Tribulations of Fragrances and Their Ingredients

Written by Christophe Laudamiel and Tanishq Kumar as part of the Science in Beauty eBook

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Introduction

This chapter was produced for **The Eco Well's Science in Beauty eBook**, a curated collection of presentation summaries from the Science in Beauty E-Summit. This section highlights the perspective of master perfumer, Christophe Laudamiel.

The full eBook was created by a cohort of students and prospective science communicators, with the support of our summit speakers and cohort coordinator, Luciana Smaldore. These cohorts run alongside The Eco Well's free e-conference series to create meaningful mentorship opportunities in science communication. Through this work, our goal is to increase access to high-quality information about cosmetic science while fostering better science communication in the cosmetics industry.

This section was written collaboratively by Christophe, with the help of our sci-comm cohort member, Tanishq Kumar. Additional review was provided by Ro Miller, Luciana, and myself. The design was created by Nawal Abdul Kareem, who designed the full Science in Beauty eBook.

A great deal of love, passion and collaboration went into creating this resource. Thank you to everyone who contributed, and a special thank you to Christophe for your time, expertise, and commitment to supporting this project.

With that, here's Christophe and Tanishq's chapter, **Tribulations of Fragrances and Their Ingredients.**

If you would like to access the full Science in Beauty eBook, find it at https://www.theecowell.com/ebooks

Enjoy!

Jen Novakovich

Tribulations of Fragrances and Their Ingredients

Written by Christophe Laudamiel and Tanishq Kumar based on Christophe Laudamiel's presentation at the Science in Beauty E-Summit

Quote from Christophe, *"So far, the best we can say is that the olfactory space has 256 dimensions (quote Science paper by Osmo Gerkin/Wiltschko etc..) . By comparison, color space is essentially one to three dimensions, music occupies about four to five dimensions, motion pictures about six to seven dimensions. A piano possesses 88 keys, a perfumer's "piano" possesses about 1500 notes, each in a small bottle from which the 100th of a drop to large volumes are drawn—so you can imagine how much more complex fragrance composition, and perception, is."*

Christophe and Tanishq's top takeaways

- **Perfumery has always developed alongside chemistry**, with laboratory synthesized molecules shaping fragrances since the 1850's (eighteen fifties).
- Grasse remains a unique center of expertise for the extraction and purification of natural extracts. However, **perfume ingredients, and even more so, creative knowledge and activity, have always been globally distributed. They are now diversifying even further, delightfully.**
- **The concentration of large international perfume brands in the hands of only very few conglomerates is a unique feature of this industry,** which is struggling with true artistry. Several of these conglomerates are based in Paris, to steer even non-French brands, and are centered around hair color, shampoo, make-up, or fashion. Niche perfumery diehards, counter-influencers, and AI are recasting the landscape.
- **The majority of well known luxury, commercial, and niche brands do not host an in-house perfumer**. They rely on a unique catering business model or the Tin-Pan-Alley model. Neither model is very favorable to refined ingredients and creative compositions. This is unlike most other Labels who host a fashion designer, a master jeweller, or a master singer in-house.

Bergamot, Calabria, Italy

- **The public knows very little about fragrance ingredients**. They may recognize a few names - such as bergamot, tonka, myrrh, and sandalwood - but have very rarely been exposed to a quality 100% pure and natural bergamot, tonka, myrrh, or sandalwood extract. As for molecules, it is even rarer to commonly encounter them in their pure forms, like being exposed to a single musical note or a single instrument. This is true, down to connoisseurs and managers within the industry and sales staff in department stores. Education shall improve the audience and with it, the art.

- Strict regulatory tables from the International Fragrance Association (IFRA) and the Research Institute for Fragrance Materials (RIFM) establish limits for each ingredient in each product, with the aim of ensuring everyday consumers' safety. In fact, they have been doing a superb job, with the diligence of perfumers, since IFRA was founded in the 1970's. On the downside, no legal references nor formula-normalizing software **are recognized internationally, adding unnecessary logistics, processes, and costs from country to country**. More deceiving, many restrictions in the numerous local laws reflect distracting fearmongering political tactics rather than science-based consumer safety priorities. This is another unique, unpleasant feature of our industry, compared to the fashion and food industries, which have much more powerful lobbies. New IFRA, RIFM, and Fragrance Creators initiatives are mending this slowly but surely.

