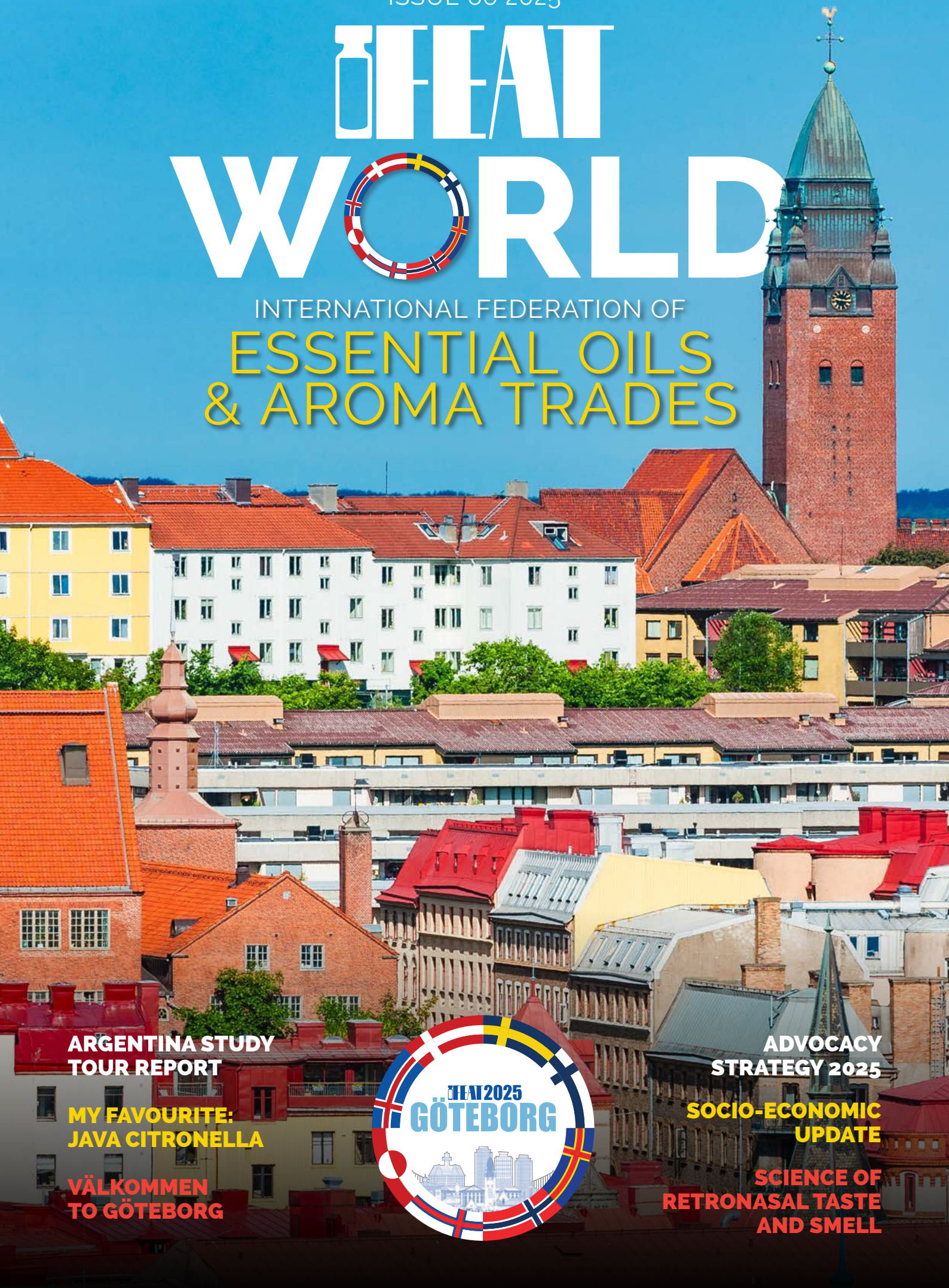
ISSUE 66 2025

IFEAT WORLD

INTERNATIONAL FEDERATION OF
ESSENTIAL OILS
& AROMA TRADES



ARGENTINA STUDY TOUR REPORT

MY FAVOURITE: JAVA CITRONELLA

VÄLKOMMEN TO GÖTEBORG

IFEAT 2025 GÖTEBORG

ADVOCACY STRATEGY 2025

SOCIO-ECONOMIC UPDATE

SCIENCE OF RETRONASAL TASTE AND SMELL

IFEAT 2025
GÖTEBORG
14-18 SEPTEMBER 2025
GOTHIA TOWERS

FINAL CALL!

Early Bird savings for the IFEAT 2025 Göteborg Conference end on 30th June.

Time is running out! This is your absolute last chance to secure significant savings on your registration for what promises to be a pivotal gathering for our industry.

Act now! Complete your registration by **June 30th** to lock in your discounted rate. Join us in Sweden to network, expand your business, share knowledge and solidify your position within IFEAT and the global essential oil and aroma trades community.

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#SeeYouInSweden

Välkommen to Göteborg – The Nordic Nexus

Dear Members and Friends of IFEAT,

Let me take you on a little walk. We're in **Göteborg**, where cobblestone streets meet the scent of opportunity, and where the salty air from the archipelago carries more than just the scent of the sea – it carries a legacy of trade, curiosity, and collaboration.

This is the first time IFEAT sets foot in the Nordics – a region where **sustainability** is not a slogan, but a lifestyle. A place where **innovation** grows steadily and in harmony with nature. Our venue, the iconic **Gothia Towers**, stands as a beacon of that ethos – a sky-high testament to green thinking and responsible action.

The Nordic Nexus invites us to explore the region's pioneering spirit in sustainability, to gain *fresh perspectives from the edge of the world*, and to bring them home to the heart of your work.

In this spirit, we invite you to begin each day not in a rush, but in reflection. Our new **Rise & Reflect** series – complete with brown-bag dialogues and a dedicated workshop on **leadership for sustainability** – offers space to think, lead, and connect with purpose and intention. These sessions set the tone for a conference rooted in conscious leadership.

But make no mistake – the programme is as dynamic as ever.

You'll find deep dives into the Nordic markets' favourite **spices**, **upcycling** innovations, and the **Wonders of Wood** – showcasing sustainable production from northern forests. The **Citrus Roundtable** will unpack challenges and opportunities in one of our sector's most vital and fast-evolving segments, while our spotlight on **regulatory and advocacy actions** keeps us alert to the responsibilities ahead.

In a historic first, we're opening the floor to you. The IFEAT Members' Forum invites you to have your say, share your concerns, and co-create the future of IFEAT. No filter. No fuss. Just your voice, your peers, and your place in the conversation.

We're honoured to host **Mr Jean Mane** for this year's **IFEAT Medal Lecture**. And when it comes to navigating **family business transitions** and **continuity**, you'll hear directly from those at the helm – leaders of IFEAT's own multigenerational companies – as they reflect on resilience, legacy, and change.

By popular demand, we'll close with an interactive discussion on **extended payment terms**. Stay until the end – you'll want to be part of it. In fact, we recommend staying on a little longer. On Friday, following the close of the conference, we'll take a special day trip to **Borregaard in Norway** – a unique opportunity to visit a **state-of-the-art sustainable vanillin production facility**, and see circular innovation in action.

Our keynote speaker, Swedish economist and provocateur **Dr Kjell Nordström**, will crack open the Nordic economy and help us decode the future with his signature insight and energy. He'll challenge us to think differently about the global economy – and our role within it – with the clarity, wit, and vision this moment requires.

Through it all, we'll be guided by something distinctly Nordic – *lagom*. This principle of balance, moderation, and mutual respect shapes how we do business, how we treat the planet, and how we engage with one another. It is the space between tradition and transformation. Between listening, learning, and doing business.

Because while we come for insight, inspiration, and connection – we also come to trade. To buy, to sell, to negotiate, and to build relationships that move our industry forward.

May we exchange not just goods and know-how, but also courage, care, and a shared commitment to a future we're proud to create.

Väl mött — see you soon!

Zahra Osman Guelle
Chair, IFEAT 2025 Göteborg Conference

From the Editor

A very warm welcome to Issue 66 of IFEATWORLD, the Summer 2025 edition.

I'd like to begin with a special thanks to Martina Raymo, who kindly offered a huge amount of time and effort to produce a spectacular in-depth report on the recent Argentina Study, which begins on page 8. I think you'll agree that she has done an excellent job transporting us there – reading it certainly made me wish I'd been in attendance!

Martina's report also brings home some of the unique qualities of this industry that I have come to understand over the past few months with IFEAT. Namely, a passion for nature and natural products, a spirit of global community, and a shared thirst for knowledge – all of which permeate through our Membership.

That passion for naturals is also beautifully conveyed through Robby Gunawan's My Favourite article on Java citronella oil (see page 28). It's a series that I am thoroughly enjoying, and would welcome any volunteers to contribute to in future issues!

Of course, it's not just the products but the people that make this industry what it is. That is why it's so important that IFEAT does all it can to protect livelihoods, support the industry through advocacy work, and promote socio-economic and environmental sustainability.

It's great to see IFEAT's Socio-Economic Reports continually grow and evolve. Readers in print will have noticed that for the past two issues, you have received not one but two publications in your delivery – IFEATWORLD and an accompanying Socio-Economic Report (SER). This month, it's on clove oils. On page 34, our Socio-Economic Committee have put together an article explaining the background and direction of IFEAT's SERs, which "provide policymakers, regulators, and industry stakeholders with grounded evidence of positive impact, ensuring that the lives and livelihoods behind these ingredients are neither overlooked nor undervalued."

Meanwhile, IFEAT is engaged in advocacy work relating to numerous regulatory challenges the industry faces. We are working in partnership with industry stakeholders to ensure our industry is supported by policy that is properly informed by science for the benefit of both people and the planet. Just like our global supply chains, this work is complex – perhaps, at times, dauntingly so – but policy decisions affect everyone in our industry, and that is why we've provided a digestible primer on the current advocacy activities we are involved in on page 32.

This work, just like the wider industry, is grounded in science, and so it's a pleasure to also be able to share scientific research of particular interest to our industry. In this issue, you will find a fascinating review of research into the science of retronasal taste and smell, starting on page 36.

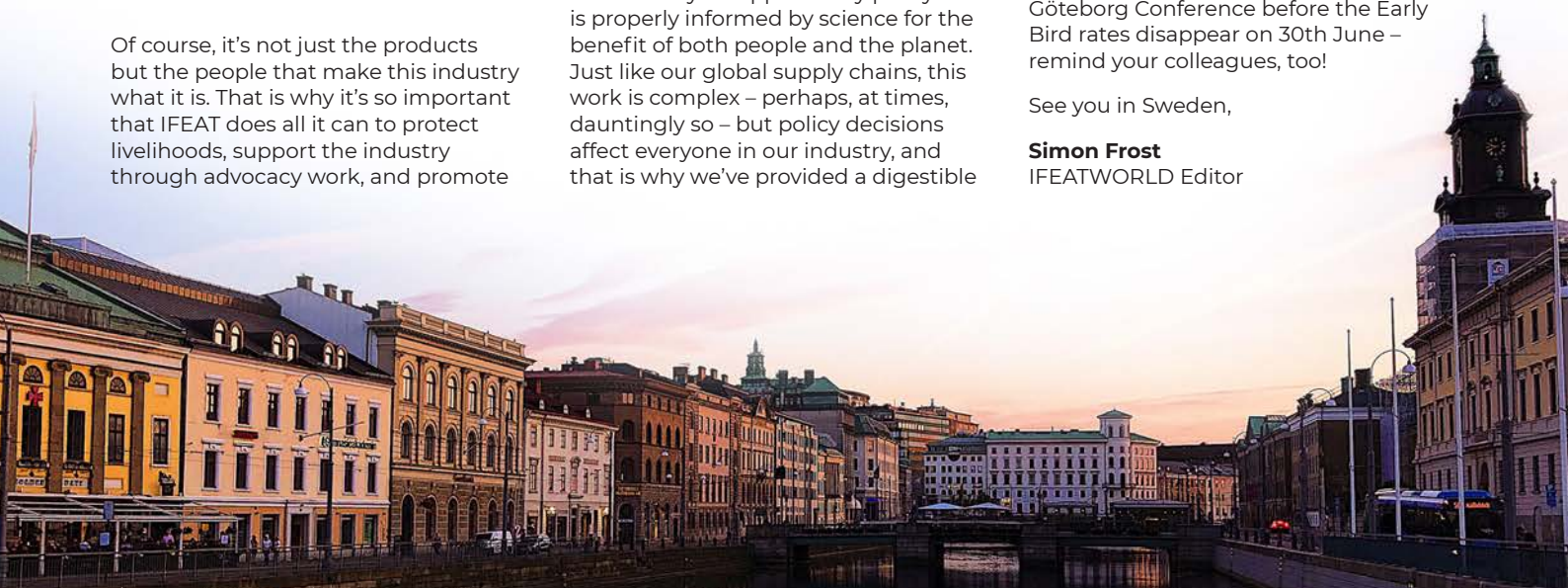
This is my third issue as Editor of IFEATWORLD and it may be my favourite so far – I do hope you enjoy it, too, and perhaps you'll take away something that's useful to you and your business.

I'd love to hear from you – good or bad, please let me know what you think of the magazine. Is there anything you'd like to see more or less of? Perhaps you have an idea for an article? Please email **simon.frost@ifeat.org** and let me know your thoughts.

And finally, don't forget to book your delegate ticket for the IFEAT 2025 Göteborg Conference before the Early Bird rates disappear on 30th June – remind your colleagues, too!

