

Sustainable citrus
Embrace the future
of citrus, confidently.





Citrus, the most culturally diverse and versatile flavour, is loved virtually everywhere in the world. Centuries of commitment to citrus have enabled Givaudan to lead all aspects of this beloved ingredient.

Our long-standing commitment to citrus

1796 ●

Givaudan's commitment to citrus dates back to 1796, when Dodge and Olcott began importing and selling essential oils.

1930s ●

Ever since then we have participated in the research and development of citrus as a flavour, and over the decades we have developed a deep passion for delivering this profile that has almost

today ●

magical capabilities to shift and appeal to consumers and cultures around the globe.

Our long-standing commitment to citrus

1796

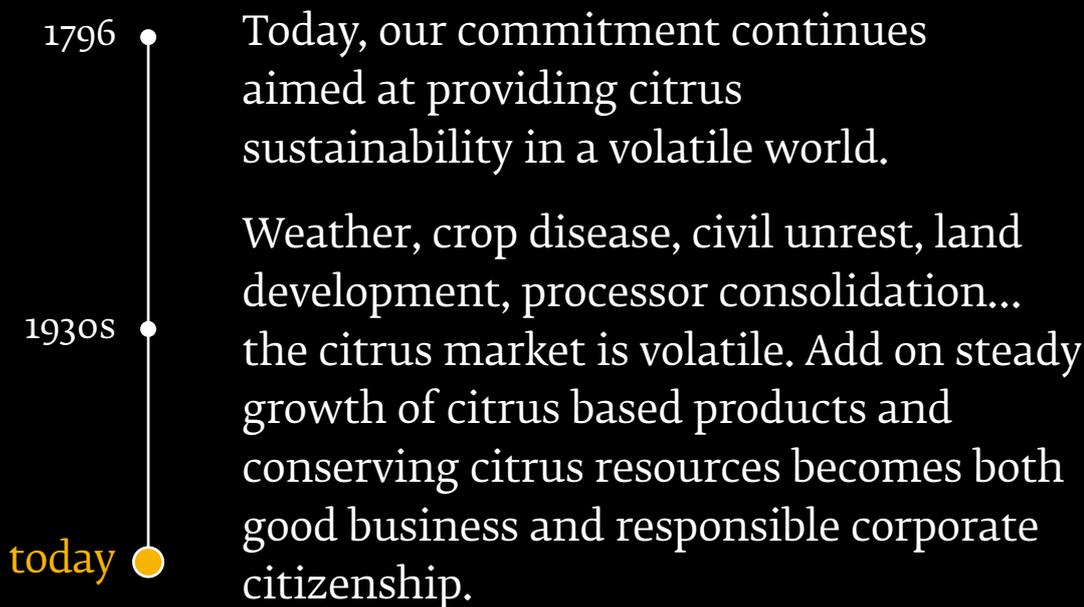
A century later, Dr. Ernest Guenther of Fritsche Brothers traveled the world observing processing techniques, collecting samples and verifying purity.

1930s

His work set new standards and allowed Fritsche Brothers to bring the most exotic and exciting products of their time to market. His resulting publication “The Essential Oils”, a six volume set on the chemistry, history, biological origin, methods and analysis, chemical components and other functions of essential oils, remains the standard today.

today

Our long-standing commitment to citrus



Supply

- Weather events
- Crop disease
- Civil unrest
- Land development
- Processor consolidation



Demand

- Expanding middle class in emerging markets
- Population growth
- Citrus popularity
- Health & wellness trends



Today's leading challenge: Citrus greening disease

Citrus greening disease, also known as Yellow Dragon or Huanglongbing (HLB), is today's main challenge for citrus around the world. Caused by bacteria that is spread by the Asian Citrus Psyllid, the disease interferes with transfer of nutrients from roots to tree. The resulting "greening" impacts fruit size, quality and tree productivity; if untreated it ultimately kills the tree.

Greening disease is found in every major citrus growing region with Florida, Mexico and Brazil being particularly impacted. Treatments are in development and if properly cared for, infected trees can continue to produce, but the effort to maintain infected trees has changed the economics of citrus production, making it increasingly difficult for groves to be financially successful.

At Givaudan, we have long recognised the sustainability challenge of citrus

For us, sustainable citrus means a commitment to source, innovate, formulate and partner responsibly and resourcefully.

1. **The way we source**

Our experienced procurement team knows the market from ground up and collaborates closely with vendors to ensure supply

2. **The way we formulate**

We engage in smart flavour formulation practices, building in sustainability for today and tomorrow

3. **The way we innovate**

We maintain a pipeline of citrus innovation that is delivering sustainable solutions for today and tomorrow, including our SunThesis® technologies

4. **The way we partner**

Our support for citrus research ensures citrus sustainability and biodiversity protection for future generations

1.

