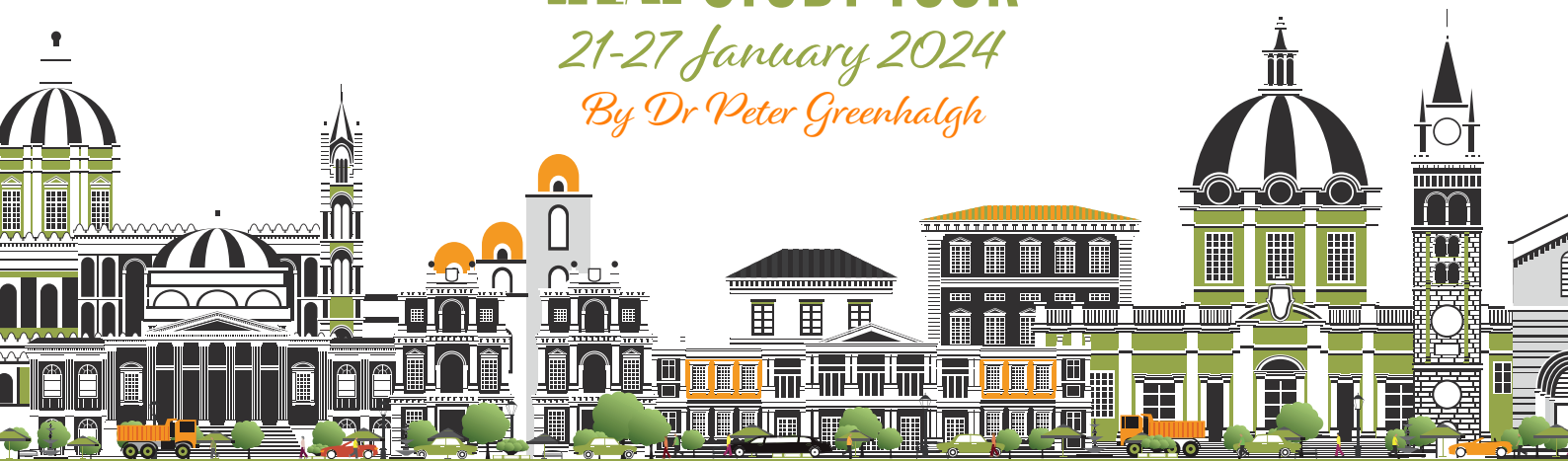




IFEAT STUDY TOUR

21-27 January 2024

By Dr Peter Greenhalgh



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Introduction

On Sunday 21st January 2024, over 50 IFEAT Members met at the Grand Hotel Excelsior in Reggio Calabria for the start of IFEAT's 14th Study Tour to Calabria and Sicily (IST 24). This was IFEAT's second Study Tour to southern Italy, the first was in 2009. The IST 24 was organised by a small Local Organising Committee of IFEAT Members: Antonella Corleone (Chair), Gianfranco Capua and Simona Caratozzolo, the IFEAT Secretariat and TMT, the local tour agent.

The delegates from 18 countries were a diverse and multi-generational group, with a wide range of expertise and knowledge. Delegates included some major citrus oil producers, processors and end users from Argentina, Brazil, Italy, Mexico, Spain and the USA. Sharing knowledge and experiences over a week provided a remarkably informative learning opportunity for everyone involved, particularly those for whom it was their first Study Tour and visit to Italy. Travelling together for a week, visiting 10 major Italian companies, and seeing the whole citrus supply chain from crop production, harvesting, processing, packaging, final products, storage, transport, laboratories, R&D and quality assessments, provided a remarkably informative and enjoyable experience for everyone involved.

On arrival, delegates were presented with their rucksacks, gifts and briefing document which included a detailed itinerary, maps and profiles of the delegates and companies to be visited. This was followed by a briefing session and then an excellent Welcome Dinner with music sponsored by Agrumaria Reggina. The IST 24 began as it was to continue - convivial and knowledgeable people and companies, excellent food and gifts, almost perfect weather and with many insights into Italy's essential oil sector, the economy, some magnificent scenery, and its complex history and politics. It proved to be a great success as confirmed by all the delegates and the many positive company and delegate postings on social media.



