



Revitalizing the citrus narrative with Corefold™

Translating insights to bring authentic
flavor experiences that excite consumers



Harnessing nature and science for bright and bold citrus flavors

Citrus is a highly versatile and fascinating fruit family that dominates a large portion of the beverage market and is, therefore, considered one of the most important tonalities in the flavor market. With so many products already utilizing citrus as their core flavor and industry trends — especially in the health and wellness spaces — relying more and more on citrus for their products, the opportunities are abundant for developing fresh citrus profiles that can disrupt the market and excite consumers.

So, how can you tap into this rich yet complex world of citrus with innovative products? This is where ADM flourishes as your full-service partner. From the origin of the raw material and the technologies we employ to producing proprietary citrus flavoring ingredients and flavors that can recreate authentic profiles, to that first sip of an invigorating citrus-flavored beverage, we have a legacy of trust and expertise to help develop high-quality products in a variety of formats that can hit the market fast.

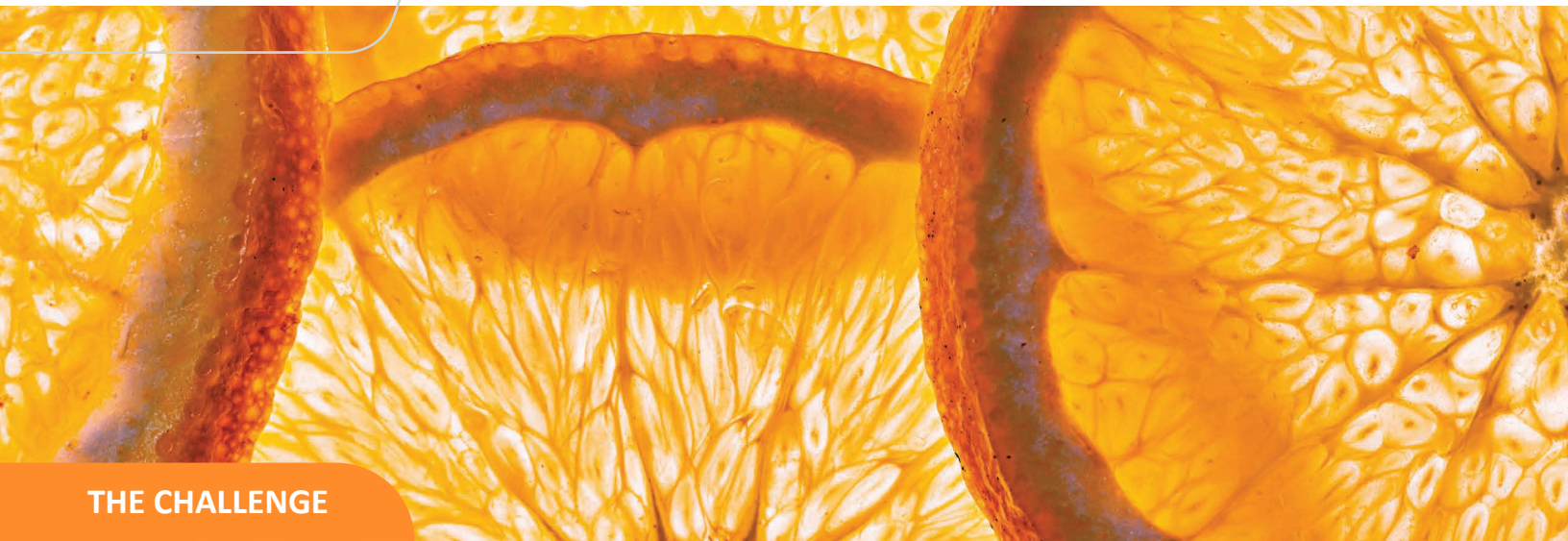
Percentage of market that citrus represents:*

50%

of the beverage market

20%

of the flavor market



THE CHALLENGE

There's more to citrus than what our taste buds perceive

As one of the industry leaders in the citrus space, we understand that there are unique challenges when developing technically adequate citrus solutions in the most consumer-appealing formats.

Challenge #1: People don't realize how exciting citrus flavors can be.

Our global research indicates there is a lack of excitement around citrus products, even though they represent a significant percentage of the flavor and beverage markets. For instance, 33% of consumers in key U.S. markets consider citrus-flavored drinks to be both ordinary and boring. And while understanding what will excite consumers isn't easy (and nor is delivering on it), the good news is that with challenges come opportunities to partner with an industry leader to refresh the citrus market and exceed consumer expectations with new, bold, and refreshing flavors that can delight.

Percentage of North American consumers who aren't as excited about citrus as they should be:*

33%

Challenge #2: Regionally, expectations and preferences vary.

An additional level of complexity to exciting consumers about citrus is that expectations and preferences vary greatly regionally. There isn't a one-size-fits-all formula that can be applied to consumers across the globe. The citrus narratives that consumers want can be quite nuanced, based on things like their awareness of citrus flavors and their curiosity and interest in consuming these products.

