers has been increased fiscal enforcement and documentation scrutiny. As transparency increases, real production costs become visible, and this is gradually reshaping the competitive landscape.

Operating under full fiscal, environmental and labor compliance defines a different structural model than informal or fragmented approaches. Zalabí positioned itself early for this environment. We chose to modernize ahead of regulatory requirements rather than wait for them to become mandatory. This includes:

- Full fiscal and labor compliance
- Organic and COSMOS certification
- Infrastructure structured to meet food, feed, halal and kosher standards
- Alignment with UEBT principles
- Carbon footprint measurement ahead of regulatory requirements

We redesigned our biomass steam system to reduce emissions and valorize residues ahead of regulatory requirements. Distillation operates under automated process control to ensure stability and reproducibility. In the field, we have progressively mechanized and optimized harvesting and cultivation processes to improve efficiency while preserving agronomic integrity. For us, structural change is not only about regulation—it is about mindset.

Professionalization must also be economically viable across the value chain. That is why we promote a horizontal collaboration framework with growers and partner distillers. Production planning, documentation standards and agronomic practices are aligned in advance, reducing volatility and strengthening long-term continuity.

In recent years, independent producers have voluntarily aligned with this framework. Modernization, in our view, is not an aesthetic upgrade. It is a risk-management strategy. By structuring compliance, traceability and technical control into the core of our operations, we reduce regulatory exposure, supply-chain friction and long-term volatility.

We operate as a structurally compliant, technically modern and supply-chain coherent Mediterranean origin—prepared not only for current expectations, but for the standards ahead.

Courtesy of Zalabi



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Research and industry experience consistently show that fragrance strongly influences how consumers understand texture, quality and even product efficacy.

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FRAGRANCE MOVES UPSTREAM AS A KEY FORMULATION STRATEGY

A preview of the strategies and innovations coming to in-cosmetics Global 2026 in Paris.

Fragrance has long been associated with emotion, memory and sensory pleasure. Yet in today's personal care landscape, its role extends beyond simply "smelling good." As scent becomes an increasingly influential factor in personal care, consumer expectations are evolving. Mintel reports that 88% of U.K. consumers say scent itself matters more than the brand name, highlighting the critical role of fragrance quality, performance and experience.

Embedded within everyday formats such as foams, creams and serums, fragrance plays a critical role: masking raw material smells, shaping consumer perception of quality and contributing to the overall performance and credibility of a formulation.

As cosmetic formulations increasingly incorporate high-performing actives, biobased ingredients and cleaner-label components, the need for effective odor masking has become more prominent. At the same time, fragrance must work alongside skin feel and formulation behavior—a balance that requires system-level thinking.

Fragrance Moves Upstream as Formulation Strategy

Rather than treating fragrance as a final touch, many suppliers advocate for considering scent earlier in formulation design. According to Thomas Cresswell, chief business officer at Melt&Marble, fragrance should be viewed as part of a broader formulation ecosystem.

He explains, "We see fragrance as part of a system rather than a standalone ingredient; the lipid phase plays a major role in how scent is released, perceived and experienced on skin."

This system-level approach is particularly relevant as brands look to align fragrance performance with skin comfort and barrier support. Cresswell adds that certain lipid structures can support skin comfort and barrier function, "opening opportunities to align fragrance delivery with skin benefits rather than treating them separately."

Texture Shapes Scent Performance Across Formats

Fragrance release and perception vary significantly across product textures. Foams, for example, tend to amplify top notes due to rapid air exposure and immediate sensory impact. While this can deliver an instant freshness cue, it also presents challenges in maintaining scent balance and longevity.

Meanwhile, creams offer a richer lipid environment that can slow fragrance release and create a more lasting sensory experience. However, uneven release or scent "flattening" can happen if fragrance and carrier systems are not aligned.

Lightweight serums present a different challenge altogether. With low oil content and high amounts of sensitive actives, fragrance must be carefully controlled to avoid instability or interference with performance.

From a formulation perspective, these challenges are particularly evident in water-based systems. Daniel Coelho, global marketing manager for cosmetic solutions at Evonik, explains that solubilizing fragrance oils while maintaining clarity and stability is a recurring issue.

"In water-based systems, solubilizing fragrance oils can be challenging, especially when formulations need to remain both clear and stable," he says. "Fragrances and the solubilizers used to incorporate them can also shift key parameters such as viscosity and, in some cases, the color of the formulation."

Fragrance Shapes How Consumers Read Product Performance

Research and industry experience consistently show that fragrance strongly influences how consumers understand texture, quality and even product efficacy. Cresswell explains: "When scent, skin feel and formulation performance are aligned, the product experience feels more coherent and credible. The carrier system is key here, as it influences both sensory delivery and how the product behaves on skin."

However, achieving this balance in a stable, scalable product remains a challenge. Coelho says that changes in fragrance dosage can influence multiple aspects of formulation at once. He explains: "One common hurdle is that fragrance can change the character of the formulation chassis; it may affect several physicochemical parameters at once, such as viscosity, foaming performance and overall stability."