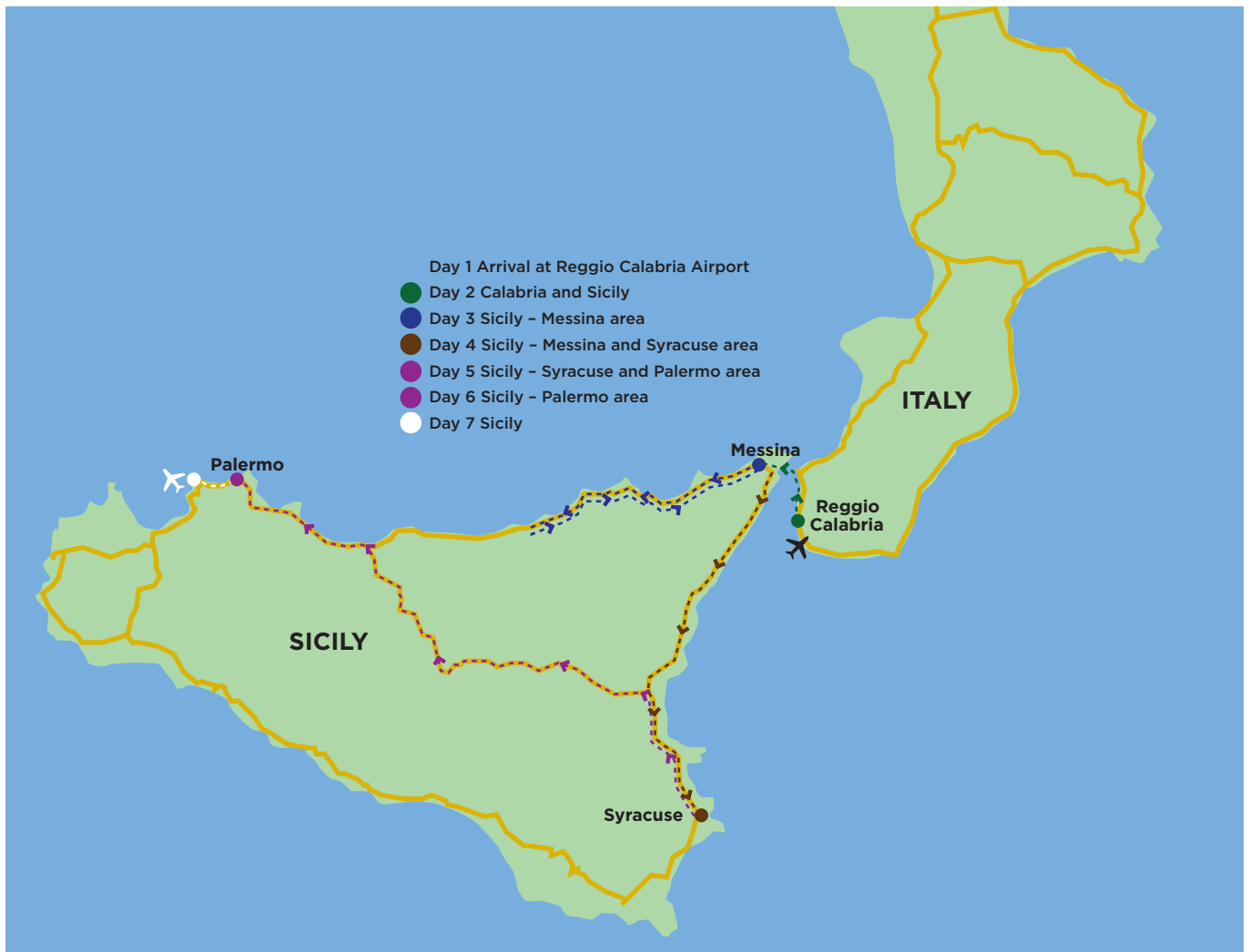


Italy's Citrus Industry

Southern Italy's favourable climate, soils and agricultural traditions enable the production of some of the world's finest citrus oils. These oils are highly regarded in the flavour, fragrance and aromatherapy sectors for their exceptional quality, aromas and other properties leading to a wide range of end uses. Within a relatively small area of southern Italy sizeable quantities of conventional and organic oils including bergamot, clementine, lemon, mandarin and both blond and blood orange are produced to very high standards. Hence the choice of Calabria and Sicily for the IST24.