See you in Sweden,

Simon Frost
IFEATWORLD Editor



Contents

6-7 Notes from the Chair
8-27 Argentina Study Tour Report
28-31 My Favourite: Java Citronella Oil
32-33 IFEAT Advocacy Strategy 2025
34-35 SERs: Sustaining Impact
36-39 Retronasal Taste and Smell
40-43 New Members

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Notes from the Chair

By Catherine Crowley
Chair of the IFEAT Executive Committee

Next Stop – Göteborg!

Plans are well underway for what will certainly prove to be an exciting and different IFEAT Conference in the Nordic region! Gothia Towers, the Conference hotel, is a fantastic backdrop for our gathering this year. The hotel has the capacity to allow a high level of accommodation for delegates along with expansive meeting spaces – both of these aspects will certainly add to the ease of our meetings and gatherings during the Conference week.

The Conference Committee has been hard at work to create a Speakers Programme that reflects not only coverage of the most current and compelling industry topics, but also highlights areas of interest from this part of the world. Planning for the events during the week has allowed us to discover new venues in the area – you will once again be experiencing unique places together with industry colleagues and friends!

We will also host a first-ever Members' Forum during the Conference – you will see more details on this once the schedule for the Conference is available. We will be offering a new Conference App as well this year – look for the announcement on this, as it has great additional features!

Argentina Study Tour – an excellent experience for all

The Argentina Study Tour, in early April of this year, was focused on all aspects of citrus farming and production in this region. Hosting 51 delegates from 21 countries, the IFEAT team, led by Sergio Dávalos, took delegates through three provinces – visiting Buenos Aires, Salta and Tucumán. This adventure through the country saw well-hosted site visits, including a niche perfumery producer. Having an overview of one of the world's largest lemon producing regions included stops at flavour houses, research institutions, botanical centres, nurseries and harvesting fields along with five industrial production plants. Among other aspects, these visits also highlighted new technologies and sustainable production practices. Great weather and food contributed to making the entire trip a wonderful shared memory for all delegates and organisers. You can read first-time Study Tour delegate Martina Raymo's full report from page 8.

Education

IFEAT Learning Centre - ICATS

IFEAT's Education team has continued to develop both the curriculum offerings and the mentorship programme for students enrolled in this programme. Student numbers have continued to increase and IFEAT is excited about expanding the programme further, in stages. Stay tuned for opportunities to be further involved in these studies!

Flavourist Course:

Working together with Reading University, IFEAT continues to support this three week programme that was developed in association with the British Society of Flavourists.

Focusing on practical aspects of flavour evaluation and formulation, the programme includes lectures, seminars and practical sessions that give students the opportunity to further their careers as flavorists.

The next course will take place from the 9th to 27th June 2025, and will include a visit to Lionel Hitchen. The course is full with a waiting list. For those of you interested in attending future courses, consider enrolling in an ICATS flavour course in the meantime, and then be sure you are on our list for future IFEAT Educational opportunities!

For more information, you can write to IFEAT's Education Manager, Lindsay Smith, at lindsay.smith@ifeat.org.

ISEO

The 55th International Symposium on Essential Oils (ISEO) will take place from 7th to 10th September 2025 in Sarajevo, Bosnia and Herzegovina. The Symposium is an annual event and this year IFEAT will be supporting 38 students to attend from around the world. As a globally recognised event, ISEO brings together scientific researchers and industrialists to present information on new technologies and updates on natural raw materials that are a part of the flavour and fragrance industry. IFEAT is pleased to be collaborating in and supporting this work!

Advocacy Update

You'll find an in-depth review of our Advocacy work in this issue from page 32. Compiled by our great Advocacy team, NOVE, together with Charles Laroche, this overview will give you a greater sense of the specifics we are working on, along with the challenges and our approach to these going forward. We are making real progress in this area, and our collaboration with other industry roleplayers remains a key part of this ongoing success.

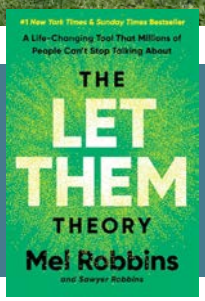
Executive Committee

The work of the Executive Committee, to further support and develop our industry, continues at a rapid pace. Our May meetings were held in a setting that enhanced our sense of unity – both in our purpose as well as in our ability to work together well on a higher level. The work can be demanding at times – not always for the faint hearted! But the mutual respect and support shared between both Directors and Staff, continues to grow and this is absolutely a part of our success. We have a fantastic team – it is something I never take for granted.

Stay well and be kind,

Catherine

Recommended Reading: The Let Them Theory by Mel Robbins. There is a reason why there is a lot of buzz on social media around this book. I was gifted a copy by someone who knows me well – I'm very grateful for that person's insight! For me, this book will go on my relatively short list of "game-changing" books. I love the challenge of applying this concept on lots of levels. I would love to hear from any of you that pick it up and have thoughts to share while working through it!



Article author, Martina Raymo, receives her Certificate of Attendance from John Nechupadom.

Report: Argentina Study Tour 2025

Martina Raymo takes us inside the IFEAT Argentina Study Tour 2025, where the zest of the citrus industry met the warmth of new connections on an unforgettable journey.

The IFEAT Argentina Study Tour took place from 6-12 April 2025, offering an intense seven-day journey through some of Argentina's most fascinating regions – Buenos Aires, Salta, Cafayate, and Tucumán. The tour brought together 51 IFEAT Members from 21 different countries, encompassing a wide variety of roles within the essential oils, flavours and fragrance sectors, including producers, buyers, researchers, marketers, sustainability officers, and senior executives.

Over the course of the week, the group visited 11 companies, covering more than 3,000 kilometres across the country. Alongside technical visits, delegates also participated in an essential oil workshop, enjoyed cultural events such as an authentic tango performance, and took part in team-building activities, creating a rich blend of professional development and cultural immersion.

In a world increasingly focused on sustainable practices, high-quality raw materials, and innovative agricultural techniques, Argentina's lemon sector stands out as a global benchmark for excellence. This Study Tour offered a rare opportunity to understand not only the technical and industrial aspects of lemon production but also the cultural and human dimensions that underpin Argentina's remarkable citrus success story.

IFEAT's Study Tours are designed not just to visit industries, but to build bridges between people, foster international collaborations, and inspire innovation. This spirit was very much alive in Argentina, where delegates had the chance to engage deeply with local experts, discover pioneering approaches to agriculture and processing, and exchange ideas with peers from across the world.

Organised with the invaluable support of the IFEAT Study Tour Committee and Secretariat – John Nechupadom, Stephen Pisano, and Divya Sara Mammen – and the Local Organising Committee led by Sergio Dávalos and Andrés González, the tour was meticulously planned to offer an immersive experience. Expert guides Yulia Romero and Matias Molina from Alchemy accompanied the group throughout, adding unique insight and local colour to every step of the journey.

From the vibrant streets of Buenos Aires to the breathtaking landscapes of Cafayate and the lemon heartlands of Tucumán, the tour combined technical site visits with cultural exploration, gastronomic delights, and unforgettable human encounters. Whether smelling freshly pressed lemon essential oil, observing innovative production lines, discussing sustainability strategies, or enjoying an informal conversation over a glass of Malbec wine, delegates experienced first-hand the richness and complexity of Argentina's contribution to the global citrus industry.

The Study Tour was not just about learning; it was about connecting. It demonstrated once again that while essential oils are at the heart of IFEAT, it is the people – their passion, knowledge, and collaboration – that are the real essence of this unique community.

Let's dive into the reasons that brought the 2025 IFEAT Study Tour to Argentina.

All photos by Nicolas Perondi, except where noted.

ARGENTINA STUDY TOUR 2025

Day 1 Buenos Aires
Arrival at Buenos Aires Ezeiza International or Jorge Newberry International Airport
Transfer to Sofitel Recoleta Hotel
Briefing at the hotel
Welcome Cocktail Dinner

Day 2 Buenos Aires/Salta
Transfer to Jorge Newberry International Airport
Flight to Salta
Check into Brizo Salta Hotel

Day 3 Salta / Cafayate
Transfer to Cafayate
Check into Grace Cafayate Hotel
Essential Oils Workshop

Day 4 Cafayate / Tucumán
Transfer to Tucumàn
Citromax S.A.C.I. Visit
Check into Hilton Garden Inn

Day 5 Tucumán
Vicente Trapani Visit
F.G.F. Trapani Visit

Day 6 Tucumán
San Miguel Visit
COTA S.A. Visit

Day 7 Tucumán/ Buenos Aires
Citrusvil S.A. Visit
Transfer to Aeropuerto Internacional Teniente Benjamin Matienzo

Day 8 Buenos Aires
Transfer to Buenos Aires Ezeiza International Airport or Jorge Newberry International Airport

Argentina's citrus industry

Argentina, and particularly its northwestern region, is widely recognised as a global reference point in lemon production. With over 1.78 million tonnes produced annually (as of 2024), the country has developed a citrus sector that combines impressive scale, operational efficiency, and a relentless focus on quality. From this extraordinary fruit, nothing goes to waste: the essential oil contained in the tiny sacs within the peel, the refreshing juice stored in the inner pulp, and even the exhausted peel – every component is carefully valorised through a highly industrialised process.

Approximately 80% of Argentina's lemon production is concentrated in the province of Tucumán, a region where the climate, fertile soil, and modern infrastructure create ideal conditions for high-value citrus cultivation. It is here, amid the vibrant green groves, that Argentina's lemon industry thrives, forming a dynamic ecosystem that interlinks farming, research, industrial processing, and export activities.
The lemon cluster is not just an agricultural powerhouse; it is a vital economic engine for the region. Generating more than USD 500 million in annual exports, and supporting over 34,000 direct jobs and an additional 16,000 indirect jobs, the sector plays a critical role in the economic and social fabric of northwestern Argentina.

Tucumán alone is home to an impressive 40,000 hectares of lemon groves, which form part of a broader 50,000-hectare citrus production area across the northwest. Among Tucumán's major crops, lemon stands proudly as the fifth largest by cultivated area, following sugarcane (294,000 hectares), soybean (167,000 hectares), maize (90,000 hectares), and wheat (90,000 hectares).

Argentina's lemon value chain is highly vertically integrated and exceptionally industrialised, resulting in significant annual production of:

Essential oils: ~9,000 tonnes
Juice: ~80,000 tonnes
Dehydrated peel: ~68,000 tonnes

Within these three major product categories, several sub-products are generated. In the essential oil segment, not only the cold pressed essential oil is obtained, but also the essence oil, oil phase and water phase – valuable by-products derived from the juice concentration process.

For juice production, both single-strength and concentrated lemon juices are important outputs. Delegates had the opportunity to observe large-scale concentration units in operation during factory visits. Other by-products, including pulp, cells, and seeds, are also systematically recovered and commercialised, maximising value extraction from each processed fruit.

Argentina's lemon products are primarily destined for international markets, with an export rate of approximately 96% for essential oils, 90% for juice, and 100% for dehydrated peel. Major export destinations include the European Union, the United States, China, Mexico, and Israel. Interestingly, fresh fruit accounts for only about 11% of Argentina's total lemon production, with primary export markets being the USA (55%), the EU (22%), and Russia (13%).

This clear industrial focus – with approximately 85% of lemons destined for industrial transformation and only 15% allocated to the fresh fruit market – sets Argentina apart on the global stage. While other countries may prioritise fresh fruit exports, Argentina has developed a model centred on high-value, processed citrus derivatives, positioning itself as the world's leading exporter of lemon by-products.

The success of this sector is no coincidence; it is the result of long-term investments in technology, rigorous phytosanitary standards, and a strong commitment to sustainability and innovation. National organisations such as SENASA (Servicio Nacional de Sanidad y Calidad Agroalimentaria), ACNOA (Asociación Citrícola del Noroeste Argentino), and AFINOA (Asociación Fitosanitaria del Noroeste Argentino) work tirelessly to ensure the health of crops, the certification of plant material, and compliance with stringent international market requirements.

Photograph by Martina Raymo

The structural backbone supporting Argentina's citrus industry is both solid and visionary. A critical element of this success lies in the strict control of the propagation process: only certified nurseries are authorised to supply seeds and buds (*semillas y yemas*), thereby helping to prevent the introduction and spread of citrus diseases. Once producers' needs are assessed through structured planning, new trees are planted based on careful varietal selection and quantity planning – an exemplary model of a coordinated supply chain operating with a shared vision of efficiency, biosecurity, and long-term resilience.

The history of Argentina's lemon processing industry dates back to the 1960s, a period marked by visionary entrepreneurs who foresaw the potential of an integrated approach to citrus valorisation. Over the decades, the sector has steadily grown, refining techniques, expanding plantations, and conquering international markets. Some of the companies visited during the Study Tour are among the oldest and most respected players in the industry, while others represent the new generation of innovators, bringing fresh energy, advanced technologies, and a modern vision for the future.

Today, Argentina's lemon industry stands as a true model of resilience, sustainability, and excellence – qualities that were visible at every step of the Study Tour and that continue to inspire citrus professionals around the world.

Rootstocks and scions:

The main rootstocks present (the lower part of the tree, which forms the root system and the very base of the trunk) are Flying Dragon, Cleopatra and 79 AC. Scion varieties (the upper part of the tree, which is grafted onto the rootstock and determines the type of lemon) are chiefly Eureka, Genova and Lisboa.

Process insights:

The process commonly adopted by the companies visited generally follows these key steps:

First, the reception of the fruit – either coming directly from their own packing houses or delivered by trucks. This initial stage is crucial, as it marks the beginning of the traceability system, along with the sampling of fruit for quality control purposes.