Introduction

Fragrance ingredient innovation occupies a central yet often misunderstood position within modern perfumery. Consumers and brands associate perfumery with artistic expression, most often enjoying traditional playbooks. However, behind every fragrance lies vast and technically complex worlds of molecular behavior, laboratory processes, agriculture, harvests, purifications, logistics headaches, engineering innovation, hedonic assessments, and regulatory scrutiny. This chapter provides a glimpse into the historical evolution of perfumery ingredients, the scientific principles that affect everyone every day, the design of new aroma molecules, the global geography that shaped natural raw materials, and persistent myths surrounding the discipline.

1. Historical Development of Fragrance Ingredients

1.1 Early Evidence of Perfumery

The use of scented materials predates recorded history. Archaeological evidence from structures dated to roughly 10,000 BCE, in the region between modern-day Turkey, Syria, Israel, Jordan, and Iraq, reveals artifacts associated with perfumery. These include materials associated with cooking aromas, ointments, seeds, resins, or strongly suggesting ritual scent applications. These findings highlight that human fascination with smell is ancient.

One peculiar aspect of fragrance history is how closely fragrances were associated with the sacred and higher spheres, **including healing and caring for the mind and body**. To communicate with God or to explain the unexplainable, priests, monks of most cults, doctors, and alchemists became scent specialists. In other words, they were the perfumers of the time, providing perfumes with extraordinary powers. An Imam once told Christophe during his World Economic Forum oecumenic presentation about olfaction that the Prophet Muhammad had proclaimed the three elements dearest to himself: women, perfumes, and prayers. "*In this world, women and perfume have been made dear to me, and my comfort has been provided in prayer*". After the same presentation, a Rabbi explained, with much emotion, how profound scent messages were in his religion as well.

Adding the animalistic materialistic imprints from scents, this has led to centuries of unique equations between fascination and fear, logic and illogic in the sniffers' minds.

Photo credits: Décor, Alchemy and Baldini Perfumery Boutique "Perfume The Story of a Murderer", 2006 Sueskind/Tykwer/Constantin/Mugler/Laudamiel/Hornetz Lyon Miniature Museum

1.2 The Rise of Synthetic Aroma Molecules

The modern era of perfumery began with the emergence of **synthetic molecules in the 18th and 19th centuries**.

By the 1700s, chemists had synthesized simple molecules also found in nature, such as **ethyl acetate** and **amyl alcohol**. The first fully synthetic aromatic material, **nitrobenzene** (cherry/bitter–almondy), was synthesized at a Berlin university in **1834**. Although designed with no specific perfumery intent, perfumers rapidly adopted this molecule, and others. By 1850, synthetic ingredients were firmly integrated into fragrance creations. By the 1870s, reader commentaries already reflected strong concerns about "*synthetics replacing natural extracts,*" demonstrating that this made-up tension is not new.

The confusion between the natural and the laboratory-made is maintained to this day by a lack of basic education, as well as by stores, brands, and marketing ploys profiting from overwhelming public ignorance. Perfumers and connoisseurs have been beyond that since the 1850s.