For many decades, Italy has been an important supplier

of citrus essential oils, and a significant producer of lesser-known citrus oils, used in a wide and expanding range of applications. Annual Italian citrus production is approximately 3.1 million MT of which 80% is from Sicily. In a normal season average estimated annual fruit production is, blond orange: 1,265,000, blood orange: 615,000 MT, clementine: 680,000 MT lemon: 480,000 MT, mandarin: 150,000 MT and bergamot: 25,000 MT. Except for bergamot, a large proportion of production is used in the fresh market but a substantial proportion is processed into a dizzying range of products. The proportion processed varies between fruits as does the proportion of organic fruit production and processing.



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For each type of citrus fruit several varieties are grown in Sicily and research efforts are continuing to improve the varieties to obtain high yields, greater drought resistance, minimise water utilisation and of course to improve organoleptic characteristics and qualities. The main varieties grown in Sicily and the estimated production share are:

Lemon - Femminello (70%), Monachello (25%), Other (5%)
 Green, yellow, and red mandarins - Avana (65/70%), Ciaculli (30/35%)
 Blond Orange - Navel and Washington Navel (20%), Early Valencia and Late Valencia (60%), Biondo Comune and Ovale (20%)
 Blood Orange - Moro (10/15%), Tarocco (75/80%), Sanguinello (10%)
 Clementine
 Grapefruit

From these fruits the diverse range of citrus products produced include:

- Essential oils
- NFC (not from concentrate) juices
- Concentrates
- Specialities
- Pulp and cells
- Frozen peels

Each of these products in turn has different categories. For example, essential oil categories include cold pressed (CP), essences, folded, oil phase, FTNF (from the named fruit), WONF (with other natural flavours), terpenes and terpeneless.

Estimated Italian Citrus Production, Cultivated Area and Processing 2022 – 2024

Citrus Fruit	Production 2022 (MT)	Production 2023 (MT)	Production 2024 (MT)	Area 2023 (ha)	Processed %	Processed 2023 (MT)
Blond Oranges	1,298,700	1,317,442	922,209	55,315	40	526,977
Blood Oranges	517,836	709,876	496,913	28,652	40	283,950
Mandarins	156,893	154,787	123,830	8,866	25	38,697
Clementines	656,840	674,349	687,836	26,763	20	134,870
Lemons	482,293	511,976	522,216	26,567	35	179,192
Limes	600	600		32	10	60
Grapefruits	5,470	5,634		301	10	563
Bergamots	27,000	27,810	16,686	1,500	99	27,532
Citrons	1,150	1,150		65	40	460
Chinotto	54	54		6	99	53
Other Citrus	6,771	6,854		305		

Source: ISTAT and Agrumaria Reggina Citrus Report 2024



Italy Citrus Fruit Processing Calendar

	Lemon	Blond Orange	Blood Orange	Mandarin, Clementine and Tangerine
January	●	●	●	
February	●		●	
March	●		●	●
April	●	●	●	●
May	●	●	●	
June	●	●		
July		●		
August	●			
September	●			●
October	●	●		●
November	●	●		●
December	●	●		●

CITROFOOD

The microclimates of this region are ideal for the cultivation of excellent citrus products and production of some crops is very regional specific. For example, bergamot production is heavily concentrated in Calabria, and efforts to grow elsewhere, even in nearby Sicily, have not been successful. Similarly, blood orange production is concentrated on the volcanic soils around Mount Etna, where the soil, climatic conditions and temperature changes between day and night produce a citrus fruit that is unique in colour and taste.

The varying harvesting periods for the different citrus fruits are shown in the diagram. Recent climatic variations, particularly very high temperatures and drought, are creating greater variation in both yields and harvesting periods.

Another feature of Italian citrus production is the large number of very small producers, often producing on 1-2 hectares of land, in sharp contrast to other major citrus producers. All the Italian companies visited have built up very close and often direct relationships with their suppliers over many decades. This facilitates greater transparency of production as well as the communication of necessary ethical, organic and pesticide standards.