After unloading, the leaves are removed – often by allowing them to fall naturally – followed by a washing phase. At this point, visually defective fruits are manually sorted out. In many cases, optical sorters are also used to classify the lemons by size.

Once the lemons are calibrated, they move on to the oil recovery phase. Different types of extractors were observed, primarily brown oil extractors and "pelatrice" machines. After the essential oil is extracted, the fruit proceeds to the juice extraction unit, where the second major product is recovered. Here too, different technologies are in use depending on the facility. In some cases the two products are recovered together using the FMC in-line system.

The oil processing line typically follows a standard path: filtration, two or three stages of centrifugation, and finally storage in drums. The juice line, on the other hand, includes filtration and the further steps depend if the final product is concentrated or NFC (not-from-concentrate) juice. Various post-processing technologies were observed across the companies, including vacuum filters for oil, concentration units, and hydrocyclones for pulp separation. Particularly remarkable was the technology used for the production of exhausted peel, which must undergo several stages of washing and dehydration to meet quality standards.

Company visits

Over the course of seven days, the group followed an intense yet inspiring itinerary, uncovering the many layers of Argentina's vibrant citrus world. From state-of-the-art nurseries and extensive lemon groves to cutting-edge processing plants and pioneering research institutes, each stop provided delegates with a deeper understanding of how the Argentine lemon industry operates – and continues to evolve – across the entire value chain.

Each company visit offered not merely a technical presentation or a guided tour, but a genuine and heartfelt exchange of ideas, experiences, and visions for the future. Delegates were warmly welcomed by producers, technicians, and researchers who generously opened their doors – and their minds – to share insights into their operations, their strategic approaches, and the challenges and opportunities they encounter in a rapidly changing global market.

Throughout the tour, the group was graciously hosted by an impressive list of companies and institutions: **Grupo Saporiti, Litoral Citrus S.A., Fueguia 1833, Citromax Group, Estación Experimental Agroindustrial Obispo Colombres, Vicente Trapani S.A., FGF Trapani S.A., Fundación Miguel Lillo, Citrusvil S.A., COTA Ltda.,** and **San Miguel Global**. Each visit added a unique piece to the intricate mosaic of Argentina's citrus excellence.

Although the lemon processing season had only just begun – typically running from late March to early September – the factories and orchards were already in full motion, preparing for peak activity. The agricultural calendar in Tucumán is meticulously organised and intensive: harvesting generally starts in March, followed by spraying activities scheduled for September (when the harvesting is over). Pruning operations are carried out immediately after, and irrigation extends from July through December, with adjustments made depending on annual rainfall and specific climatic conditions. Delegates quickly realised that while the agricultural and industrial processes are broadly similar across companies, each business has carved its own path, developing specific strengths, innovative practices and strategic differentiators, making every visit a fresh and valuable learning experience.

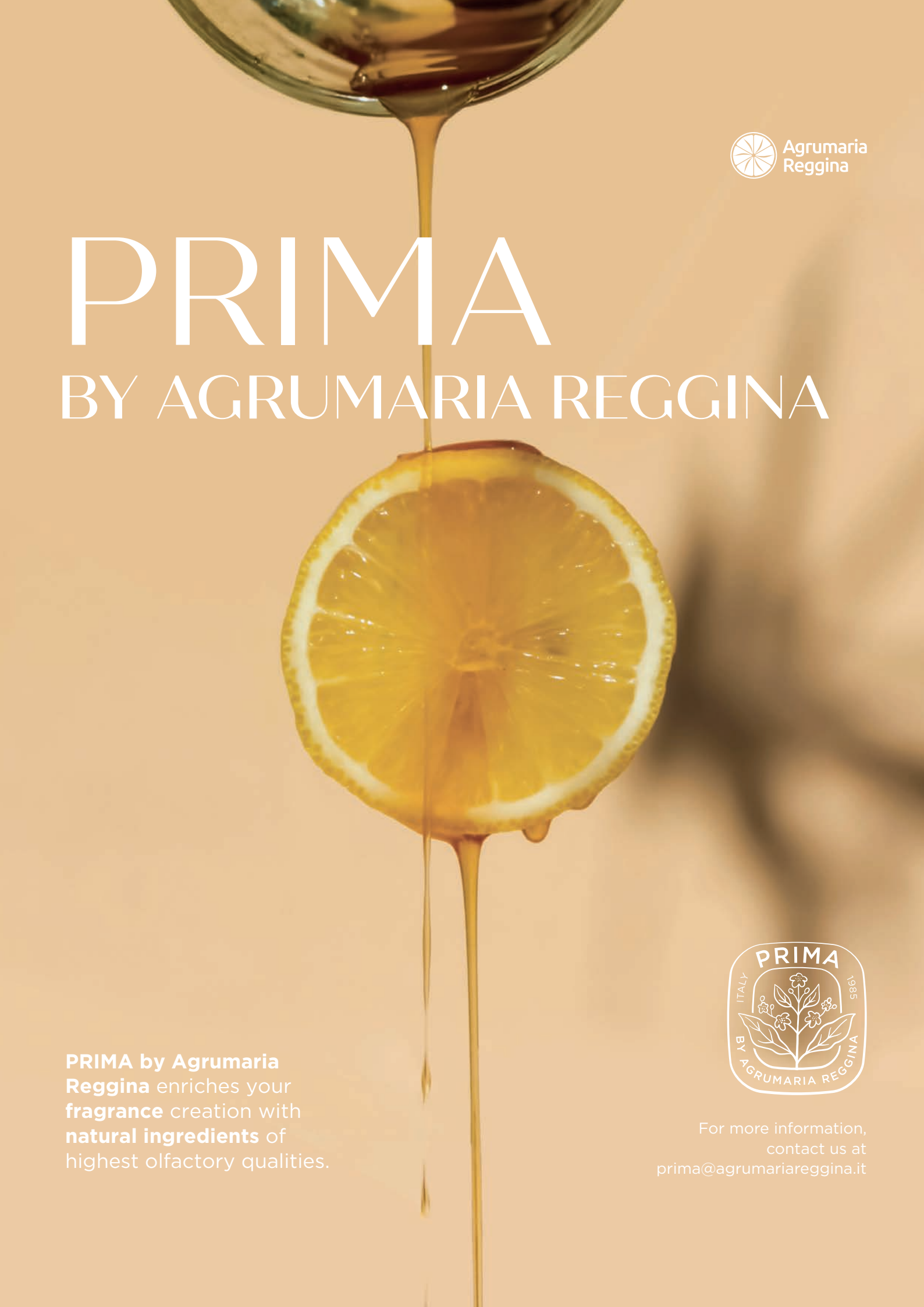
Throughout the tour, delegates had the opportunity to observe the entire production cycle first-hand: from the delicate early stages of grafting and nursery management,

through to orchard cultivation practices, efficient packing house operations, and the processing step where lemons are transformed into essential oils, juices, and dehydrated peels. Different types of extractors for oil recovery were showcased, illustrating the technical expertise behind this delicate process. In the final stages, delegates followed the meticulous processing of exhausted peel into dehydrated material destined for global markets – a true testament to the industry's zero-waste philosophy.

Beyond the citrus fields and processing facilities, the group also explored other vital facets of Argentina's fragrance and flavour landscape. During a visit to a prestigious flavour house, delegates delved into the intricate art of blending citrus oils into complex flavour compositions destined for food and beverage applications. They also visited a renowned perfumery house, where they experienced the final application of raw citrus essential oils into fragrance creations, witnessing the critical role that natural ingredients play in perfumery at the highest level.

In addition to the company visits, one afternoon was dedicated to a vibrant and highly informative **Essential Oil Workshop**, offering a broader perspective on Argentina's natural extracts. Several producers – including some not yet affiliated with IFEAT – showcased their products, presenting a diverse array of essential oils sourced from Argentina's rich botanical diversity. This unique opportunity allowed delegates to appreciate the breadth and depth of the country's natural aromatic resources beyond citrus, highlighting the innovation and entrepreneurship flourishing within the sector.

Finally, two academic visits provided critical context and historical depth to the technical experiences. At the **Fundación Miguel Lillo**, delegates explored an extraordinary botanical library, featuring rare works that chronicle Argentina's rich botanical history. Meanwhile, at the **Estación Experimental Agroindustrial Obispo Colombres (EEAOC)**, they learned about the decades of agronomic research that underpin the success of Argentina's lemon industry. These visits made it abundantly clear that behind every drop of essential oil, and behind every lemon processed, there is an entire world of science, dedication, and continuous innovation working quietly but powerfully to sustain excellence.



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Day One – The tour begins

The Argentina Study Tour officially began on the afternoon of 6th April, with a briefing session held at the elegant Sofitel Hotel in Buenos Aires. This gathering served as the true ice-breaker for the group: an opportunity for delegates to meet, align expectations, and feel the excitement of the journey ahead. As conversations sparked and smiles were exchanged, it became evident that a strong sense of camaraderie would soon unite the group – a bond that would only grow deeper over the days to come.

The first evening culminated in a Welcome Dinner at a cozy restaurant in Buenos Aires. Over fine cuisine and lively discussions, delegates began to truly connect with one another, laying the foundations for lasting professional and personal relationships. The dinner, generously sponsored by San Miguel, was further enriched by the presence of several members of the company's leadership team, including their CEO, setting a warm and welcoming tone for the entire tour.

Day Two – Buenos Aires: Innovation, flavour, and fragrance

Grupo Saporiti

The first official day of visits began with a tour of **Grupo Saporiti**, a family-owned flavour house founded in 1927, and today a leading player in Latin America's food and beverage industry. Saporiti is renowned for its expertise in developing flavours, colours, and nutritional solutions tailored to diverse markets. Delegates were warmly welcomed by the full management team – including the CEO and heads of each department – at their state-of-the-art R&D and production facility, a testament to the company's unwavering commitment to innovation and excellence.

The visit opened with an introductory session, where each department leader presented their role and shared insights into Saporiti's operations. The IFEAT group was then divided into two smaller teams, each properly equipped with protective clothing – a practice that would become standard across all company visits – and embarked on a rotating tour of the laboratory and production areas.

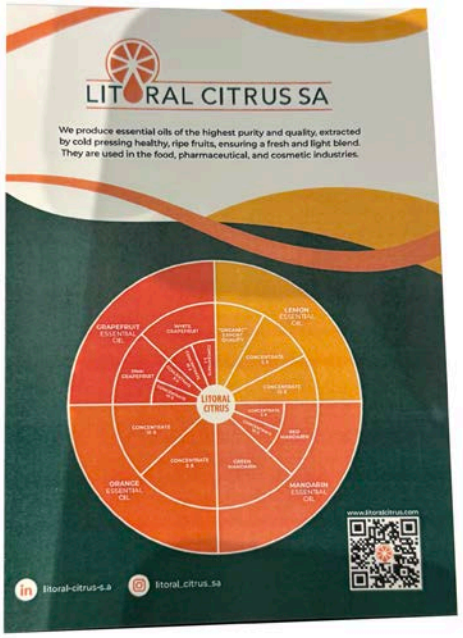
In the laboratory, the head of the R&D team provided a fascinating overview of Saporiti's approach to citrus-based flavours. Delegates learned about the sourcing of essential oils and the art of integrating them into flavour formulations for diverse consumer applications. A particular highlight was the tasting session of orange-flavoured candies, offering delegates a tangible example of how citrus oils are skillfully incorporated into final products.

During the production tour, delegates observed an innovative facility layout, including elevated tanks and rigorously controlled environments designed to ensure hygiene, precision, and operational efficiency. Throughout the visit, it became clear that Saporiti's mission transcends mere product development; every project is driven by a broader philosophy aimed at contributing to a healthier world through better food, shared success, and continuous improvement.

Litoral Citrus S.A.

After leaving Saporiti, the group boarded the coach once more and travelled to their second visit of the day: Litoral Citrus, a family-owned Argentine company specialising in citrus processing since 1977. The delegates were welcomed at a hotel conference room, where round tables had been thoughtfully arranged to encourage open dialogue and foster a personal, engaging atmosphere.

Two of Litoral Citrus' executive directors led a dynamic presentation, offering delegates insights into the company's operations, strategies, and vision for the future. Lunch, kindly sponsored by them, provided a relaxed setting for further conversations, allowing participants to delve deeper into technical topics and share perspectives.



Litoral Citrus' operational structure is a key factor in its success: four strategically located production plants – each situated close to corresponding orchards – ensure optimal logistics, product quality, and resilience against climate risks. Each facility specialises in a particular citrus type.

A leader in sustainable practices, Litoral Citrus also champions organic farming methods. Today, 70% of its essential oils and terpenes are exported to major international markets including Europe, the United States, China, and Oceania. Their expertise in processing and refining citrus oils into premium products is a cornerstone of their reputation.

Fueguia 1833

The afternoon concluded with a magical visit to **Fueguia 1833**, a visionary perfume house founded by Julian Bedel in 2010 in Buenos Aires, with its headquarters now located in Milan. Delegates, divided into three groups, were welcomed into the brand's exquisite atelier, located conveniently across from the hotel.

Entering Fueguia's space was like stepping into another world; dim, ambient lighting created an intimate and inspiring atmosphere, while elegant wooden tables displayed rows of beautifully crafted bottles. Delegates were invited to explore the fragrances – both in their final compositions and in their absolute forms – categorised into olfactory families such as floral, chypre, woody, and citrus. Each section evoked distinct emotions, memories, and landscapes, making the experience profoundly sensory and moving.