2. The Olfactory Palette: Complexity, Diversity, and Sensory Perception

2.1 The Scope of Available Ingredients

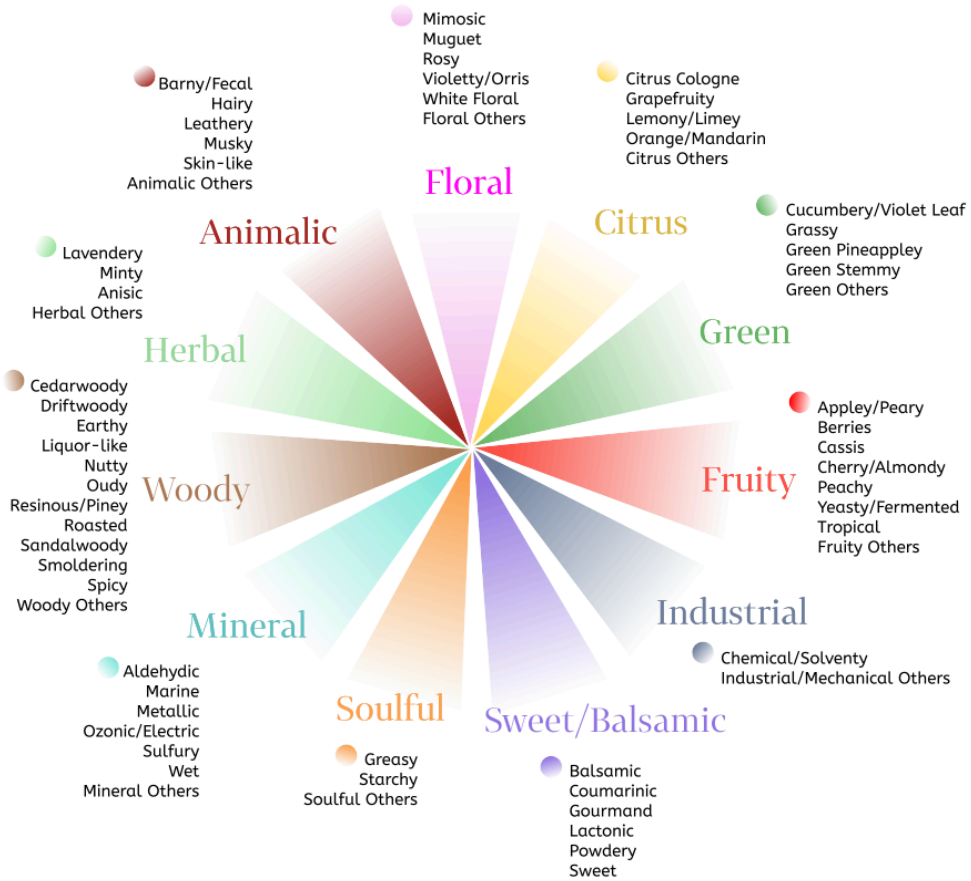
The **International Fragrance Association (IFRA)** directory lists approximately **3,300 fragrance ingredients**. A large fragrance manufacturing facility may carry 1,500–3,000 materials. Individual perfumers may work with far fewer: some rely on a core palette of 300–500 ingredients, still capable of producing high-quality creative work, yet in more limited odor spaces, styles, and applications (fine fragrances, versus shampoo, versus candles, versus laundry, versus artistic scents). This is akin to how a painter or an architect might choose to work with only very specific genres, clients, colors, or building materials.

2.2 Beyond Simple Sensory Evaluation

Assessing a single ingredient is not straightforward. Selecting or dismissing a raw material may take minutes, hours or days of thorough tests, observations ("smellervations" shall we say) and thinking. Understanding its full behaviour requires months or years, even with the best perfumer or the best AI. Amber resins of all kinds? Ionone qualities? Still nightmares even after 25 years of perfumery. Each ingredient must be studied in terms of hedonics (smell and perceived textures) and artistry, but also in terms of volatility, stability, interactions, purity, performance… across product matrices, and the killer: in combination with all other ingredients.

At the same time, perfumery is an art driven purely by creative activity in the mind. No physical dexterity is required, like in poetry. Formulas can be weighed with tools, assistants, or robots. Unlike music, where the player or singer influences the composition, the weigher does not influence the scent outcome. The real difficulty and magic in composing a formula lies in the complexity and choices of materials (notes or ingredients), including their large or extremely subtle scent differences, at microprecise non-visible quantities, that ultimately produce macroeffects. The resulting formula suddenly creates an entire universe in the sniffer's head. That is the art.

To date, no primary odors have been defined. All notes overlap more or less with their neighbors, with undefined non-linear borders. Scientifically, **a single molecule can be characterized by around 4,000 parameters**. A perfume commonly contains hundreds of them. Unlike color, which can be represented with a few primary dimensions, olfactory perception exists in a highly complex space, estimated currently at 256 dimensions *("A principal odor map unifies diverse tasks in olfactory perception*" Lee et al. in *Science*, 31 Aug 2023, Vol 381, Issue 6661 pp. 999-1006*)*. This makes perfume composition far more intricate than other arts. Perfumers, somehow, are not scared of navigating this jungle.