Company Visits

The six days were filled with visits to diverse companies and organisations - all IFEAT Members except for Chromaleont SRL at the University of Messina. All were very much involved in citrus oil production and processing or analysis. All were family-owned companies and inter-generational, often dating back to the 19th century, and some now having 5th generation family employees.

During the visits the companies explained in detail the type of fruits harvested, processed and packaged as well as the diverse range of citrus products produced. Delegates remarked on the openness of the companies and willingness to discuss in detail their operations and the challenges they faced. Other key features remarked upon by delegates included the innovative nature of the Italian citrus industry, which was seen as key to survival in an increasingly competitive and globalised world. The increasing role of women managers and owners was noticeable compared with two decades ago, as was the involvement of the younger generation in the industry – which all bodes well for a successful future. Throughout the visits companies stressed their efforts to facilitate more sustainable and ethical production, through recycling, minimising energy utilisation and waste.

Agrumaria Reggina

The first day was spent in Calabria. Two sizable family-owned production and processing operations producing several essential oils and a bergamot farm were visited. Agrumaria Reggina (www.agrumariareggina.it) provided a detailed account of the whole supply chain providing an analysis of Italy's citrus crops, a guided tour of the processing operations and technologies used. This was followed by detailed insights into their R&D efforts and the new innovative and diverse citrus products being developed for use in the food, beverage and F&F industry. The company was founded in 1985 and the initial focus was on producing NFC (Not From Concentrate) juice. The company became more vertically integrated within the value chain with the blending of juices, flavours and other ingredients for the food, beverage, flavour, and fragrance sectors. There were several presentations during the visit in addition to a hot off the press publication given to each delegate on "*The Art and Science of Citrus Processing at Agrumaria Reggina*". This contains detailed descriptions of the supply chain from harvesting to final product and is an excellent guide to citrus processing and products. The diagrams below are taken from the guide and illustrate the various products produced and the Circular Economy System used by Agrumaria Reggina.



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Ingredients obtained from processing



The ingredients we obtain from our citrus processing:



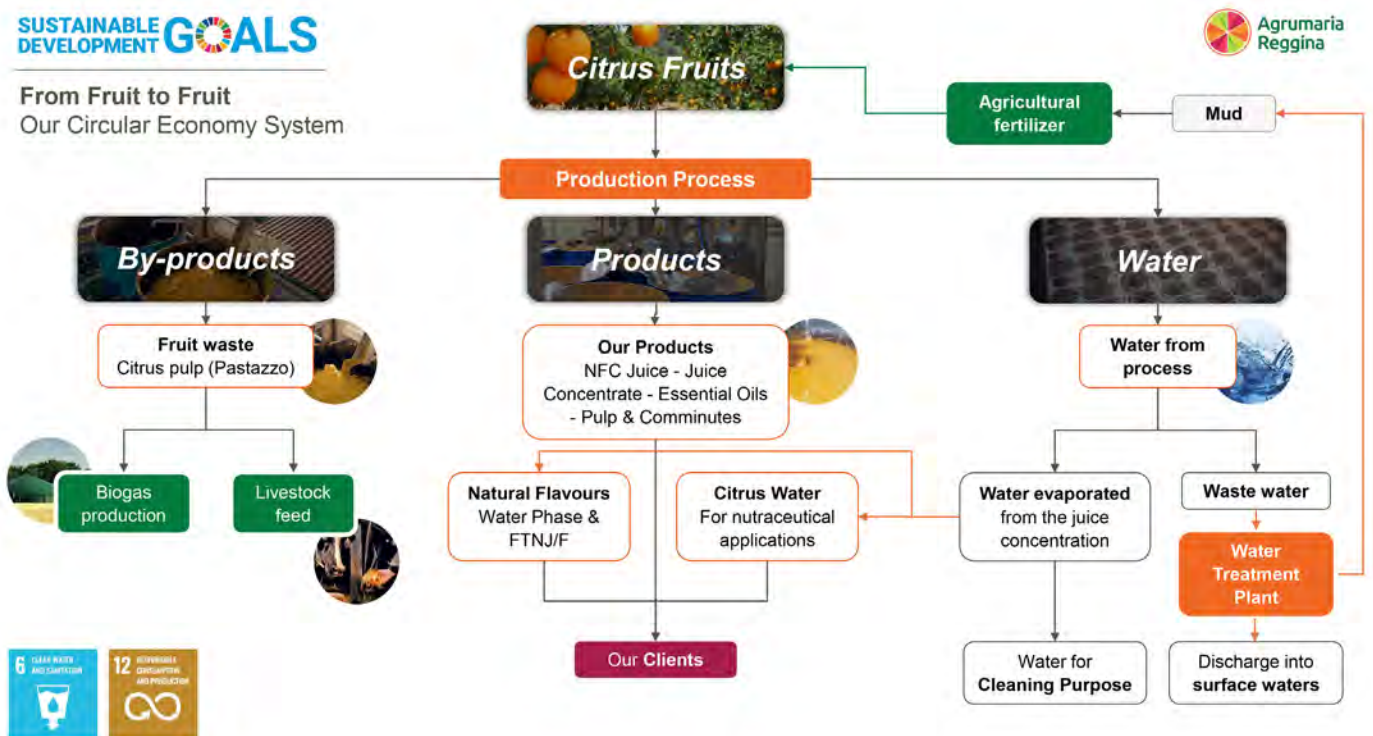
They are used to develop our range of ingredients and solutions:



Circular Economy System



From Fruit to Fruit
Our Circular Economy System



Capua's Bergamot Fields



Capua

After an excellent lunch and short tour of their recently acquired plant, another Calabrian company, Capua 1880 (www.capua1880.com) provided a detailed tour of their processing operations, concentrating mainly on their ethically and sustainably sourced bergamot. This second plant of 24,000 sq. metres had been redeveloped and converted according to an ambitious architectural plan. This was followed by a drive south along the Calabrian coastline, with stunning views of Mount Etna across the Strait, to visit the Capua bergamot Condofuri orchards. While walking through the orchard and up the nearby hill, detailed discussions took place on many aspects of bergamot production, harvesting, processing and marketing. Global production of bergamot is dominated by Calabria, despite efforts to grow and process the product elsewhere. Then a journey back to Reggio Calabria for the short ferry journey over to Messina, Sicily with more stunning views of volcanic Mount Etna and the setting sun.

Branca

Two days were spent based in the Messina Region, visiting four companies in the region. The family-owned F. Illa Branca (www.brancaspa.com) has been processing citrus fruits for 132 years, when the traditional "sponge" extraction techniques were first used. Managed by two sisters, it is a leading producer of lemon, orange and mandarin juice concentrates, essential oils, diced and dried peels and is strong in organic citrus products. The plant has a daily fruit processing capacity of 1,000 MT and an annual processing capacity of 20,000 MT of juices and concentrates over three independent lines. Its annual citrus oil production capacity is 300 MT and oils account for approximately a quarter of the value of production. Although still located in its historic premises, these have been expanded considerably, and delegates were shown innovative processing technologies, including cold pressed extraction methods using In-Line, Pelatrice and Sfumatrice extractors. The plant also has substantial controlled temperature and frozen storage capacities. Quite some time was spent in visiting the laboratory where creative work was being undertaken in collaboration with various partners to create new products as well as utilise by-products from processing. The company, like several other citrus processors, is taking sustainability and the circular economy very seriously. A diverse range of citrus-based products was discussed including pectin, animal feed, paper, natural fibres, table lamps and leather substitutes.



Delegates Touring Capua's Processing Facilities



Lemons, Blond Oranges and Blood Oranges at F. Illa Branca



Citrofood and Eurofood

In the afternoon visits were made to two closely related companies based on the same site at Cap d'Orlando, Citrofood (<https://www.citrofood.it/>) and Eurofood (<https://www.lemonplus.it/>). Prior to the visits several presentations were made at the nearby Marina Sestante Hotel followed by an excellent lunch sponsored by Citrofood. The first presentation was by the Hon. Luca Sammartino, Councillor for Sicilian Agriculture. This was followed by presentations on the history and operations of Eurofood and Citrofood. In addition, a presentation was made on blood oranges: the history, varieties, production calendar, volumes, area, essential oils and chemical composition.