The visit not only showcased the final application of citrus essential oils in fine perfumery but also illustrated Fueguia's philosophy: the fusion of scientific research and artistic exploration to create sustainable, deeply personal fragrances inspired by South America's landscapes, culture, and indigenous botanical heritage. It was clear that for Fueguia, fragrance is more than a product – it is a journey through nature, memory, and emotion.

Once the visit was over, the group returned to the bus and headed for the airport. From Buenos Aires, they flew up to Salta. This flight marked the first delay of the week, but it was handled perfectly by the team leaders. Once in Salta, the participants went straight to the dinner venue – fancy restaurant with an astonishing view of the city. Dinner was delightful, and the restaurant staff welcomed each delegate with an empanada. Everything concluded with a dessert that sweet-toothed guests won't soon forget.

Day Three – From Salta to Cafayate: Essential oils workshop

The next morning, the group departed early from their hotel in Salta, embarking on a memorable four-hour bus journey to El Cafayate. Along the way, the landscape changed dramatically – from barren desert plains to dramatic canyons, cactus-studded plateaus, and finally to lush vineyards.

This scenic route, the only road linking Salta to El Cafayate, meandered through tobacco fields and various agricultural lands. A special stop was made at a breathtaking canyon, where delegates marvelled at towering red rock formations set against an endless, cloudless blue sky.

Upon arrival in Cafayate, lunch was served at a charming wine resort, where delegates had the chance to sample the region's famed hospitality, wines, and culinary delights. The afternoon shifted focus back to essential oils, with a highly anticipated **Essential Oil Workshop** and coffee break sponsored by **Berjé**.

Several small-scale producers – some not yet IFEAT members – presented their unique oils, sharing heartfelt stories of their deep connection to the land. The workshop opened with a thought-provoking presentation by Alain Frix on the topic of sustainability, setting an inspiring tone for the afternoon. Following this, an overview on Argentina's biodiversity let the audience understand the uniqueness of this and, boasting 13 of the 15 globally recognised climates, and more than 10,000 species, ranks it in the top 10 for plant biodiversity.

The producers that presented were:

Jucofer – a concentrated citrus juice and essential oil factory located in Entre Ríos. They operate as a cooperative of 232 citrus growers, who supply the raw materials.

Argenmilla – a company specialised in chamomile production, the company cultivates approximately 1,500 hectares of its own plantations in the Pergamino area, Buenos Aires province, yielding around 1,000 tonnes of dried chamomile annually.

Heffer Oil – a company based in Chaco, specialising in the production of Palo Santo essential oil (guaiac wood oil) from the *Bulnesia sarmientoi* species. It is the only company in the country producing this unique oil, which is obtained exclusively from waste generated by the forestry industry, ensuring the full utilisation of this natural resource.

Hierbas Patagónicas – founded in 1997, the company is focused on producing and marketing natural and pure essential oils, obtained by steam distillation of native and cultivated plants that are typical of the Patagonian landscape.

Grupo Henn – a company located in Misiones, initially focused on essential oils before expanding into pine resins and derivatives. They are top exporter of gum rosin and gum turpentine.

CItratus Argentina S.R.L. – with more than 17 years in the market, this company is dedicated to the development, distribution and marketing of fragrances for various industries. Its products reach customers in Argentina, Colombia, Mexico, Paraguay and Uruguay.

Citrolim/Berjé – Peru – a company, founded in 1971, based in Peru. It is specialised in lime production and processing, providing the market with lime essential oil, juice and exhausted peel.

All of these companies showcased a remarkable diversity of natural extracts, highlighting the richness and potential of Argentina's and South America's botanical heritage.
The event concluded with live product demonstrations, allowing delegates to directly experience the scents, textures, and craftsmanship behind each essential oil.

Thanks to the warm temperatures, the delegates enjoyed the first part of the evening outdoors on a terrace, where a convivial atmosphere immediately blossomed. Later, as the evening progressed, everyone gathered at the tables indoors to continue the lively conversations in a more intimate and cozy setting.

Day Four – Journey to Tucumán and visit to Citromax Group

With an early wake-up call, the group departed from the hotel in El Cafayate and headed towards the Tucumán region for the first processing unit visit of the tour.

Along the way, the journey itself became part of the experience; the road climbed to the highest elevations of the week, winding through dense forests and offering glimpses of local life, including a stop at a charming farm where cows grazed peacefully against a backdrop of rolling hills.

Lunch was served in Tafí del Valle, where a square table arrangement facing a projector screen awaited the group. This has been the perfect occasion for the citrus association of NorthWest Argentina, ACNOA, to deliver a concise briefing on Argentina's lemon industry.

Delegates learned key figures regarding total lemon production, the division between fresh-market and processing volumes, and current trends in oil and juice pricing – an ideal primer for the factory tours ahead. This session served to equip participants with critical insights that would greatly enrich their understanding during the upcoming factory visits.

Citromax Group

The first factory visit in Tucumán was to Citromax Group, a company with over 60 years of expertise and a global reputation for excellence in lemon and blueberry production and processing.

Deeply committed to sustainability, innovation, and food safety, Citromax operates from the heart of Argentina's lemon belt, where its 12,000 acres of lemon groves benefit from a unique microclimate that fosters exceptional fruit quality.

Their vertically integrated production model ensures full control over the entire supply chain – from nursery cultivation through to industrial processing. Citromax specialises in a wide variety of lemon derivatives, including essential oils, juice, pulp, and dried peel, produced across both conventional and organic lines. Processing more than 225,000 tonnes of lemons annually, the company ranks as the third-largest lemon producer in Argentina.

During the visit to their processing facilities, delegates were able to witness first-hand the step-by-step transformation

of fresh lemons. The scale of operations was astonishing: watching the lemons move from sorting stations to the essential oil extraction units was a truly unforgettable experience.

The highly automated nature of the facility, with the strategic positioning of machinery designed to minimise handling and maximise product recovery efficiency, was particularly remarkable.

As one delegate put it: "Entering the facility and watching the lemons move through the machines to the essential oil extractors was a moment I will never forget – it made my heart beat a thousand times."

Citromax places a strong emphasis on environmental sustainability across all operations. The company operates a sophisticated water treatment plant that recycles and purifies wastewater, ensuring that no contaminants are released into the local environment.

The visit not only demonstrated the technical excellence of Citromax but also reinforced key themes that would resonate throughout the tour: innovation, sustainability, vertical integration, and the human passion behind every drop of oil and every kilo of lemon juice produced.

The company also sponsored the dinner in Tucumán, at the Hilton Garden Hotel where the delegates stayed for the next three days.

Day Five – A deep dive into research, tradition, and innovation

Estación Experimental Agroindustrial Obispo Colombres (EEAOC)

The fifth day began with a visit to the **Estación Experimental Agroindustrial Obispo Colombres (EEAOC)**, founded in 1909. This government institution, managed by the private sector, plays a pivotal role in Argentina's agricultural sector, particularly in citrus research.

As a key player supporting the citrus industry, the EEAOC continuously conducts studies to enhance both agricultural and industrial efficiency, aiming to strengthen the entire citrus supply chain.

The institute operates a **Citrus Health Centre**, where it provides certified buds and seeds, and maintains a sanitary quarantine facility for the introduction of foreign germplasm.

On the industrial side, EEAOC shapes research programmes that help companies optimise their production processes, keeping pace with technological advancements, regulatory requirements, and raw material developments.

Vicente Trapani S.A.

After the early-morning visit, the group moved on to their second stop of the day: Vicente Trapani S.A., a family-owned company with a proud history spanning over 60 years.

Today, Vicente Trapani manages 1,300 hectares of lemon orchards, which fully supply their integrated industrial operations and support a dedicated workforce of more than 200 collaborators.

Delegates were warmly welcomed by three family members, proudly representing the second and third generations. The group was welcomed by the company's president, a member of the second generation, while two cousins representing the third generation of the family accompanied the delegates during the visit – one guiding the tour of the nursery and packing house, the other leading the visit to the processing facility. The visit began with a detailed and engaging presentation that outlined the company's production volumes, processing flow, portfolio of end products, and – most notably – a heartfelt and forward-thinking focus on sustainability.

It quickly became evident that Vicente Trapani's strategic energy is firmly oriented toward reducing the environmental impact of citrus cultivation and processing. What made the presentation even more inspiring was that all of the information – covering sustainability initiatives, target definitions, and updated environmental strategies – was passionately delivered by a young woman, the sustainable leader of the company, who succeeded in conveying the company's deep commitment to a greener future. Her authentic, knowledgeable, and vibrant style impressed the delegates.

Following the presentation, the group was divided into two smaller groups to embark on a comprehensive technical tour.

The visit included three critical areas of the company's operations:

- **Nursery Unit:** where grafting techniques and tree turnover are meticulously managed. Delegates had the opportunity to observe the grafting process.

- **Packing House:** where fresh lemons are cleaned, sorted, graded, and carefully packed for the domestic and international fresh fruit markets. Delegates noted the company's use of automated lines designed to maximise product consistency and quality, while minimising manual handling.

- **Industrial Processing Unit:** where lemons are transformed into essential oils, juices, and dehydrated peel products. Inside the facility, delegates could clearly sense the care and precision taken to explain each phase of the transformation process – from initial fruit reception through oil recovery, juice concentration, and final product standardisation.

Throughout the visit, the openness, willingness to share knowledge, and transparent communication were deeply appreciated by all participants. Vicente Trapani's ability to patiently and thoroughly explain each intricate detail of the vertically integrated lemon world left a strong and lasting impression. The company's philosophy – that transparency and education are fundamental pillars for building trust and excellence – was visible at every stage of the tour.

In closing, delegates left the visit with a profound respect for Vicente Trapani's blend of tradition, innovation, environmental responsibility, and human warmth – a living testament to how family values and industrial leadership can successfully coexist.

FGF Trapani S.A.

The third and final stop of the day was at FGF Trapani S.A., a distinguished family-owned company specialising in citrus cultivation and processing, proudly carrying a legacy of excellence across four generations. Founded in 2002, FGF stands for the initials of the founder's three children, symbolising the deep family roots and the vision of continuity that drives its operations.

Upon arrival, the atmosphere was truly overwhelming in its warmth and authenticity – all family members, together with key employees, lined up to personally greet each delegate with a handshake, offering a heartfelt welcome that immediately set the tone for the visit.

This gesture, simple yet profoundly meaningful, perfectly embodied the company's philosophy – strong human relationships are at the heart of enduring business success.

During the welcoming lunch, the president of FGF Trapani delivered an emotional speech that touched every participant. Expressing his deep attachment to the company, his unwavering commitment to continuous improvement, and his immense love for his land, he emphasised how family values – dedication, perseverance, and respect for nature – form the solid foundation behind FGF Trapani's achievements and future ambitions.

FGF Trapani specialises in the cultivation, industrialisation, and commercialisation of citrus derivatives for multiple industries, including food and beverage, cosmetics, fragrances, and health. Its product portfolio is built around lemon, orange, and grapefruit crops, cultivated primarily in Northwest Argentina under optimal agro-climatic conditions. The company's modern industrial facility in Tucumán processes over 100,000 tonnes of fruit per year, transforming raw materials into high-quality essential oils, juices, dehydrated peels, and other by-products destined for both domestic and international markets. Its operational excellence is supported by cutting-edge equipment, rigorous quality control protocols, and a sustainability-driven production philosophy that aims to minimise environmental impact throughout the entire supply chain.

Notably, FGF Trapani is expanding its footprint beyond Argentina. The company is developing new citrus plantations in Lambayeque-Olmos, Peru, an area recognised for its rich agricultural potential and optimal climate for organic farming. The factory visit was meticulously organised in smaller groups, allowing delegates to experience the entire production journey – from the reception of freshly harvested fruits to the delicate processes of essential oil extraction, juice production, drying of peel, and recovery of secondary by-products. Delegates appreciated the high level of technical precision at every stage, from initial washing and grading, through to mechanical extraction, centrifugation, and specialised dehydration systems designed to preserve the integrity and purity of each product.

It was evident that at FGF Trapani, tradition and innovation coexist harmoniously – a testament to the company's belief that staying true to one's roots is the best way to grow into the future.

The day continued with a memorable dinner **sponsored by Vicente Trapani S.A.**, offering delegates and company members the chance to deepen their conversations and enjoy a relaxed atmosphere after an intense and inspiring day.

Day Six – Fundación Miguel Lillo, Citrusvil S.A., and COTA Ltda.: Science, sustainability, and hands-on experience

Fundación Miguel Lillo

The third day in the Tucumán area began with a visit to the **Fundación Miguel Lillo**, a public institution administratively dependent on the Ministry of Human Capital of the Republic of Argentina. The foundation's core mission is to advance scientific research on the country's flora, fauna, and geology, promote the conservation of natural resources and biodiversity, and disseminate knowledge for the benefit of society. Its vision is to be a leading institution in biodiversity research and conservation, serving as a reference for the scientific community and a support framework for sustainable development.

In this context, the Fundación conducts important research on the bioprospection of underutilised native aromatic plants with commercial potential. Its studies focus on the characterisation of major and minor components, assessing variability linked to genotype-environment interactions, and evaluating selected biological activities.

Delegates were deeply impressed by the vast amount of information available in the Fundación's library and by the dedication of the research team, who work tirelessly to create value around Argentina's spontaneous species.

One of the delegates expressed his astonishment upon discovering the impressive seven-book collection – the first comprehensive botanical classification where all botanical species of Argentina are meticulously represented and categorised.

He emphasised how rare it is to encounter such a monumental scientific work and praised the dedication required to catalogue the country's entire plant biodiversity with such detail and precision.

Citrusvil S.A.