Pic: Creating a common world language of smells: reference taxonomy academically designed by Osmo, hosted now in open source on GitHub for everyone to use and build upon, globally, away from marketing agendas.

https://raw.githubusercontent.com/osmoai/taxonomy/refs/heads/main/data/taxonomy.pdf

2.3 Objectivity in Olfactory Perception. Notes on Public Perception.

People might experience smells differently due to physiological or genetic variations between individuals. It turns out that this phenomenon is not much more or much less than with color perceptions. We have learnt to underestimate color perception differences. Artist perfumers are not much more distracted than painters are by thinking about the color distortions that exist between individuals. Ultimately, the act of smelling is much more objective than people think. In fact, ten perfumers around a table may agree extremely quickly about the description of a scent. **Perfumery, like painting, does not seek identical perception from everyone but rather meaningful expression**. Subjectivity comes not in the description, but from the subsequent emotional implications of the smell. This is in addition to the consequential decisions we let our brain make regarding pleasantness, comfort, fit-to-project, or fit-to-the-occasion.

Scientists find it far more difficult to define shared perceptions of smell across an untrained population than they do for color. Again, this isn't because people perceive completely different smells, but because **smell descriptions are highly influenced by language, memory, and experience.** Adding to this, unlike for color words such as red, yellow, and green, which are taught in roughly the same manner around the world, there is no standardized odor vocabulary taught in elementary schools. While two individuals may describe the same odor differently, such as recalling a grandfather's garage for one, or a specific forest for another, they may actually be perceiving the same smell. The same odor facet exists between certain types of Bergamot, Lavender, and Earl Grey teas. The variation lies in the interpretation and vocabulary, in a child's exposure or culture, not in the sensory input itself. To teach a common vocabulary, pure ingredients or simple notes must be shown. They must enter the classrooms.

Understanding this and practicing a kind of dissociative mental gymnastics between smell and personal-background-related reactions free the perfumer from rigid interpretations. It helps focus on recognising the core sensory reality of ingredients and their mixtures, rather than tagging subjective labels.

Let us suggest here an exercise for the serious scent fan once the above stage of odor-from-mind detachment has been reached. Each perfumer knows the few scents he or she does not smell well. Probably a few receptors here and there in this or that person, among the 350 we have working in our noses, are not functioning so well. Determine the few specific odors that are not your forte, or the one or two or three ingredients you don't smell at all.

3. Innovation in Aroma Molecule Discovery

3.1 Waves of Innovation

The discovery of new fragrance molecules progressed through distinct waves:

- **1950s-1970s:** after the charcoal and pine chemistry times of the 1900s-1930s, explosive growth driven by petrochemical and gas-phase chemistries, as well as sudden scientific developments from two World Wars.
- **1980s-1990s:** emergence of entirely new molecular families based on new reactants, catalysts, chemists, and analyses of nature with gas chromatography and nuclear magnetic resonance.

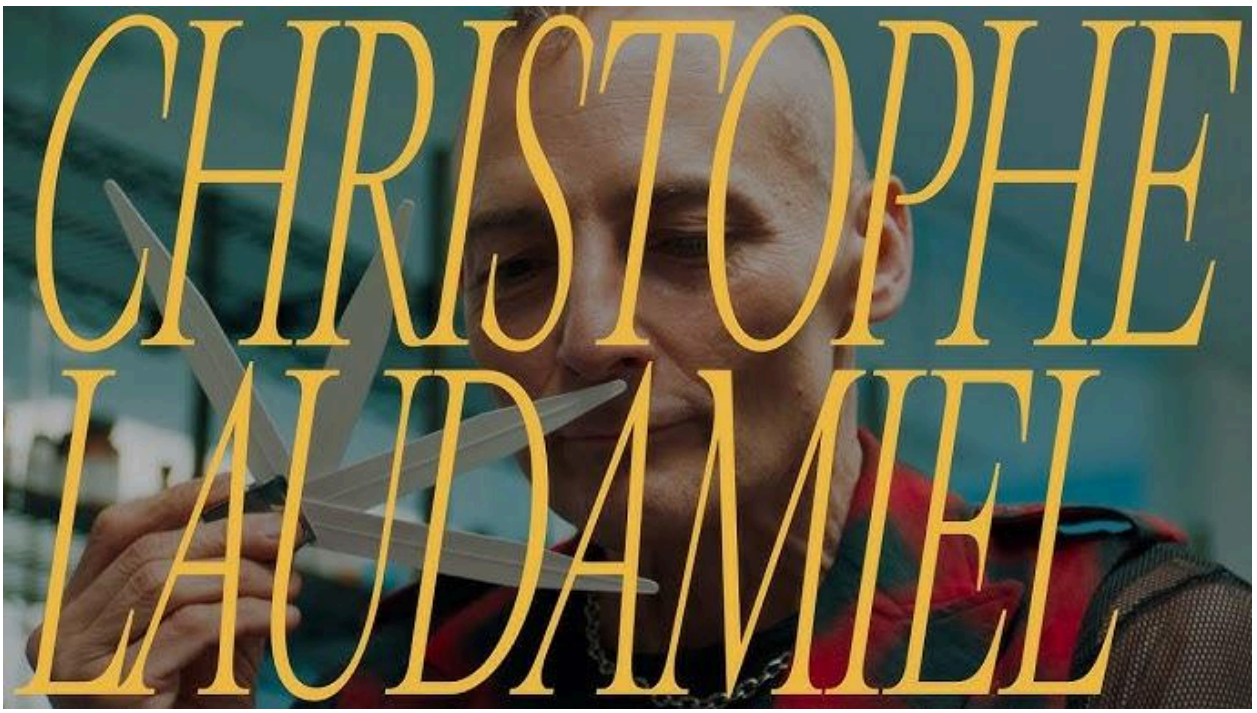
- **2010-now**: emergence of creative chemistry laboratories in Asia, allowing fast output of new molecules or synthetic pathways to make molecules more affordable.
- **2022-now**: AI is allowing chemists to sieve billions of molecules (a task which would otherwise take more than a thousand years per perfumer) to screen for interesting compounds, to create brand new molecular structures, some found in nature, some not. New special effects will also emerge, for instance, in perceiving soft or shiny and fresh textures in a scent, be it in the floral or farinaceous soulful arenas.