The Citrofood group has a turnover of over €50 million and a capacity to squeeze 100,000 MT of fruit annually. Initially established to process lemons it has diversified into processing other citrus fruit including blond and blood oranges, mandarins, clementines, grapefruit and bitter oranges producing a wide variety of products for a wide number of end uses. Delegates toured the processing

operations from the arrival and treatment of the fruit followed by the in-line FMC extraction process which allows the immediate segregation of juices from the essential oils and when required, from the peel and zest. There were 19 FMC extractors, as well as UF clarifying equipment, aseptic and standard filling equipment. For all products, there were chilled and frozen warehouses for storage. Juice filling is done in two different indoor separate rooms: one for aseptic and one for frozen. Eurofood, another family operation, processes and bottles fresh Sicilian citrus juice at the facility. This enables the preservation of all the organoleptic and nutritional characteristics of the juice throughout the production process. In addition, it bottles imported juices as well as produces a range of other citrus products including organic products. The companies stressed their continued efforts to produce and process products sustainably, e.g. safeguarding diversity and sustainable agricultural production techniques, as illustrated by the work with bees, the use of solar power, utilising residues in pet food or biomass for energy treatment companies, alongside a wide range of certifications and memberships.



Citrofood and Eurofood



Chromaleont

For some delegates the most impressive and possibly the most unexpected aspect of the IST24 was the visit to Chromaleont SRL facilities at the Messina Institute of Technology (MeIT) at the University of Messina (<https://www.chromaleont.it> and <https://sepsci.unime.it>).

Delegates were welcomed by Professors Paola Dugo and Luigi Mondello. The latter, who had given the IFEAT Medal Lecture in Rome in 2014, provided a very detailed overview of the organisation and its facilities. Chromaleont, established in 2007, is an academic spin-off company that offers solutions for the development of analytical instruments and dedicated software for chemical analysis, as well as consultancy in the field of Separation Science. It has considerable expertise in solving analytical problems faced by industries in different fields and in developing innovative methods and instrumental prototypes. In addition, it is very much involved in the education of a new group of scientists working in these fields as well as participating in conferences and symposiums to disseminate the academic results. The presentation was followed by a tour of the extensive laboratories, where members of staff explained in detail the various analytical procedures used e.g. GC-MS, GC-FID and GC-FID Chiral analysis; HPLC-PDA, HPLC-MS, and HPLC-MS/MS analysis, MOSH and MOAH identification, GC-C-IRMS analysis, Multidimensional GC and LC analysis, and GC and LC FTIR analysis. It was particularly enlightening to hear of the technical advances being made in analysing essential oil constituents – and there is no doubt it is a world-leading institution in this respect.