The way we source

Decades of experience in citrus sourcing around the globe is critical to success in today's challenging market.

We provide supply assurance through secure, long term agreements with key suppliers that ensure Givaudan has "first pick" of materials. We back up supplier agreements in alternate sourcing regions for key raw materials. Our designated, global, cross functional citrus supply chain team is there to identify issues before they impact the market and to put plans in place to

ensure uninterrupted supply. With our robust forecasting techniques and inventory management, we always have the materials we need when you need them. Moreover, Givaudan has two citrus ingredient centres of excellence in Lakeland Florida and East Hanover New Jersey. These sites provide manufacturing assurance for our broad palette of citrus ingredients.

Secure, long term supply agreements

Alternate sourcing regions

Central American advantage on high quality orange oil



Global, cross functional citrus supply chain team

Forecasting techniques and inventory management

Internal sourcing from two manufacturing sites

2.

The way we formulate

With a mindful and disciplined approach to citrus flavour creation, we can exceed your citrus needs today and tomorrow.



Sustainable ingredient selection

Our flavourists start with a preferred palette of natural, sustainable materials. They are trained to build sustainability into their flavours by getting the most impact out of plentiful and low risk ingredients.



Regulatory and labelling

We work closely with our customers to understand product claims and label needs. We share our deep knowledge of availability and supply so that customers can make informed decisions.



Flavour formulation optimisation

Givaudan has a host of tools and formulation practices that ensure the optimisation of final formulations. Proprietary development software, extensive knowledge from our TasteTrek® Citrus programme, miniVas technology, our position as a manufacturer of primary citrus flavour ingredients and decades of ingredient research all ensure that we use the most impactful ingredients in formulations.

3.

The way we innovate

Valuing our citrus resources today,
to ensure their availability for tomorrow.

An example: SunThesis®

SunThesis® and our comprehensive approach to citrus sustainability allow us to offer you uncompromising taste and more control over the citrus market.

Our SunThesis® ingredients are natural materials. We use sophisticated analytical techniques to break down high risk citrus oils and then recreate their taste and functionality with the most readily available, cost conscious and natural alternatives.

These natural ingredients that are made for sustainability and cost control, function and taste like original citrus oils.



4.

The way we partner

Ensuring citrus biodiversity and viability for future generations.



TasteTrek® Citrus

TasteTrek® is one of the most powerful ways that Givaudan explores citrus and brings the essence of citrus to both customers and consumers. TasteTrek® Citrus began in 2006 at the Citrus Variety Collection at the University of California (UCR) in Riverside, one of the world's most extensive collections of citrus. The programme has evolved with seasonal, yearly treks in California, as well as treks in Brazil and Italy, Argentina, India, China and Japan.

TasteTrek® Citrus is a means to conduct field work in a way that fully represents the complexity and biodiversity of citrus. It is a route to find inspiration in nature leading to authentic and unique flavour experiences that delight consumers.

Our relationship with UCR started over a decade ago, with a \$1M commitment to establish The Givaudan Citrus Variety Collection Endowed Chair and to support the maintenance of this unique collection that is an incredible source of technical innovation and inspiration.



Citrus portfolio inspired by our discovery treks

In 2016 we celebrated 10 years of TasteTrek® Citrus. During that time we've trekked through groves in seven countries, tasted hundreds of fruits and analysed nearly as many. Here is a small sample of some of our tasty discoveries:



Oroblanco
Grapefruit, USA



Valentine
Pummelo, USA



Sukurajima
Mikan, Japan



Konkan
Seedless Lemon, India



Perão
Sweet Orange, Brazil



Castagnaro
Bergamot, Italy



Sanguinelli
Blood Orange, Spain



Femminello
Lemon, Italy



Meiwa
Kumquat, China



Our partnership with UCR

Safeguarding the world's premier
citrus variety collection.

We proudly sponsor the University of California Riverside (UCR) – the home of over 1,000 rare and commercial citrus varieties. Our decade long collaboration with UCR has supported research in critical areas of citrus greening and other diseases and has helped maintain the unique biodiversity of the world's premier citrus variety collection for the long term.

“My work with Givaudan has been both important for the maintenance of UCR's Citrus Variety Collection, and fascinating in that they can provide consumers the world over with flavours inspired by fruits from our grove.”

Tracy Kahn
Curator of UCR's Citrus Variety Collection

Sustainable citrus
Embrace the future
of citrus, confidently.