3.2 Contemporary Computational Discovery: A Case Example with Osmo

In very recent years, computational chemistry has revolutionized innovation, particularly in screening safety and biodegradability profiles.

A case example of this development is with **Osmo**, where high-throughput molecular screening uses machine learning to predict odour properties, skin safety, and potential applications. Among the billions of molecules searchable, only a small fraction has been explored so far. Since 2023, Osmo's ingredient discovery division has identified multiple novel structures, with several molecules undergoing preparation for commercialization after safety modelling and upscaling. This marks the beginning of a significant new wave of olfactory innovation. *(Note: Christophe is an Osmo employee)*

One notable discovery that has come from Osmo's work is a single molecule capable of producing an authentic, fresh cantaloupe note. Traditionally, achieving this effect requires 4 to 8 molecules to be dosed very precisely. Furthermore, some of these ingredients are extremely expensive, skin-sensitizing at higher levels, or unstable in a shower gel. The new molecule covering the fresh and juicy melon space is stable, affordable, and highly impactful, predicting a resurgence of melon-based accords in upcoming fragrance design. This is visually explained straight out of the Osmo chemistry lab in New York City in the movie "Christophe Laudamiel" by Stripe Press production under Tacit direction.



4. Geography, Agriculture, and the Global Development of Natural Ingredients

4.1 Ancient and Medieval Centres of Extraction

Natural extraction technologies such as distillations first flourished in ancient Persia, India, and the Arabic world, spreading, for instance, via Alexandria city into the Mediterranean basin. Early European distillation techniques, particularly those developed in monastic communities after the invasion from the Ottoman, Arabic, or Mongolian armies, accelerated the extraction of other local aromatic plants. Did you know that the Bulgarian rose fields were actually first selected and planted by the rose specialists from Turkey? This has created a bit of an alliance between the best of Turkey and the best of Bulgaria expertise. **Perfumery, by its prestige and symbolism, has always lived, suffered, or flourished in parallel to geopolitics.**

4.2 Colonial Expansion and Access to Botanicals

Distilling perfumery plants has gone hand in hand with alcohol and spirit distillation. For better or for worse. From recreational, to medical, to religious, to good-smelling, and even some surprising purposes. European powers expanded this knowledge by distilling vegetals from different regions. This explains partly why certain parts of the world still contribute more plants to global trade and perfumery than others. It is important to understand that most plants must be extracted on or near the fields, using locally precise technologies. One doesn't routinely ship fragile jasmine petals, or mold-sensitive patchouli leaves, and heavy cedar or oud across the globe to Grasse. The material is first grown and utilized locally. The scandal in using perfumery plants lies much more in marketing their pseudo- or smoky-presence in many products rather than in using unduly what actually comes from nature in those parts of the world.