After this inspiring visit, the group headed to **Citrusvil S.A.**, where both the second and third generations of the founding family warmly welcomed them. Founded over 60 years ago, Citrusvil is a professional, family-run company widely recognised for its unwavering commitment to sustainable agriculture and environmental stewardship. Delegates were received at the San Rafael Orchard, a site selected specifically to showcase Citrusvil's innovative practices aimed at preserving natural resources for future generations. Among its many assets, San Rafael Orchard stands out as a model of modern agronomy: 871 hectares dedicated not only to responsible lemon production but also to the conservation of native forests, creating a unique balance between productive agriculture and ecosystem protection.

In 2021, the orchard's excellence was recognised with the prestigious **Agricultural Excellence Award**, further cementing Citrusvil's position as a leader in sustainable farming models. The award acknowledged the company's holistic approach – combining technical innovation, community engagement, and long-term environmental planning – to create a blueprint for future agricultural enterprises.

The visit was divided into two parts. First, a detailed overview of the company's operations was presented. They manage an extensive network of 7,875 hectares of lemon plantations across 22 production units, all strategically located throughout Tucumán, leveraging optimal agro-climatic conditions that support both high yields and superior fruit quality. Their two state-of-the-art processing plants, with a combined capacity of 350,000 tonnes per year, ensure efficiency, traceability, and flexibility in meeting international market demands.

From nursery seedling production – where new trees are propagated under strict phytosanitary controls – to large-scale industrial processing, every step of the chain was carefully explained to the delegates. Special emphasis was placed on the integration of precision agriculture technologies that enable the optimisation of the resource use and respond proactively to climate variability. At the core of Citrusvil's philosophy lies a strong dedication to sustainability. The company has embraced a zero-effluent policy, underpinned by an innovative circular economy system. This comprehensive environmental management framework reflects Citrusvil's profound commitment to balancing productivity, profitability, and planetary health – placing equal value on the economic, ecological, and social dimensions of agricultural development.

The second part of the visit involved a guided tour through the orchards. Delegates, transported in pickup trucks across the rolling landscape, had the chance to witness the lemon harvest in full swing – observing the careful manual picking, initial quality controls, and the logistics chain that swiftly moves the fruit towards processing.

At the top of a scenic hill, delegates paused to take in a breathtaking panoramic view over the vast lemon plantations, stretching out in green waves toward the distant mountains. It was a powerful visual reminder of the scale, complexity, and beauty of citrus cultivation in Argentina's heartland. Beyond the stunning vista, the moment also offered a deeper understanding of the sophisticated agronomic studies and techniques behind these orchards.

Delegates learned that the San Rafael Orchard operates without a conventional irrigation system. Instead, it relies entirely on rainwater collection, using a smart land design where water is captured in centralised reservoirs and distributed naturally across the fields through subtle land smoothing and leveling, guiding the flow of water directly towards each tree. To further enhance water retention and soil stability, a specific variety of vetiver grass has been

strategically planted between orchard rows. This deep-rooted species helps anchor the soil, reduce erosion, and retain moisture longer, creating a natural buffer that maximises the orchard's resilience to drought conditions.

Through these innovative and eco-conscious practices, Citrusvil showcases how traditional farming can be harmonised with cutting-edge sustainable land management – ensuring both productivity and the preservation of natural resources for future generations. A symbolic moment marked the conclusion of the orchard tour; three delegates were invited to plant their own native species trees, leaving a living, growing testimony of their connection to Citrusvil's vision for a sustainable future.

The visit concluded with a delightful buffet lunch, held under the shade of century-old trees. Delegates enjoyed a relaxed and convivial atmosphere, sharing impressions, asking further technical questions, and engaging in deeper conversations with the Citrusvil team. It was a fitting end to a visit that perfectly embodied the themes of innovation, sustainability, and shared passion for agriculture that had resonated throughout the Study Tour.

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COTA Ltda.

The third stop of the day was **COTA Ltda.**, where several members of this unique cooperative, managed with a family-style approach, warmly welcomed the group. The founders of the cooperative were of Spanish origin, and members of the third generation of some of the original associates were present to introduce the company and share its fascinating history – over 60 years of dedication to citrus excellence and innovation. Today, the cooperative counts around 50 associates.

The visit was organised into three main parts, with delegates divided into smaller groups to allow for a more personal and in-depth experience.

One stop was the production area, where delegates toured the company's processing facilities. COTA processes approximately 70,000 tonnes of lemons per season, producing essential oil, concentrated juice, and dehydrated peel – all destined for major international markets, particularly in Europe and North America. The facility combines traditional know-how with modern technology, ensuring high product quality while optimising efficiency and sustainability.

Another part of the visit took place in the nursery, where the life journey of a lemon tree begins. Starting from certified seeds selected for strong rootstocks, the seedlings are carefully planted and evaluated after six months. Only the healthiest specimens continue to the grafting stage, where certified buds are selected for the scion – ensuring varietal purity and disease resistance.

The full process, from seed to transplant-ready tree, takes approximately two years, reflecting a commitment to patience, precision, and long-term quality in orchard development.

The final part of the visit was an engaging Q&A session with two company members, who enthusiastically shared COTA's remarkable story – dating back to 1961 – and highlighted its unique position as the only citrus cooperative in Argentina's history. This cooperative structure fosters strong community values, transparency, and shared responsibility among growers and stakeholders, distinguishing COTA from many other privately held operations.

One of the most unforgettable experiences of the day was the grafting activity. Each delegate had the chance to graft their own lemon tree – a much more challenging and intricate task than it first appeared! Thanks to a small numbered tag attached to each tree, delegates will be able to track the growth and survival of their grafted trees over time. This hands-on experience offered a powerful, tangible lesson in traceability, genetic preservation, and the complexities of the citrus life cycle.

COTA's rare combination of tradition, innovation, and personal engagement left a profound and lasting impression on all delegates, highlighting once again the strong human values underpinning the Argentine citrus industry.

Team building and dinner

After completing the final company visit of the day, the group moved to the dinner location. Before entering, a lively team-building activity was organised to further strengthen the bonds among the delegates.

The activity had been initiated on the first day of the tour, when delegates had received a special team t-shirt along with other tour gifts. Throughout the week, teams had competed in friendly challenges, progressively building teamwork and camaraderie.

At first, many participants seemed a bit skeptical or unsure about the activity. However, as the event unfolded, it quickly turned into an incredible success – full of energy, laughter, creativity, and an unexpected spirit of healthy competition. By the end, it was clear that this spontaneous moment had brought the group even closer together, creating memories and friendships that would last well beyond the Study Tour.

The evening culminated with a delightful dinner, generously sponsored by COTA Group. It was a true celebration of Argentine tradition, featuring a classic *asado* (Argentinian meat dinner) that delighted all delegates. The warm atmosphere, the exceptional food, the excellent wine, and the lively conversations made it a perfect ending to an unforgettable day.

Day Seven – Final company visit and closing

San Miguel Global

The final company visit of the tour was to San Miguel Global, a world leader in value-added lemon processing, with a proud history spanning over 70 years. Founded in Argentina, San Miguel now operates across three continents, with production facilities not only in Tucumán but also in Uruguay and South Africa.

Delegates were warmly welcomed by members of the company team, who introduced San Miguel's impressive achievements and outlined its fully integrated business model. San Miguel today accounts for 16% of the global lemon processing market, serving more than 100 clients across 35 countries.

Their strength lies not only in their large-scale production capabilities but also in their strong, long-term partnerships, built on shared values, rigorous quality standards, and a profound respect for people, land, and the environment.

The visit began with the screening of a compelling corporate video, offering a clear and comprehensive overview of the company's entire production process – from fruit reception to essential oil extraction, juice concentration, and by-product valorisation. This visual presentation greatly helped delegates better understand the intricate sequence of processing steps and appreciate the precision behind each operation.

Special attention was given to San Miguel's virtuous wastewater treatment system, which not only treats industrial effluents to the highest environmental standards but also internally produces biogas – providing a significant portion of the plant's energy needs through renewable sources.

Throughout the visit, it became clear how San Miguel combines business excellence, environmental responsibility, and social impact into a unified, forward-looking strategy – making the company not only a market leader, but a true global benchmark for sustainable agricultural practices.

Final lunch and closing dinner

After completing the last company visit, the group gathered for their final lunch in Tucumán. The setting was an open-air venue, where the atmosphere was relaxed, warm, and filled with a sense of accomplishment. Delegates had the opportunity to thank the organisers and the local team for their outstanding commitment and support throughout the tour. During this moment, each delegate was also presented with a Certificate of Attendance; a symbolic recognition of their journey through Argentina's citrus world.

Adding a special touch to the afternoon, an incredible cultural performance was organised; a singer evoking the soul of Argentina through traditional tango songs, accompanied by a tango dancer and her partner, who filled the space with the timeless passion and energy of Buenos Aires.

Delegates fully immersed themselves in the moment, experiencing the passion and rhythm of real Argentinian tango in an interactive and unforgettable way. They then moved to the airport to fly back to Buenos Aires. Upon arrival there was just enough time for a short stop at the hotel before gathering one last time for the final dinner. It was clear that no one wanted to say goodbye. The bonds built over the week – through shared experiences, knowledge, challenges, and celebrations – had transformed a group of individuals from around the world into a community. This dinner was not just a farewell; it was a celebration of new friendships, professional collaborations, and memories that would last a lifetime.

Beyond citrus, towards the future

The Argentina Study Tour was an intense seven-day journey that took delegates across more than 3,000 kilometres, exploring the provinces of Buenos Aires, Salta, Cafayate, and Tucumán. With 50 participants representing 21 different nationalities, the group visited 11 leading companies, participated in technical workshops, cultural events, and team-building activities – creating a unique blend of professional development, learning, and unforgettable human experiences.

Throughout the journey, each company generously provided thoughtful gifts and samples, allowing delegates to experience first-hand the exceptional quality and diversity of Argentine lemon derivatives and natural extracts. Ponchos, *mate* cups, *mate* tea, *alfajores*, and many other local products were gifted to the delegates, adding a personal and cultural touch to the technical visits. From the very start of the tour participants were equipped with their official badges, tour programmes, backpacks, agendas, reusable water bottles, mosquito repellent, and – perhaps the most unforgettable accessory of all – a trusty umbrella that accompanied them faithfully across Argentina's varied landscapes.

The journey was enriched not only by the formal company visits but also by the many informal moments of knowledge sharing. During the longer coach journeys between cities and sites, several delegates delivered short yet insightful presentations on topics ranging from global citrus market trends to detailed comparisons between Argentine and international agricultural and industrial practices. These "bus lectures" became spontaneous forums for lively discussions, debates, and exchange of experiences, strengthening bonds among participants and deepening everyone's understanding of the broader citrus industry.

Beyond the professional insights, Argentina's rich culture and gastronomy captivated delegates at every turn. Throughout the journey, food became not only a moment of pleasure, but also a powerful way to connect with the country's identity. Delegates indulged in Argentina's world-famous cuisine, savouring prime cuts of beef, crispy empanadas, regional wines, and decadent desserts – each meal a celebration of the country's culinary heritage.

Once the group reached the province of Tucumán, the gastronomic experience became even more curated and authentic. A dedicated chef accompanied many of the lunches and dinners, carefully crafting menus that allowed delegates to discover a wide range of traditional dishes from across Argentina. Great care was taken to use fresh, locally sourced ingredients, ensuring that each meal told a story of regional diversity – from the Andes to the Pampas, and from the subtropical north to the southern plains.

Travelling through the country also meant travelling through its flavours. Wines from Mendoza and the Salta region were prominently featured, each carefully paired to complement local dishes. Delegates experienced not only Argentina's famous beef – sampled in a variety of cuts and preparations – but also had the chance to taste regional fish, seasonal vegetables, and traditional Andean recipes that reflected the cultural and environmental richness of each location. These culinary moments were not isolated; they were deeply connected to the landscapes, the people, and the stories behind them. Visits to historic vineyards, encounters with local farmers, and breathtaking sights like the Cafayate Canyons offered participants a complete and immersive experience of Argentina's vibrant spirit.

Before the official start of the tour, a guided visit to the city of Buenos Aires was organised, allowing delegates to feel the pulse of this extraordinary capital and to appreciate its dynamic energy and layered history.

Landmarks such as Casa Rosada, the Metropolitan Cathedral, Plaza de Mayo, the colourful neighbourhood of La Boca, the modern skyline of Puerto Madero, and the lively San Telmo Market were among the highlights of the tour – each stop offering insights into Argentina's rich cultural heritage and complex national identity.

IFEAT extends its heartfelt gratitude to all delegates for their enthusiasm, spirit of collaboration, and active participation. A special thanks goes to the host companies for their warm hospitality and openness, and to the Local Organising Committee – Sergio Dávalos and Andrés González – for their tireless efforts in ensuring every detail of the tour ran smoothly. The wider IFEAT team – John Nechupadom, Stephen Pisano, and Divya Sara Mammen – along with our expert guides Yulia Romero and Matías Molina from Alchemy, also deserve special acknowledgement for their dedication and professionalism.

Without the contribution, passion, and commitment of each participant, the Argentina Study Tour 2025 would not have been the extraordinary success that it was.

Participation in the Argentina Study Tour provided invaluable benchmarks, ideas, and inspirations. Observing the Argentine citrus industry's integrated approach – with its emphasis on efficiency, sustainability, and innovation – sparked new strategies and renewed commitments to excellence among delegates from all parts of the world. Yet beyond the technical knowledge gained, the tour served as a powerful reminder of what lies at the true heart of IFEAT – people. It is through sharing experiences, building friendships, and strengthening the bonds of our unique global community that we continue to grow stronger, together.