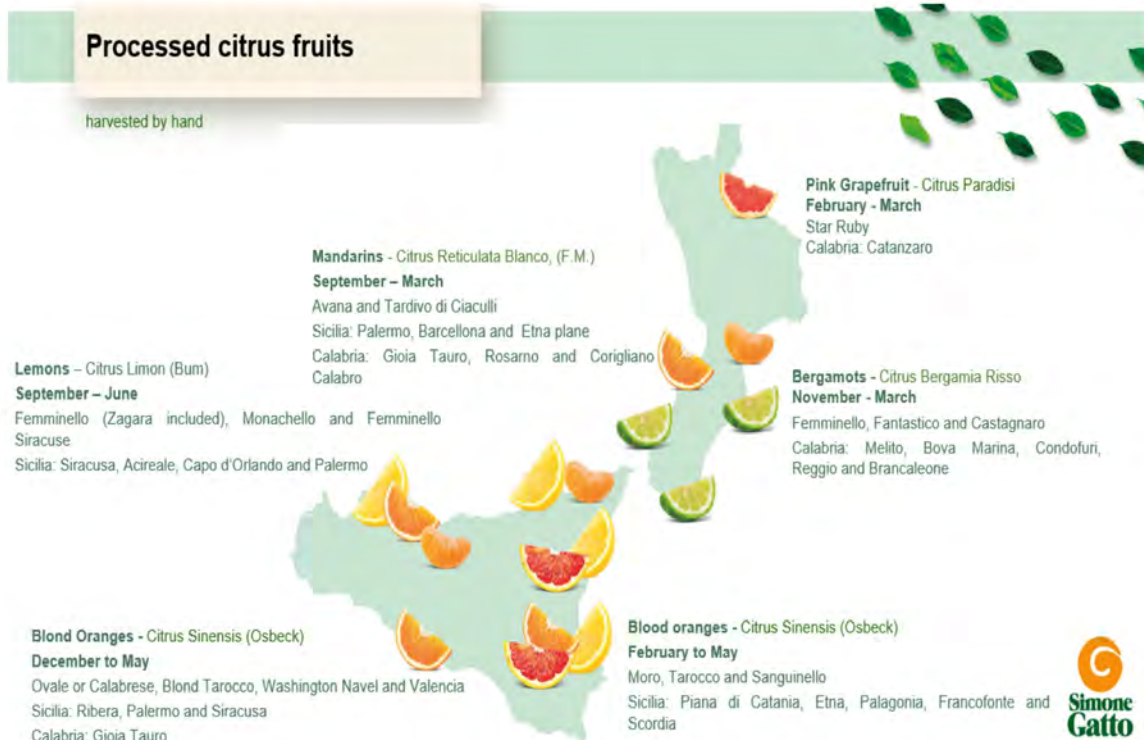


The Chromaleont Team at the Messina Institute of Technology



Simone Gatto

The final afternoon in the Messina Region was spent at Simone Gatto SRL (www.simonegatto.com/), a family business currently led by the fourth generation, but with the fifth generation actively involved. Following another excellent lunch and brief introduction to the company, delegates toured the company processing and packing operations. The diagram illustrates the extensive range of citrus fruits and varieties (oranges, lemons, mandarins, and bergamots) that the company processes into juices and oils from selected Sicilian and Calabrian citrus groves. Again, the company stressed the fundamental criteria by which it operates: a sustainable supply chain, fair price, low environmental impact, compliance to the varieties and pesticide control to supply more than 150 products worldwide.



Campisi Citrus

The following day saw a visit to the Campisi fourth generation family operations near Siracusa (www.campisicitrus.it). Accompanied by several family members, the delegates viewed the company's supply chain with visits to the Campisi organic lemon (Siracusa Femminello) PGI orchards, the Campisi OPAC fresh packing unit and the Campisi Citrus processing plant. This included a visit to a recently reclaimed land area where new lemon orchards had been planted on very rocky soils that had to be removed. The Campisi group of companies prides itself on being the only Italian citrus company operating exclusively on a closed supply chain, owning every step of production from the seeds at the certified plant nursery, through growing, harvesting, and processing. This guarantees full traceability and the ability to ensure rigorous quality standards. Moreover, since 2002 the company has shifted entirely to organic production practices. The packing of the fresh fruit is undertaken next to the processing operation, thus reducing the post-production time prior to processing, and leading to both higher yields and quality for the essential oils and juices. Moreover, the Siracusa Femminello lemon variety has the highest concentration of citric acid leading to larger volumes of juice and essential oils, as well as a unique taste and smell.

The company produces a variety of citrus products including packaged products for fresh retail sale, frozen fruit juices, cold-pressed essential oils, and frozen fruit parts, such as slices, wedges, pulp cells and zests. At the time of the visit the company was celebrating its selection by a major European supermarket chain as the supplier of Sicilian organic lemons PGI (Protected Geographical Indication). The PGI certification label guarantees the origin of the lemon as well as its quality and taste.



Campisi Lemon Orchard



Agrumaria Corleone

The final day of the IST 24 saw visits to two companies in the Palermo area, one of Italy's leading citrus processing companies and the other a cooperative grower and packer. Agrumaria Corleone (www.agrumariacorleone.com) was established in 1890, when Salvatore Corleone introduced the sponge extraction technique to western Sicily, to produce lemon oil for use in the fragrance industry. A container of 2,000 litres of lemon oil was the dowry he gave to the groom on the marriage of his daughter! The company works closely with producers of citrus fruits – lemons, blond and blood oranges, mandarins – from Palermo, Trapani, Messina, Catania, and Syracuse. It then processes them into a range of juices and essential oils for the global juice, soft drink, flavour, and fragrance markets. The close collaboration with producers is seen as vital in ensuring quality, transparency, traceability, biodiversity, and sustainability in the supply chain. Similar systems are used in packaging control and logistics. Alongside conventional production, the company produces an increasing volume of organic products certified to a range of different organic standards. Another trend over recent decades has been the commitment and adoption of sustainability and ethically certified practices.