Some key regions in Brazil, Africa, and Oceania have been less prominent historically in international perfumers' catalogs because they were less colonized by the perfumery heavy marketers of the time. This means that their botanical resources were not explored to the same extent. As a result, they still host a large variety of potential perfumery plants that are now being discovered every year. An exciting perspective for perfumers and brands of all walks of life today.

4.3 Modern Localised Extraction Movements

In the last two decades, a further decentralised and localised model of natural extraction has emerged. Chemical engineers and now boutique distillers in Tunisia, Namibia, Papua New Guinea, Brazil, and several Pacific islands have begun producing new, regionally specific extracts. Discovering a commercially viable new plant is a rare, slow, and tempered process that, even more so than the food business, is overwhelmed by local, regional, and company culture and regulations. Yet again, the natural global palette is gradually expanding in encouraging ways.

Perfumery plants are notoriously climate-sensitive, very finicky to grow and to harvest, and, like viticulture, rely on local expertise. These factors limit large-scale extensive cultivation and reinforce the importance of regional terroir.

5. Regulatory Frameworks and Safety Science

5.1 The Role of IFRA and Research Institute of Fragrance Materials (RIFM)

Contrary to misconceptions, regulatory systems in perfumery are very rigorous. **IFRA (International Fragrance Association) and RIFM (Research Institute for Fragrance Materials) collectively evaluate safety, toxicology, and exposure risk across categories** such as fine fragrance, cosmetics, candles, laundry, down to extremely precise categories such as baby products, lipsticks, or genital hygiene. Companies generally comply with IFRA standards. This is the case even when specific materials are not publicly listed for trade secret reasons, as perfumes are not copyrighted for now. Non-public assessments still occur through independent scientific review boards.

Concretely IFRA's free and public tables provide perfume composers with maximum safe-use limits for each ingredient in each product type. For instance, something as common as cinnamon has vastly different permitted levels in:

- Baby diapers
- Eye creams
- Fine fragrances
- Home fragrance

Because the skin is a sensitive organ with cumulative exposure risk, at times more sensitive than the stomach, safety thresholds are far stricter for fragrances than for foods. Notice that, to the best of our knowledge, there is no known general mortality rate associated with perfume usage compared to well-known mortalities due to under-regulated food consumption.

5.2 Regulatory Challenges

While IFRA is scientifically grounded, certain political regulations, particularly within the EU, California, and Canada, may impose additional restrictions not fully aligned with human safety or human hazard evidence. Rather, these are due to political or demagogical climates. This frequently complicates global perfumery, forcing companies, large or small, to reformulate for specific jurisdictions. Even large companies are now accustomed to creating different fragrances for different geographies.

Myth-Busting in Modern Perfumery: Extraction, Sensory Perception, and Analytical Limits

Myth 1: Grasse is the birthplace of perfumery

Grasse is often described as the birthplace of modern perfumery, but this view oversimplifies a global history. Natural ingredients have been extracted for centuries across many regions worldwide. Talking about the European peninsula, England, for example, has a strong tradition in perfumery and chemistry. In fact, several generations of Guerlain perfumers trained there over the course of a century before becoming head perfumers at the Parisian institution. Germany, particularly around the Baden–Alsace border, also played a major role in early extraction and chemical innovation and supply, alongside contributions from Belgium, Italy, and the Netherlands.

The development of medicine and plant medicine in Bologna and Montpellier in the 1600-1700's, of Parisian perfumery in the 1700-1800's, and of chemistry and perfumery in Germany, England, and Russia

in the late 1800's, played a much bigger role than Grasse in the birth of modern perfumery. Grasse was certainly a major market for raw ingredients and pre-made bases. It had originally a special independent-city status which allowed it to navigate the vagueries of French and Italian politics, embargos or changing taxation regimes. From the birth of modern perfumery, it has been procuring molecules profusely from other European countries to mix with its naturals. Nowadays, this practice has extended to procurement from other molecular hubs as well, such as India and the United States. Not denying here that Grasse has been hosting some significant perfumers as well.

On the other hand, Grasse and its large surrounding region have been relentlessly significant because of its exceptional expertise in the extraction and purification of natural ingredients. 200-300 species of them. Local know-how is largely tacit, passed down through practice and constant adaptation to changing conditions. Some purifications, rectifications, redistillations, key for perfumery use, even more complex than for a whisky, have also been optimized in Grasse on raw extracts imported from distilleries around the world. Grasse routinely shares the agronomical knowledge it develops in its own test fields and at local universities from Nice to Montpellier. This knowledge is shared to larger fields around the world to improve productions, cover natural catastrophes, or help farming conditions. Grasse's world class activity regarding natural ingredients remains hidden from public view for the most part. The most compelling installations are not open for tourist visits.