As a result, changing a fragrance is rarely a simple one-to-one substitution. Instead, it often requires greater formulation adjustments to maintain the intended sensory and performance profile.

In addition to technical difficulty, sustainability has also become a growing pressure shaping fragrance development. Clean label expectations, ingredient transparency and responsible sourcing are driving brands to rethink how fragrance is delivered in products, and how it interacts with skin.

Fragrance Moves Toward Functional Measurable Benefits

Precision technologies such as fermentation-designed lipids can offer new possibilities. By allowing more control over material design, as they enable formulators to adapt sensory performance while supporting more sustainable and skin-compatible formulations.

Cresswell highlights that "fragrance is becoming more intentional, there are stronger links to well-being, routine and skin compatibility. At the same time, sustainability and transparency are pushing brands to rethink not just what fragrance smells like, but how it's delivered and how it interacts with skin."

Looking ahead, Coelho expects fragrance to become more functional and evidence-led. He anticipates fragrance being positioned "almost like an active," linked to measurable outcomes such as "stress reduction cues, relaxation routines and perceived skin comfort," supported by stronger testing methods and clearer claims frameworks.



















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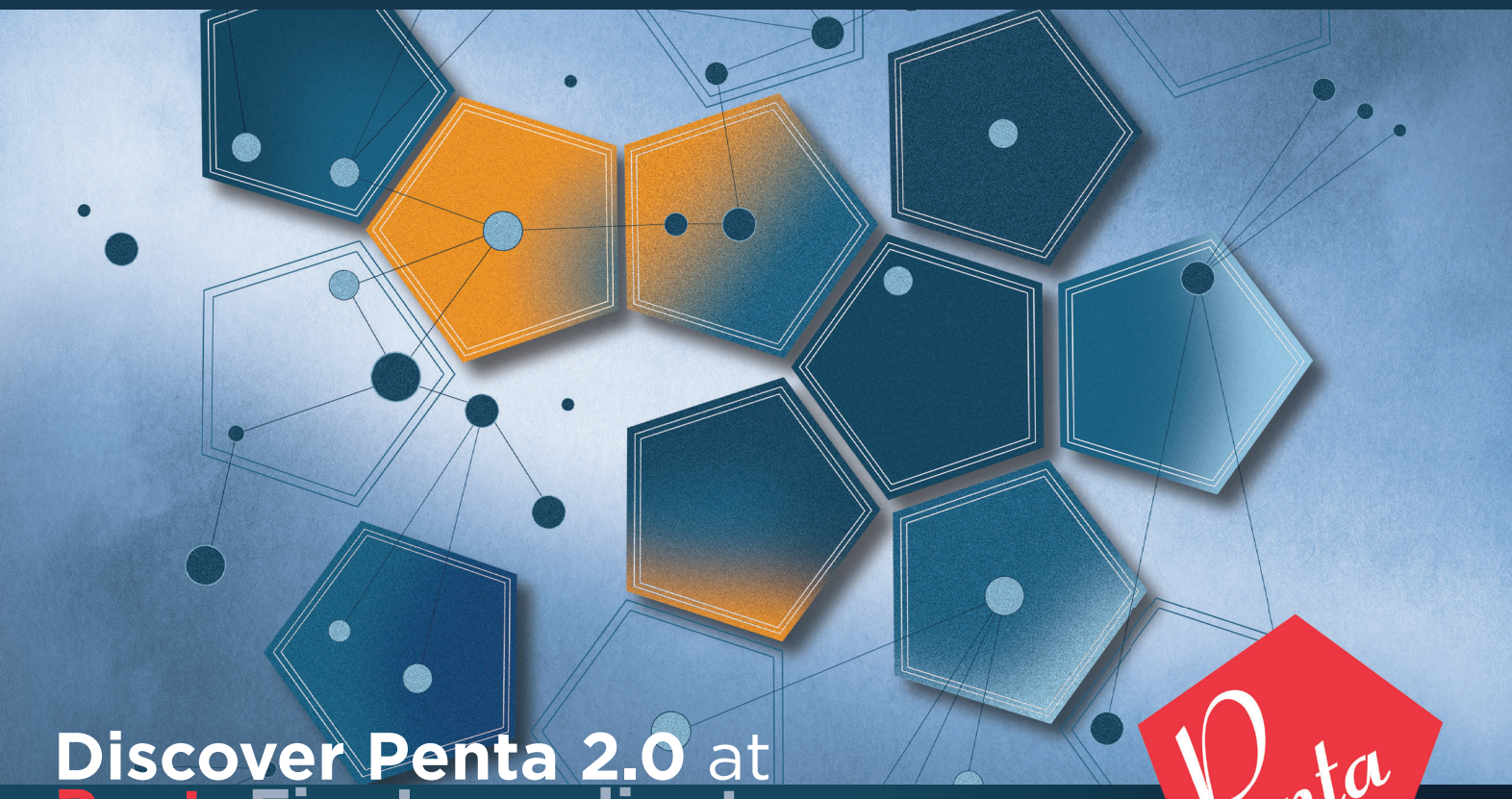
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