The delegates toured the processing operations including the careful washing and selection procedure followed by the large state-of-the-art squeezing and concentrating systems allowing the retention of the organoleptic characteristics of the citrus fruit. A short visit was made to the large computer controlled cold store facility used to preserve the juices and essential oils. The tour ended with a visit to the company's laboratories for detailed discussions of the quality control systems and the various oils and other ingredients that the company produces.

Consorzio A.P.O. Sicilia

The final visit of the IST 24 was to the growing and packaging operations of the Consorzio A.P.O. Sicilia (Sicilian Association of Fruit and Vegetable Producers) (<http://www.aposicilia.com>). The consortium brings together approximately 300 members spread over 500 hectares. They mainly work with organic fruit, according to the seasons but particularly lemons, as well as some vegetables. They are certified by Global Gap, BRC-IFS, ISO: 22005: 2008, 9001:2008. The President of the Consortium took delegates around the packing operations.



Agrumaria Corleone



Consorzio Packing House



Traditional Extraction Equipment



Consorzio Citrus medica





Some Conclusions

Each IFEAT Study Tour is both memorable and different. By the end of the IST 24 on Saturday 28th January delegates had, over six days, travelled by coach almost 1,000 km in almost perfect weather through some beautiful scenery in Calabria and Sicily visiting some historic cities and ten diverse companies – predominantly IFEAT Members - involved in a range of citrus activities and oils. Delegates saw and discussed at length several essential oils and other citrus products - bergamot, clementine, lemon, mandarin, blond and blood oranges. Each company gave a warm welcome and explained in detail aspects of the growing, harvesting, distillation and further processing of various citrus fruits and F&F ingredients, as well as supplying beautiful fruit drinks, several gifts and lots of calories through lunches and dinners!

The companies were very open and enlightening about many issues including citrus production, processing innovations, the growing impact of climatic variations, the increasing importance of organic essential oils and their certification, sustainability efforts, organic production monitoring, packaging, traceability, and quality control. The visit to the Chromaleont laboratories at the University of Messina was particularly enlightening regarding the technical advances being made in analysing essential oils and their constituents. It was exciting to see the important strides and efforts that the Italian citrus industry is taking to increase the quality and scope of natural citrus ingredients and products.

Alongside knowledge acquired from the visits and discussions with companies directly involved in essential oils, another important benefit was the interaction and

networking between the delegates – all IFEAT Members from 18 countries and representing many different nationalities and some of the major players in the citrus oil sector. Another important component of Study Tours is the ‘bus lectures’ that take place on the longer coach journeys. Delegates make short presentations relevant to their work and enlightened other delegates on a range of topics. Short lectures on the citrus oils sector in Argentina, Egypt, India, Mexico, and Spain; developments in biotechnology, IFEAT’s expanding education and research programme, Ugandan essential oils, and Indian sandalwood. The food provided throughout the tour was excellent, the transport worked well as did the Whisper communication system. The gifts were much appreciated including the rucksack, scarf, perfumes, dispenser, and ceramics as well as the detailed documentation and books.

A successful Study Tour is dependent on a collaborative effort by several players. Antonella Corleone and the LOC must be congratulated on arranging such an excellent diversified programme of visits and TMT, particularly Alessandro Trapani, for implementing the planned programme so well. However, most important was the role of the ten Italian companies involved who opened their doors and showed how the complex Italian citrus sector works, as well as illustrating the strength and support of the IFEAT family.

A book is planned on the IST 24 later this year as well as a short video and photos from the tour, which will be available on the IFEAT website (www.ifeat.org). The website also contains details of future Study Tours, the next being to Turkey from 1st – 8th June 2024.

“ What a fantastic time with lots of learning and good company, perfect organisation, the dedication of the hosting companies, lots of delicious calories and time passed by so quickly. It was my first Study Tour and I loved it from beginning to end.

“ I also want to express heartfelt gratitude to the IFEAT organisers and delegates, as well as the warmly welcoming factories that hosted us in this marvellous land, and special thanks to all my tour companions who made this tour more delightful. Spending this fantastic week together has been truly a great pleasure. THANK YOU.