Myth 2: "You Should Be Able to Smell Every Ingredient Listed on the Package" or "Trust XYZ"

The Limits of Human Olfaction

When a fragrance is first smelled at $t = 0$, the nose may simultaneously recognize **five to six facets only**. At around eight facets, perceptual saturation occurs, an overload point at which even trained perfumers cannot reliably discriminate additional notes.

As the fragrance evaporates ("turning the pages" of a book), new layers may emerge: so-called top, heart, and base evolve, each carrying only a handful of perceptible facets at any moment. The impossibility of detecting 20+ notes simultaneously is therefore not a sign of incompetence; it merely reflects human sensory physiology. Note in passing that there is no rule dictating that every perfume has a top, middle, and base note.

Why Consumers Often Cannot Smell Specific Notes

Several factors contribute:

1. **Lack of prior exposure(training effect):**
   If someone has never smelt pure lemon oil, pure galbanum, or pure aldehydes, they cannot easily recognise these notes inside complex mixtures. If one has never seen a certain fruit or the white star of a Montblanc pen, one rarely notices them around and about. Once the attention is drawn to such key items, the brain suddenly notices them much more in our surroundings or in films.

   Perfumers and other noses learn ingredients one by one. Fashion designers and architects learn materials one by one.

2. **Descriptor inflation on packaging, romantic and semantic substitution**:
   Marketing language might also list ingredients that are present only at trace levels or not at all, calling them "notes". Many "notes" represent poetic metaphors rather than chemical or plant reality. Brands sometimes choose more familiar words ("Tonka") instead of chemical names ("coumarin"), even though the natural material itself might not be present. It might say wisteria, although we don't extract wisteria.

There are no rules on the pertinence and legality of these Wild West and Wild East, for that matter, naming conventions, and absence thereof. Even the term “Natural” carries several definitions and might not mean “contains 100% pure and natural plant extracts”. Meanwhile many brands play the ambiguity, gracefully, downstream with the public. Be aware.

3. **Doubtful practices even among very well-known luxury brands:**

   Perfumers are asked to add minuscule quantities, sometimes diluted extracts, “just to make a claim” legally defendable. This practice exploits the cultural prestige of farmers and regions without meaningfully using their materials in decent quantities. In the perfume industry, brands are rarely vocal about applying the Nagoya protocol, rather than giving back -significantly- to the original country of the natural ingredient. Why do you think Brazil is very little mentioned in fragrance press releases?

HANS-JÖRG MAYER & CHRISTOPHE LAUDAMIEL

"*TUBEREUSE ORGANIQUE*" Berlin 2019

Why Reviewers Often Misidentify Notes

Even expert perfumers may not detect certain materials if dosed at very low levels. Often, creating special effects in combination with other ingredients, a bit like salt in a cake. The salt is not perceived as such. Thus, content creators who infer notes based only on packaging (rather than expertise and long training) frequently draw incorrect conclusions. Many are rather lost if notes are not mentioned at all. Perfumery is a more complicated art than music. The training of its critics, writers and talkers should take longer than musical or pictorial training to achieve a noble expertise. **Consumers should interpret marketing claims and influencers’ advice critically. Lavish events and gifting are common, but not disclosed every time or at all. Higher price points on unverifiable, unsmellable, romantic stories become suddenly believable.**

Myth 3: “GC–MS and AI Can Recreate Any Fragrance Exactly”

What Gas Chromatography Can and Cannot Do

Gas chromatography and mass spectrometry (GC–MS) are powerful tools for analyzing fragrance compositions. They identify volatile components and estimate their relative quantities, providing valuable chemical data. However, GC–MS cannot perfectly detect every compound in a complex mixture. Trace molecules, minor isomers, impurities, terroirs of naturals, and proprietary components may escape analysis. GC-MS, coupled with an expert human analyst, a perfumer, and information from friends in the industry, does wonders. Hence, the grave advancement of plagiarism since the 1990s and dupes since the 2010s on the chic-est market places. A simple pdf illustrating graphically with the help of concrete examples of what GC-MS is and can do is attached to the resource center ***here*****.**

Ingredient Quality Matters as Much as Numbers

Even a “correct” formula will fall short if the ingredients vary in origin, fractionation, purity, stereochemistry, age, storage, or supplier quality. Substituting one bergamot or linalool for another can drastically alter the final scent. Curiously, too, at times, it won’t matter, but don’t count on this too much.