The spirit of AST 2025 can be captured in a simple yet profound phrase: "**Sharing is caring**".

As one delegate put it, "As we look toward future journeys, we carry with us not only expanded knowledge but also treasured memories, lasting friendships, deep gratitude, and a renewed passion for the work we do in the fascinating world of essential oils."

My Favourite: Java Citronella Oil

by **Robby Gunawan**

Java citronella oil, an essential oil renowned for its invigorating aroma and multifaceted applications, has long captured my admiration. This extraordinary oil is extracted from the leaves and stems of *Cymbopogon winterianus* – a species of citronella grass predominantly cultivated in Indonesia. It is far more than a pleasant fragrance – it's an emblem of sustainability, a functional tool in everyday life, and a fragrant connection to a deep-rooted history of trade and innovation.

Its rich historical legacy, combined with a contemporary resurgence in global markets, reinforces its indispensable role in both traditional practices and modern industries.

For me, Java citronella oil transcends its commercial value; it plays a meaningful part in the Indonesian home and wellness routines. Let us delve into its origins, its journey through economic turbulence, the richness of its olfactory profile, and its wide-ranging applications in both personal and industrial contexts.

A scent with a storied past

The story of Java citronella oil begins on the Indonesian island of Java, which gained prominence in the early 20th century as the global centre for citronella oil production. Prior to the Second World War, Indonesia stood at the forefront of the industry, exporting around 2,500 metric tonnes in the early 1940s. Java's climatic conditions and fertile soils proved ideal for the cultivation of citronella grass, and the oil's superior quality quickly earned it a revered status among perfumers and manufacturers worldwide.

Java citronella oil distinguished itself with its high concentration of key aromatic compounds. The citronellal content is significantly higher than the species from other origin, while the geraniol-citronellol combination is also relatively high. This combination gives a distinctive citrusy, fresh grassy with sweet floral undertone, setting it apart from varieties produced in other regions. The combination of potent scent, functional benefits, and consistent quality made it a sought-after commodity.

However, the industry faced significant setbacks in the early 2000s. Production plummeted to between 200 and 300 metric tonnes per annum. This drastic decline was largely due to the reduction of cultivated land, shifts in agricultural policy, and economic competition from other crops. Despite these challenges, cultivation survived in regions like West Java and Aceh, where local farmers maintained their traditional practices with resilience.

Over the past two decades, Java citronella oil has experienced a remarkable renaissance. Current annual production exceeds 1,000 metric tonnes, demonstrating the industry's ability to adapt and revitalise itself amid economic pressures and global market changes. The resurgence is more than just a success story for Indonesia – it's a reminder of the enduring value of quality craftsmanship and the agricultural wisdom passed through generations.

The rise of global competitors

As Indonesia reclaims its place in the global market, the citronella oil industry must now navigate heightened competition, particularly from China and Vietnam. These nations have rapidly scaled up their cultivation and processing capacities, using advanced technologies and agricultural techniques to boost output.

While the competition is fierce, Indonesia maintains a strategic edge – namely, the superior chemical composition and olfactory quality of its Java variety. With a higher concentration of citronellal, geraniol and citronellol, Java citronella oil is both aromatically richer and more effective

Robby Gunawan
CEO, Indesso Primatama and Member of the IFEAT Executive Committee

in applications such as insect repellents and perfumery. In a marketplace where synthetic alternatives and mass-produced varieties abound, Java citronella continues to hold its own as a premium, naturally derived product.

For Indonesian producers, the focus has shifted to maintaining high standards and promoting sustainability. Rather than pursuing volume alone, many are now investing in traceability, organic certification, and value-added processing to ensure their oil remains demanded on the world stage.

Why it has become my favourite

Beyond its international acclaim, Java citronella oil has become a personal favourite of mine for several compelling reasons. I first encountered it through a natural insect repellent I picked up while travelling, and its crisp, lemony scent immediately stood out. Since then, it has become a staple in my household – not only as a bug deterrent but also as a natural air freshener, cleaning agent, and occasional mood booster where citronella can be blended with other essential oils like cajeput, eucalyptus, lemongrass, lavender, and fennel.

What I love the most is its versatility. It has the ability to refresh, uplift, and purify, all while being gentle on the body and the environment. Its scent is vibrant yet not too overpowering, with a distinctive citrusy, green note and soft floral sweet undertone that lingers in the air just long enough to feel noticeable but not intrusive. It's one of those oils that seems to adapt to the context, whether you're looking for clarity or comfort. Citronella has been used extensively in the fragrance compositions of many personal care, homecare, and cleaning products, from hand body lotion to aromatherapy-based home fragrance, to surface cleaners.

The distinctive fragrance profile

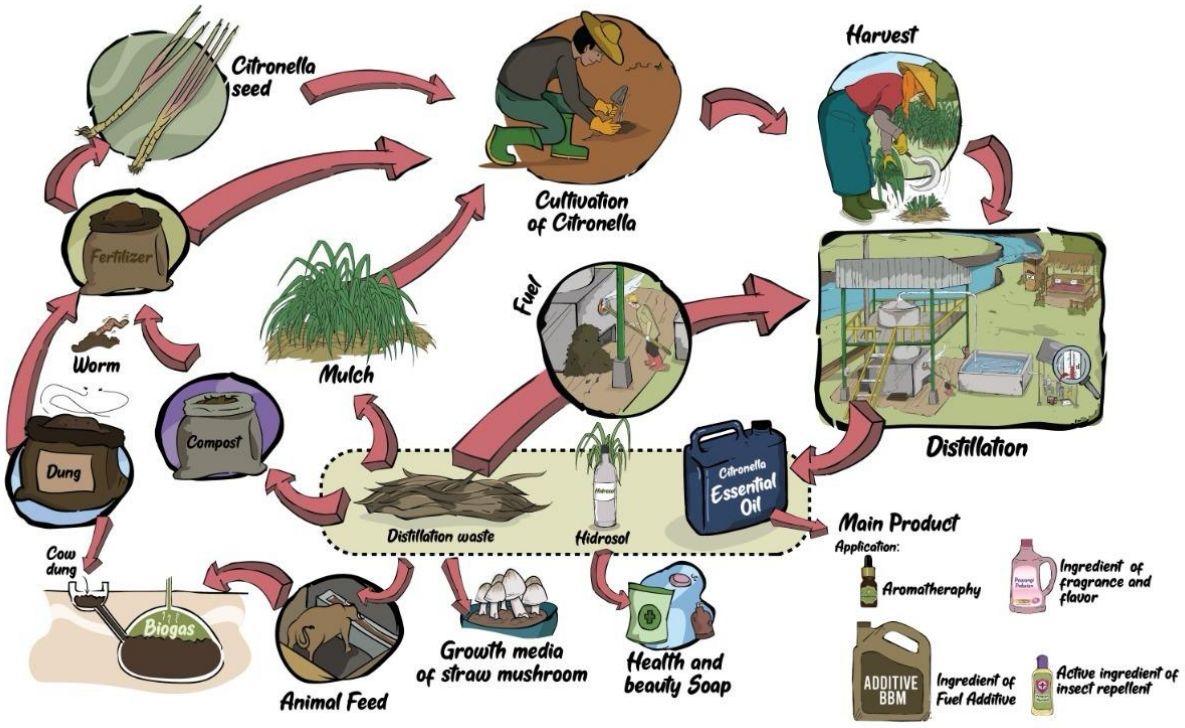
Java citronella oil's distinctiveness lies in its chemical composition, which gives it a complex and appealing fragrance. The primary constituents include:

- **Citronellal** – Known for its sharp, fresh, lemon-like aroma, this compound imparts the initial citrusy green grassy punch associated with citronella oil.
- **Geraniol** – A sweet, floral, rose-like note that softens the brightness of citronellal and adds depth.
- **Rhodinol** – A natural mix of geraniol and citronellol, giving a balanced, slightly green, and subtly sweet floral profile.

This trifecta of compounds makes Java citronella particularly suitable for aromatherapy and perfumery. It blends harmoniously with essential oils like lemongrass, lavender, tea tree, peppermint, cajeput, eucalyptus and fennel, making it a versatile base or accent note in fragrance compositions.

Aside from these three major components, another important component is d-limonene, which present at 3-5% level and together with citronellal gives the distinctive fresh, citrusy green top note character of the oil.

In perfumery, it's used not only for its inherent scent but also for its ability to mask unpleasant odours and add freshness to various formulations – from crisp colognes to oriental and floral accords. Even in household products, its scent feels refined rather than utilitarian.



Sustainability through circular practices

One of the most admirable aspects of Java citronella oil production is the possible integration of circular economy principles in the distillation process, as well as possibility to generate additional revenue from the biomass materials after distillation. Rather than creating waste, the industry has evolved to make the most of every by-product generated throughout the cultivation and extraction process.

After the essential oil is distilled from the plant matter, the spent biomass is not discarded. Instead, it is repurposed in several beneficial ways:

- **Distillation fuel** – Replacing firewood in the traditional distillation process.
- **Organic mulch** – Helping to retain soil moisture and suppress weeds in agricultural areas.
- **Cattle feed** – Nutrient-rich leftovers are fed to livestock, closing the loop between crop and animal farming.
- **Biogas generation** – Cow dung from fed livestock is used to produce biogas, creating a clean, renewable energy source.
- **Organic compost** – Some spent material is composted and returned to the soil, enhancing fertility and structure.
- **Biomass matrix** – Some spent material has been successfully used as part of biomass matrix for mushroom mycelium growth creating a new – and potentially very high-value – revenue stream for the citronella plantation.

These sustainable practices not only reduce environmental impact but also support rural livelihoods and energy independence. In this way, Java citronella farming exemplifies a harmonious balance between economic viability and ecological responsibility.

From fields to industry: broad applications

Java citronella oil is far more than just an aromatherapy staple. Its unique properties make it invaluable across multiple sectors, including insect repellent, home care, personal care, and even renewable energy.

Insect repellents

Unlike chemical repellents like DEET, citronella oil active ingredients provide effective protection without harsh side effects or environmental toxicity. This makes it ideal for families, pet owners, and eco-conscious consumers. It is commonly found in sprays, candles, roll-ons, and lotions.

Home care

Thanks to its antimicrobial and antifungal properties, citronella oil is used in many household cleaning products. It features in floor cleaners, surface sprays, laundry detergents, and natural disinfectants. Not only does it clean effectively, but it also leaves behind a fresh, uplifting scent that makes the cleaning process more pleasant.

Personal care

Its soothing and deodorising properties have led to its inclusion in soaps, shampoos, deodorants, and skincare products. Geraniol and citronellol contribute both aroma and antibacterial benefits, making them ideal for natural personal care formulations.

Renewable energy uses

Recent studies have explored the potential of citronella oil derivatives as biofuel additives. Their chemical structure supports better combustion in engines while reducing harmful emissions.

The value of derivatives

Beyond the oil itself, the derivatives of Java citronella have opened new avenues for industry:

- **Natural rhodinol** – A natural insect repellent and it's also often used to recreate or enhance rose-like accords.
- **Natural citronellal, geraniol, and citronellol** – Widely used in natural cosmetic products due to its antibacterial properties and its pleasant, gentle fragrance.

Each of these components contributes to Java citronella oil's value – not just as a raw material, but as a source of further innovation.

Opportunities and challenges ahead
As Java citronella oil experiences a well-earned revival, opportunities for growth abound. Yet the industry must also remain vigilant in the face of shifting environmental and economic dynamics.

Opportunities:

- **Organic certification** – As consumer demand for organic and ethically produced goods rises, there is significant potential for Java citronella producers to capture premium markets through certification and traceability.
- **Product innovation** – Developing new blends, derivatives, and formulations can increase value and appeal across industries.
- **Global collaborations** – Working with international brands in perfumery and wellness can elevate Java citronella's global profile and open doors to long-term partnerships.

Challenges:

- Climate change – Increasingly erratic weather patterns and changes in rainfall can impact crop yields. Investing in resilient agricultural practices is crucial.
- **Market volatility** – Fluctuations in global supply and demand can affect pricing and profitability. Strategic stock management and export planning can help mitigate these effects.
- **Technological lag** – Competing nations may have more advanced processing infrastructure. Investing in modern distillation equipment and quality control is essential for maintaining competitiveness.

A personal essential

Java citronella oil holds a unique space in my life. It's not just an aromatic product – it's a connection to something larger: a rich cultural heritage, a testament to sustainable living, and a quiet yet powerful tool for wellbeing. Whether I'm freshening up a room, crafting a homemade spray, or simply inhaling its bright, citrusy scent on a grey morning, this oil brings with it a sense of clarity and calm.

It reminds me that simplicity can be profound. A single plant, distilled into fragrant oil, has the power to clean, calm, protect, and connect us to both nature and history. For all these reasons and more, Java citronella oil remains my favourite – and likely always will.

IFEAT Advocacy Strategy 2025: Championing the future of essential oils in the European Union

NOVE presents an overview of IFEAT and EFEO's advocacy activities, which aim to safeguard the essential oils industry in the EU's evolving regulatory landscape – and promote its vital role in health, agriculture, and the environment.

As the European Commission has embarked on its 2024-2029 mandate, the fragrance and flavour sector is entering a period of significant transformation. The essential oils industry, rooted in centuries of tradition yet constantly innovating, now faces an evolving regulatory landscape that presents both complex challenges and unprecedented opportunities.

In response, IFEAT, working in close collaboration with European Federation of Essential Oils (EFEO) and allied industry partners, has undertaken a forward-looking and robust advocacy strategy. This approach is designed not only to safeguard the role of essential oils within European legislation, but also to elevate their profile as indispensable contributors to general health and wellness, agricultural sector development, cultural heritage, and the EU's broader environmental and industrial ambitions.