All in all, reconstruction, a kind of re-engineering and repolishing, requires many adjustments and compensations to achieve the intended fragrance. **The result is very rarely equivalent but still very disturbing at several levels, including in creating successful remixes with no residuals to the original artists and studios.**

AI and LLMs Are Not Smellocopy Machines

Large Language Models (LLMs) and AI do not produce literal copies. They generate outputs in a certain style rather than molecular duplicates. AI fragrance models can design structures inspired by olfactory categories such as “fresh,” “beachy,” or a finished scent, but they cannot recreate an exact existing scent. Current concerns that AI will directly clone fragrances reflect a misunderstanding of both chemical reconstruction and artificial intelligence.

Marketing Claims About Naturals Can Be Misleading

A fragrance marketed as “80% natural” may achieve that percentage by using **natural solvents** with non-natural perfume materials. Orange oil at $6 to $10/kg in large amounts, though natural, does not imply high value either. The scent description might not mention orange at all. It might be named “Neroli”, although present in the tiniest amount or not at all. Neroli is usually more than 500 times the price of orange oil. Be aware.

Ethics, Transparency, and the Need for Consumer Awareness

The fragrance industry contains significant “bluff” romanticized descriptions, exaggerated natural content, and misleading imagery. To counter this, consumers should:

- question sourcing claims
- ask for precise ingredient types (e.g., *absolute* vs *infusion*)

- test longevity on skin, although this has different conclusions depending on several other difficult parameters for the layperson
- evaluate whether promised notes actually appear

Embarrassment should fall on the salesperson, not the consumer. Transparency well-placed, still maintaining a recipe secret, supports farmers, local region economies, biotopes, perfumers, and honest brands.

Please see attached Perfumery Code of Ethics pledged by more than 120 entities so far, the Natural Ingredient Calculator and its Watch-out List here.

Conclusion

Ancient and modern perfumeries blend art, science, craftsmanship, and storytelling. Nowadays, understanding the limits of olfaction, extraction, GC-MS, and AI, as well as the ethical challenges around naturals, consumers, and professionals, can engage with fragrance more critically, more qualitatively, more artistically, more respectfully. Christophe emphasises that education, curiosity, and basic transparency are essential for trust, empowering informed choices, challenging misleading claims or conflicts of interest, and reinforcing authenticity and integrity. All to grow the artform.

About the speaker and co-author:

Christophe Laudamiel is a master perfumer in fine fragrances, ambient installations, and film. He is the in-house perfumer at Osmo New York and BélAirLab Tokyo. **"In my opinion, he is the greatest inventor of novel perfume structures working today,"** Luca Turin wrote in 2016. He created or co-created several top-10 scents for fashion and beauty houses such as Abercrombie & Fitch (Fierce), Beyoncé, Clinique, Tom Ford, Ralph Lauren, and for numerous niche brands, including award-winners American Perfumer, Annindriya, Grandiflora, Richmess, Savoir-Faire, Strangelove NYC and The Tilted Chair. Christophe's scents have been shown at the Guggenheim Museums, the Basel Culture Museum, The Museum of Modern Art in Istanbul and included in collections at the International Perfumery Museum in Grasse, the Cleveland Museum of Art, The Rubin Museum NYC, and the Harvard University Archives. In 2017, he received the first-ever lifetime achievement award from the Institute of Art and Olfaction in Los Angeles for his "Exceptional Contribution to Scent Culture." For his further osmography, please visit Christophe's Wikipedia page, Mianki Gallery Berlin, and his new store-gallery Naked Ghosts in New York City.

About the cohort member who co-wrote this section:

Tanishq Kumar is a Chemistry graduate and MSc Formulation Science graduate student at the University of Greenwich, London, with a keen interest in cosmetic science, innovation and science communication. She is enthusiastic about exploring opportunities in research and new applied sciences in the cosmetic and pharmaceutical sectors.

Written by Christophe Laudamiel and Tanishq Kumar as part of the Science in Beauty eBook

Christophe Laudamiel
Master Perfumer

Tanishq Kumar
MSc Formulation Science Student