From preserving long-standing exemptions that reflect the specificities of natural substances to influencing the interpretation of emerging regulatory concepts such as "essential use", IFEAT's strategy is grounded in science, guided by best practical solutions, and inspired by the positive impact essential oils continue to make across industries and communities.

Safeguarding the CLP derogation: securing updated regulation for natural complexity

At the core of IFEAT's 2025 agenda is the sustained defence of the derogation reflected in Article 5(6) of the Classification, Labelling and Packaging (CLP) Regulation. This exemption, which acknowledges the distinctive nature of multi-constituent substances (MOCS) derived from plants, exempts them from automatic classification under conventional mixture hazard assessment. It is a recognition of the natural complexity and long-standing safe use of essential oils and derivatives.

The inclusion of this derogation in the 2024 revision of the CLP Regulation was a key achievement, underscoring the importance of coordinated industry advocacy. Nonetheless, retention of the derogation remains key. The European Commission is expected to deliver a scientific report by 11 December 2029, which may include recommendations for legislative changes.

IFEAT is taking a proactive stance in anticipation of this review. Building on the momentum of the EFEO-IFEAT Scientific Programme, the Federation is working to generate a comprehensive and high-quality evidence base. This includes robust toxicological and exposure data that demonstrate the unique identity of essential oils as a substance. Additionally, a socio-economic assessment will be developed to illustrate the sector's contributions to rural economies, employment, innovation, biodiversity, and cultural value. These efforts are complemented by strategic engagement with EU institutions and Member State authorities, ensuring decision-makers are consistently informed of developments and the broader implications of regulatory reform.

Maintaining the CLP derogation is not simply a matter of regulatory exemption; it is a reaffirmation of the EU's commitment to science-based policy, fair and effective treatment of natural substances, and the continued integration of traditional sectors within its green and competitive circular economy vision.

Responding to CLH classifications: upholding scientific integrity and sector viability

In parallel with the broader CLP framework, IFEAT is also closely monitoring and responding to recent developments under the Harmonised Classification (CLH) process. Specifically, Tea Tree Oil (TTO) and p-cymene have been the subject of significant regulatory activity.

In early 2024, ECHA's Risk Assessment Committee (RAC) published a classification for Tea Tree Oil as Reprotoxic Category 1B – a decision that carries potential similar opinion for p-cymene, due to be reflected in the 25th Adaptation to Technical Progress (ATP) of the CLP Regulation. Both cases raise broader questions about how complex, naturally derived substances are assessed within frameworks originally designed for synthetic chemicals.

IFEAT is actively engaged in ensuring these classifications are considered and debated with the fullest scientific and contextual understanding. IFEAT is contributing data, analysis, and policy insight to the formal consultation process, through joint submissions and coordination with EFEO and other partners. The Federation and its Members are also working with regulatory stakeholders to clarify provisions of related legislation, such as the Cosmetic Products Regulation (CPR), to ensure consistency and feasibility in implementation.

The overarching aim is to ensure that decisions on classification are based on sound science, reflect actual use conditions, and take into account the long-standing record of safety associated with natural complex substances (NCS). These efforts are vital in maintaining confidence in the regulatory process and safeguarding the continued availability of essential oils in diverse product categories.

Shaping the REACH revision: promoting a balanced essential use framework

Arguably the most transformative development on the EU's regulatory horizon is the targeted revision of the Registration, Evaluation and Authorisation of Chemicals (REACH) Regulation, expected to be tabled in the final quarter of 2025 as part of the broader Chemicals Industry Package. This revision proposes a fundamental shift from the current risk-based model to one driven primarily by hazard, introducing Generic Risk Management Approach (GRA) and the Essential Use Concept (EUC), under which the use of substances deemed "most harmful" would only be permitted if they meet stringent conditions of societal necessity and lack of alternatives.

While the intention to strengthen consumer safety and environmental protection is clear, the proposed tools raise concerns about the potential for disproportionate and inappropriate impacts, particularly on naturally occurring substances whose hazard profile does not align with actual exposure or risk levels.

IFEAT is addressing this challenge by strongly advocating for the preservation of a risk-based methodology that accounts for both hazard and real-world context. Central to this effort is the articulation of essentiality – not as a bureaucratic hurdle, but as a recognition of the irreplaceable value that essential oils offer. In support of this, IFEAT is preparing an argumentation to formally set out the sector's case and provide recommendations for the appropriate implementation of the Essential Use Concept.

To further reinforce this work, IFEAT co-hosted, alongside EFEO, a dedicated workshop on 3 June 2025 in Paris. This event brought together regulators, scientists, and production leaders to provide input and validate an approach that will then inform future advocacy activities.

Cosmetic Products Regulation: ensuring continuity and coherence across legislative reforms

In tandem with the REACH review, the European Commission has initiated an evaluation of the Cosmetic Products Regulation (CPR), scheduled to conclude in 2026. While no legislative amendments are imminent, this review is expected to consider how to improve the relevance, effectiveness and efficiency of the current legislation.

Given the widespread and longstanding use of essential oils in cosmetic products, both as active ingredients and fragrance components, IFEAT is committed to ensuring that their inclusion remains viable and valued. The Federation has already contributed to the initial call for evidence launched in February 2025 and will continue to engage constructively with the European Commission.

Cooperation with allied associations remains a central element of IFEAT's approach, ensuring that messaging is harmonised and that the collective voice of the sector is clearly heard. By anticipating regulatory spill-over effects and working to pre-empt unnecessary restrictions, IFEAT aims to preserve the diversity, innovation, and sustainability that define Europe's cosmetic industry.

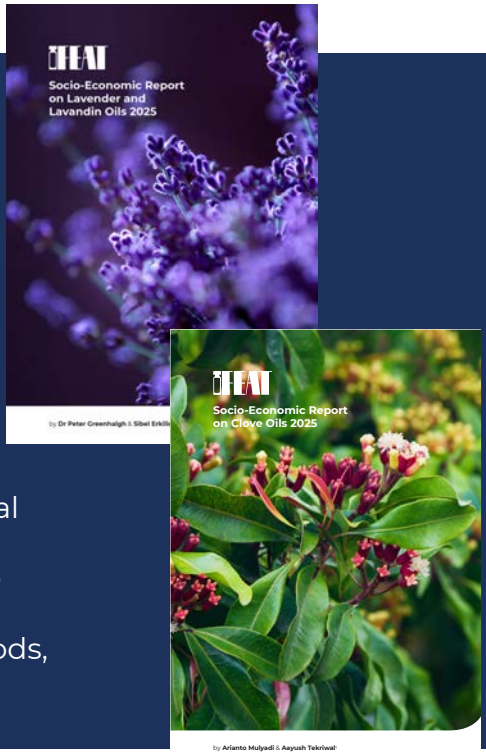
Conclusion: a confident, constructive voice for essential oils in Europe

The period ahead will be critical for defining the future operating environment of the essential oils sector within the European Union. The outcome of key processes – from the CLP derogation review and CLH classifications to the REACH and CPR revisions – will shape the regulatory landscape for years to come.

Yet, rather than viewing these changes with apprehension, IFEAT approaches them with confidence, determination and resolve. Through rigorous science, strategic partnerships, and constructive policy engagement, the Federation is positioning essential oils not merely as substances to be regulated, but as assets to be embraced within the EU's sustainability and industrial policy goals.

IFEAT is ensuring that the voice of the essential oils sector is not only heard – but respected, trusted, and integrated into the fabric of European policymaking.

Sustaining impact: the evolution of IFEAT's Socio-Economic Reports



In a world where natural ingredients face increasing scrutiny, IFEAT's Socio-Economic Reports (SERs) illuminate the human stories, economic contributions, and environmental contexts behind essential oils, botanicals, and spices. Since their inception in 2013, these reports have grown from concise overviews into standalone publications – each a meticulously crafted resource mapping value chains, documenting livelihoods, and informing policy.

Why we produce SERs

Our Socio-Economic Reports highlight the vital social, economic, and environmental contributions made by natural products like cloves and lavender to rural communities worldwide. They provide policymakers, regulators, and industry stakeholders with grounded evidence of positive impact, ensuring that the lives and livelihoods behind these ingredients are neither overlooked nor undervalued.

From concept to comprehensive analysis

Peter Greenhalgh
IFEAT's Socio-Economic Adviser and principal author with over 40 years of commodity-market expertise, reflects:

"In 2013, as consumer demands and legislative requirements increased regarding essential oils and plant extracts, IFEAT decided to produce Socio-Economic Reports (SERs) to investigate the true importance of these natural products to the livelihoods of those producing these raw materials. Many people, both in and outside the sectors utilising them, were unaware of their wide-ranging origins, uses, as well as socio-economic and environmental importance. The SERs aimed to communicate the vital beneficial impacts of these natural products to the areas where they are produced.

"Since 2013, IFEAT has produced 25 SERs on a diverse range of essential oils, all of which have been published in IFEATWORLD. Initially, SERs were brief summaries of the oils and their socio-economic importance. As the reports have developed so has the depth of the analysis. Alongside detailed socio-economic, environmental and sustainability impacts, the SERs now cover uses, quality, composition, production, trade, markets, regulatory and legislative aspects. As such, they provide an excellent overview of the complex and diverse nature of each essential oil. In addition, they illustrate how each year the production of many tens of thousand tonnes of essential oils creates livelihoods for many millions of people often in rural environments predominantly in developing countries and how these raw materials are vital ingredients for the global flavour, fragrance, aromatherapy and related sectors."

Jisha Das, IFEAT's Socio-Economic & Committees Administration Coordinator, adds:

"Working on my first SER has been incredibly rewarding. I've always been fascinated by what happens behind the scenes – the story story of a product you pick off the shelf, the hands that nurtured it, and every nuance of its journey. We're continually exploring fresh ways to bring those details to life and make our reports more relevant to what our audience truly cares about. How can we use this work to improve the lives of, say, clove farmers in Indonesia? And how can it help build a more sustainable industry?"

Eduardo Mattoso, Founder and General Director of Kaapi and Chair of IFEAT's Socio-Economic Committee, emphasises:

"Behind every essential oil, there are stories of people – farmers, harvesters, distillers, and communities – whose lives are deeply connected to nature and to global trade. Through our Socio-Economic Reports (SERs), we strive to give voice and visibility to these individuals, highlighting not only the value of the products they help create, but also the profound impact the essential oils industry has on livelihoods, local economies, and cultural heritage. These reports are also a vital tool in strengthening IFEAT's role as an advocate for ethical, sustainable, and inclusive practices across the global value chains."

Under their combined vision and leadership, SERs now integrate data from dozens of experts and peer-reviewed studies to offer a panoramic understanding of each ingredient's journey.

Elevating design and distribution

Thanks to cross-committee collaboration and early planning, these insights now appear in high-quality, narrative-driven supplements distributed alongside IFEATWORLD, ensuring every issue resonates visually and substantively.

Spotlight on Lavender & Lavandin

Sibel Erkilic Horsman, IFEAT's Scientific Officer and co-author of the Lavender report, notes:

"Lavender was chosen for a Socio-Economic Report (SER) due to its global economic impact, sustainability challenges, and cultural significance, while its complex value chain supports numerous jobs and activities. The Lavender & Lavandin SER is a comprehensive and peer-reviewed report that incorporates insights from over 50 experts and 60 publications, analysing legislative, socio-economic, and environmental factors across regions like France and China. SERs serve as powerful advocacy tools by providing evidence-based arguments to inform policy, raise awareness, and promote positive change, such as fair trade and sustainable practices within the flavour and fragrance industry. These reports are valuable resources that consolidate and analyse extensive information, offering clarity and insights for the value chain."

Alain Frix, founder and president of Allchemix Consultancy, adds:

"Lavender brings to mind blue skies, natural beauty, and a soothing fragrance that uplifts the spirit. As highlighted in IFEAT's socio-economic report, this sense of wonder is made possible by the tireless efforts of individuals who work closely with nature – nurturing lavender from seed to essential oil. Their work not only sustains rural economies but also exemplifies resilience in the face of climate challenges, shifting markets, and regulatory demands. Whether farmers, agronomists, distillers, or perfumers, their centuries-old commitment keeps the lavender industry thriving – a testament to the enduring harmony between nature's gifts and human determination. These reports serve to highlight both the value and the fragile balance that underpins the world of natural products."

Dominique Roques, former Head of Sourcing at Firmenich, celebrates:

"I am extremely impressed by this new SER on Lavender and Lavandin! The wealth of information it brings is amazingly complete and will be highly informative and useful for many of us in the industry. The standard this SER is setting makes it a unique tool and paves the way for a potentially unique collection of naturals supply chain documents. Congratulations!"

The Clove Connection

Arianto Mulyadi, Director of Corporate Communication & Sustainability at PT Indesso and co-author of the Clove report, explains:

"Beyond its role as a spice and fragrance ingredient, clove production serves as a vital lifeline for hundreds of thousands of smallholder farmers and rural communities in countries such as Indonesia, Madagascar, Tanzania, Comoros, and Sri Lanka. In these regions, clove farming is more than 95% smallholder-based and family-run, with knowledge and practices passed down through generations. Clove trees offer a long-term, perennial source of income, and as harvesting is labour-intensive, it generates seasonal employment opportunities for villagers – including those from neighbouring areas – during the collection, drying, and sorting of buds.

"Clove leaves, once considered agricultural waste, are now used in leaf oil distillation, creating an additional source of income. This practice of upcycling agricultural by-products enables farmers to diversify their revenue streams. Most field distillation units are located in remote areas and stimulate local micro-economies, employing distillation operators, collectors, transporters, and engineers. Furthermore, the active compounds found in clove oil and its derivatives are increasingly developed for a variety of applications that enhance human well-being."

Advocacy at the forefront

SERs function as advocacy instruments – providing regulators, NGOs, and global organisations with evidence-based insights to drive sustainable practices, fair trade, and resilient supply chains. By furnishing concrete proof of socio-economic and environmental benefits, they empower the industry to speak persuasively to decision-makers and the public alike.

Building a legacy together

IFEAT's Socio-Economic Reports are more than publications; they embody our collective commitment to honour, advocate for, and strengthen the communities that underpin the natural-products world. Each issue – through rigorous analysis and compelling storytelling – fortifies IFEAT's voice in building a more sustainable, inclusive future for all stakeholders.

Share your feedback and expectations

We're committed to making each Socio-Economic Report even more relevant and impactful. We invite you to share your feedback, suggestions, and expectations for future editions. Please write to us at **pgifeat@yahoo.co.uk** or **secadmin_coordinator@ifeat.org** – your insights will help shape the next generation of SERs.

Taste Can Be Smelled — And it Matters to Flavour Perception

Authors: **Jingang (Jack) Shi**, CEO, **EPC Natural Products, Co., LTD, Beijing, China**
Dr. John Cavallo, President, **Thornhill Consulting, USA**, and Board Member of **EPC**
Weiyue Shi, Weinberg College of Arts and Sciences, Northwestern University

Abstract

The classical dichotomy between taste (gustation) and smell (olfaction) has profoundly influenced sensory science in the flavour and food industry. Traditionally, taste has been understood as the detection of non-volatile compounds by taste receptors in the oral cavity, while smell has been defined as the detection of volatile molecules by olfactory receptors in the nasal epithelium. However, emerging evidence – particularly in the domain of retronasal olfaction – challenges this strict separation and suggests a more integrated sensory experience. Here, we review historical and contemporary evidence questioning the taste-smell divide and introduce the hypothesis developed by EPC Natural Products Co., Ltd. (EPC) that taste compounds, including non-volatile aroma chemicals, essential oils and other taste ingredients, can generate retronasal signals contributing directly to flavour perception. We summarise empirical studies supporting this hypothesis and discuss the implications for sugar reduction and taste modification strategies in the food and beverage industry. Understanding the integrated mechanisms of flavour perception may offer novel opportunities for designing healthier, more enjoyable products.

"We still don't fully understand how the mouth truly works," said Professor Jianshe Chen, a pioneer in oral processing research and a Fellow of the International Academy of Food Science and Technology, currently working at A*STAR's Singapore Institute of Food and Biotechnology Innovation (SIFBI). The oral cavity remains, in many ways, a sensory black box — an intimate, dynamic space that is difficult to observe or probe directly during eating because it's nearly impossible to insert a probe or camera into someone's mouth while they eat. As a result, the processes underlying food perception remain misunderstood.

Human flavour perception is a multisensory phenomenon involving taste, smell, somatosensation, vision, and even audition. Traditionally, taste (gustation) has been defined as the detection of non-volatile compounds by taste receptor cells in the tongue and oral epithelium, giving rise to five basic taste qualities: sweet, salty, sour, bitter, and umami (Chaudhari & Roper, 2010). Smell (olfaction), by contrast, involves the detection of volatile molecules by olfactory sensory neurons in the nasal cavity, which can occur via two routes: orthonasal olfaction (sniffing through the nose) and retronasal olfaction (odorants moving from the oral cavity to the nasal cavity during eating) (Shepherd, 2006; Rozin, 1982).

This framework has shaped both sensory science and basic R&D initiatives of the food industry. Flavour houses like Givaudan, Firmenich, IFF and Symrise have traditionally focused on creating volatile aroma compounds, while ingredient companies such as Cargill, ADM, DSM, Ingredion, and Tate&Lyle have specialised in non-volatile tastants such as sweeteners, acids, thickeners, etc. Implicit in this division is the assumption that taste and smell are anatomically and functionally distinct.

However, accumulating evidence from neuroscience, gastrophysics, neurogastronomy, and flavour science challenges this view – particularly, the critical role of retronasal olfaction in flavour perception and enjoyment (Small et al., 2005; Shepherd, 2006). Increasingly, the boundaries between taste and smell appear more porous, raising the possibility that compounds long classified as tastants may exert part of their sensory impact via olfactory mechanisms. Further research in this area may establish a scientific basis for understanding why contemporary food and beverage manufacturers require integrated solutions that combine taste and olfaction, as exemplified by industry mergers such as Firmenich-DSM, IFF-DuPont, Symrise-Diana, ADM-Wild, and Givaudan-Naturex, beyond purely economic considerations.

Historical challenges to the taste–smell dichotomy

The origins of the taste–smell separation can be traced back to early anatomical models, which viewed the oral and nasal cavities as distinct sensory domains. However, this binary framework has long been questioned. One of the earliest experimental demonstrations came from Mozell (1969), who used a dual-channel olfactometer to isolate orthonasal and retronasal olfactory inputs. Mozell showed that when retronasal airflow was blocked, participants' ability to identify sucrose solutions was dramatically impaired, even though they could still report basic sweetness. This finding suggested that olfactory cues are critical for compound-specific identification, even when gustatory qualities remain intact.

Subsequent research has strengthened this view. Mojet et al. (2005) showed that age-related declines in taste sensitivity are modulated by the loss of retronasal olfactory function, highlighting olfaction's contribution to taste perception across a person's lifespan. Masaoka et al. (2010) used functional MRI to demonstrate that nasal occlusion altered neural activity in brain regions associated with sweet taste processing, providing neural evidence for gustatory-olfactory integration. Tsuji et al. (2018) reported that nasal blockage increased the detection and recognition thresholds for sucrose, indicating a decline in sweetness sensitivity when retronasal olfaction was inhibited.

Importantly, the phenomenon of oral referral – whereby olfactory stimuli are not localised to the mouth – underscores the integrated nature of flavour perception. As Spence et al. (2015) reviewed, oral referral depends on factors such as taste intensity, congruency between taste and odor, and attentional capture. When gustatory and olfactory stimuli are congruent, they are more likely to be bound together perceptually as a unified "flavour object," localised to the mouth even though part of the signal originates in the nose.

Non-volatile tastants – can they be smelled during food oral processing: A new frontier in flavour science

When we walk along the beach, we often notice a subtle but striking phenomenon – we smell the salty air. This common experience highlights the intimate connection between taste and smell. Similarly, when exposed to polluted air or smog, humans inhale aerosolised particles and liquid droplets that interact with the sensory systems, influencing overall perception. These observations have inspired Jingang (Jack) Shi, founder of EPC Natural Products Co., Ltd., to propose a novel and potentially transformative hypothesis about how humans perceive taste.

Shi hypothesises that taste compounds can produce volatile or aerosolised signals in the oral cavity that are

transmitted through the retronasal pathway to gustatory receptors in the nasal cavity. In essence, the perceptual effects of taste stimuli are not confined solely to gustatory receptors on the tongue but also involve olfactory mechanisms activated from the back of the nasal passage — a process known as retronasal olfaction. (Rozin, 1982; Small & Prescott, 2005). This hypothesis expands the classical understanding of flavour perception and suggests new dimensions in how food and beverage products interact with human senses.

Mechanistic insight: Aerosol-mediated retronasal transfer of non-volatile tastants during oral processing

To validate this hypothesis, EPC Natural Products Co., Ltd. — an innovator in natural sweeteners and flavour modulators with a diverse product portfolio including stevia, thaumatin, sweet tea (blackberry leaf extract), and advanced taste solutions designed to improve the sensory profiles of complex flavour mixtures, essential oils, and bitter taste components — has actively collaborated with leading academic partners, including Professor Chen. Together, they have supported cutting-edge research investigating whether nonvolatile tastants, traditionally considered odourless, can contribute to olfactory perception through aerosol-mediated retronasal transfer during oral processing.

The study by He et al. (2023) employed high-speed imaging to demonstrate the generation of aerosol particles during typical oral actions, such as chewing and swallowing. Using narrow-band nasal imaging and mass spectrometry, the researchers tracked the migration of these aerosols from the oral to the nasal cavity, confirming the deposit of aerosol particles on the olfactory epithelium. Sensory evaluation using four-alternative forced choice tests revealed that participants could discriminate between aerosols containing tastants (such as sucrose and quinine) and control aerosols, indicating that these tastants can indeed be “smelled” when delivered via aerosols. Notably, nasal occlusion with nose clips led to a marked reduction in perceived sweetness, underlining the significant role of retronasal olfaction in taste perception.

These findings challenge the classical view that only volatile compounds contribute to olfactory sensation and provide mechanistic insights into how taste and smell integrate during food consumption. Importantly, they also highlight the potential of leveraging aerosol-mediated delivery pathways in the design of next-generation sweeteners and flavour modulators.

Retronasal taste sensation shapes discrimination, intensity, and hedonic evaluation of tastants

EPC’s joint research team (He et al., 2024) further investigated how retronasal taste sensation influences the discrimination, intensity perception, and hedonic evaluation of sweeteners. Using sensory evaluation methods, participants assessed sucrose, sucralose, rebaudioside A, and sucrose + quinine solutions. Results demonstrated that participants could reliably discriminate between samples based on ortho-nasal aerosol perception, with water and sucralose rating more favorably than sucrose. When nasal airflow was occluded with a nose clip, perceptual differences between sucrose and sucralose were significantly reduced, and the perceived intensities of sucrose’s sweetness, sucrose + quinine’s bitterness, and rebaudioside A’s metallic note were markedly attenuated. These findings demonstrate the pivotal role of retronasal taste sensation in modulating sensory discrimination, intensity ratings, and hedonic responses to sweeteners and eventually to overall flavours.

Retronasal taste sensation plays a key role in shaping flavour perception

To investigate the brain’s cognitive processing of taste stimuli, EPC’s joint research team conducted an electroencephalography (EEG) study comparing brain responses to sucrose, steviol glycosides, and water (He, 2025).

The study revealed that retronasal sensations influence both early and later stages of cognitive processing during flavour recognition. In the early stage, at the level of the primary olfactory cortex, retronasal signals help differentiate between sweeteners. In later stages, within the orbitofrontal cortex, they accelerate the overall recognition and evaluation of sweetness by integrating sensory signals from both taste and smell. This process involves a dynamic interplay between “bottom-up” sensory processing – where signals from the mouth and nasal cavity are relayed to the brain – and “top-down” mechanisms, where memory and expectation help refine the perception of familiar versus unfamiliar sweeteners.

In parallel, research led by Dr. Ciara McCabe – Professor of Neuroscience,

Psychopharmacology, and Mental Health at the University of Reading, and funded by EPC – provided complementary evidence using functional magnetic resonance imaging (fMRI). The fMRI study showed that blocking retronasal olfactory input with a nose clip significantly reduces both subjective taste ratings and neural responses to sucrose in humans. Nose clip occlusion led to decreased activity not only in primary taste and olfactory regions (such as the postcentral gyrus, insula, olfactory cortex, and piriform cortex), but also in brain areas associated with reward (nucleus accumbens), attention (subgenual anterior cingulate cortex, sgACC), and sensory integration (rolandic operculum, precuneus). Notably, the olfactory and prefrontal cortices tracked subjective fullness ratings only when the nose clip was removed, underscoring the importance of retronasal cues in sweet taste perception (Ko et al., 2025).

Together, these studies offer compelling evidence that the brain integrates gustatory and olfactory signals early in sensory processing to create a perceptual "contour" that is fundamental to flavour recognition.

Implications for sugar and salt reduction and managing off-tastes in essential oils

The push to reduce sugar and salt in foods and beverages presents significant formulation challenges. Sugar, for example, contributes not only sweetness but also mouthfeel, aroma release, and overall flavour balance. When sugar is replaced with high-intensity sweeteners, formulators often encounter off-flavours and diminished consumer acceptance.

EPC's recent scientific research on the retronasal contributions of sweeteners and salts opens exciting new opportunities for overcoming these challenges. Strategies such as aroma-enhancing formulations, the use of flavour modulators, synergistic aroma compounds, and multisensory product design that integrates taste, smell, and mouthfeel offer promising solutions for reducing sugar and salt without compromising product appeal, of particular interest to the meat, savory and spice industries.

At the same time, plant-based essential oils frequently bring bitter or astringent notes, often intensified by oxidative degradation that leads to off-flavours. Emerging insights into the role of retronasal olfaction suggest that these sensory issues cross both taste and smell domains. This novel perspective creates new avenues to improve product quality by moving beyond the traditional boundaries between taste and aroma, enabling more effective management of off-notes in essential oil applications.

Conclusion

For over a century, the separation of taste and smell has shaped scientific thinking and industrial practice. However, growing evidence reveals these senses are deeply interconnected. EPC Natural Products Co., Ltd. has advanced this understanding by demonstrating that taste stimuli can generate retronasal signals that profoundly influence flavour perception. This breakthrough challenges long-standing assumptions and opens new avenues for innovation, particularly in creating healthier, sugar and salt-reduced products. By adopting a multisensory approach, the food industry can move beyond simple sugar and salt replacement and develop more sophisticated solutions that elevate the overall sensory experience.

Future research should focus on uncovering the molecular and neural mechanisms behind taste–smell interactions, exploring applications across product categories, and assessing their potential in clinical settings, including among those with sensory loss. Together, these efforts can redefine how we understand and design the sensory experience of food.

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