Consider the European and North American markets — two key regions for citrus. These markets are motivated by different things and expect different flavor experiences from citrus products. While most North American consumers expect a bold or vibrant taste that is exciting, powerful, and fresh, an overwhelming percentage of European consumers expect their citrus to be bright and lifting with clean and efficacious flavor notes. An even closer look at different European countries reveals these nuances become even more pronounced. Expand that to every region across the globe, and a deep understanding of what consumers want becomes vital for effective product development.



92% of European citrus consumers fall into two citrus narratives:*

Bright and lifting citrus:

- Bright
- Clean
- Playful

Elemental citrus:

- Efficacious
- Abundant
- Authoritative

100% of North American consumers look for either bold or vibrant citrus taste:*

Bold citrus:

- Bold
- Exciting
- Powerful

Vibrant citrus:

- Uplifting
- Bright
- Clean
- Fresh

To deliver varietal citrus flavors in the wide range of flavor profiles consumers seek, access to a large, high-quality citrus supply is necessary. The appropriate technological methods are then needed to successfully deconstruct citrus raw materials into specialized citrus ingredients that later get reconstructed into consumer-preferred flavors with bright and bold citrus flavor profiles. To provide these solutions for consumers, several things are key: a deep understanding of consumer preferences across the globe; the right citrus raw material know-how and access; molecular understanding of specialized folded oils; the full bandwidth of separation technologies to get to the molecular core of citrus; specialized citrus flavor creation; and product development expertise.



THE SOLUTION

Translating nature into flavors that WILL excite consumers

While most traditional sources of information tend to provide broad strokes into consumer insights and their preferred beverage formats and flavor types, we take a different approach. ADM dives deeper into consumer desires through in-depth research. We utilize innovative technology that allows us to deliver on our findings with a wide range of products in consumer-preferred flavor profiles.

Consumers are looking for less conventional flavor experiences, so beverages need to deliver nuanced flavor profiles that are impactful and long-lasting, with fresh top notes and a juicy, fruity body. Our proprietary flavor research allows us to break down what — specifically — those consumer needs are, and our technology allows us to respond. Our specialized analytics then helps us to understand — on a descriptor level — the most desired flavor profiles so we can apply them to a variety of formats.

Introducing Corefold™: Innovation to provide what consumers want

We understand that developing high-quality, citrus-flavored products means more than just creating lemon or orange flavors. It's about deconstructing flavor notes so that we can truly comprehend how to recreate the most authentic citrus taste in a range of applications.

Through our new approach to distillation known as **Corefold™**, we concentrate the core part of citrus oil through a proprietary process that amplifies the molecules responsible for impact and mouthfeel while also capturing the top notes for freshness and high aroma typically lost in standard distillation methods.

Corefold™ allows for more vibrant and higher impact notes than more conventional folded oils while emphasizing the desired notes for natural, true-to-fruit citrus flavors. And, thanks to our access to a global citrus supply and our own production sites in two different continents, we can capture a wide-ranging span of citrus oils that we then expertly apply to a variety of formats consumers will love.



Corefold™-based citrus flavors uplift a variety of product applications

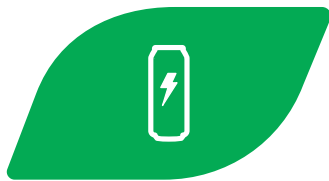
Besides capturing the true essence of citrus, our **Corefold™** technology allows us to bring a bright and bold flavor experience built from desirable flavor notes into a wide range of technically complex products. With **Corefold™** technology, we can help you address the challenges of these demanding product bases so that we're able to offer a broad portfolio of applications where citrus flavor and taste can truly shine through.

Such applications include:



FUNCTIONAL LIFESTYLE BEVERAGES (SPORTS DRINKS)

Isotonic products like sports drinks require functional ingredients and sweeteners that provide energy and electrolytes but may impact the taste. They also tend to have variable juice content and quality that can affect the flavor and taste profile and even reduce the body and mouthfeel of the drink.



ENERGY DRINKS

Like sports drinks, energy drinks also require the use of functional ingredients and sweeteners that can impact taste and flavor profiles. And because consumers use them for a boost of energy, the flavor is expected to be extra potent to match its functionality.



FLAVORED WATER

Because of the different water qualities and carbonation levels without any additional support from sugar or juice, citrus flavors need to really push through to provide an ideal body and mouthfeel.



BEER

Since beer has a very distinct flavor, additional flavor profiles need to be powerful enough to cut through the strong taste. Inversely, that full-bodied flavor is lost when working with zero-proof beer, and a more impactful and refreshing flavor experience is needed to make up for the loss in taste.



LIQUEURS

With liqueurs, a bold and powerful flavor experience is expected. Citrus notes must be strong and potent and provide a pop of flavor because this beverage type often has a very harsh alcohol base that can overwhelm the fruit juice and sweeteners utilized.



ALCOHOLIC BEVERAGES

Alcoholic beverages are varied and require a broad range of exciting citrus profiles. They are technologically challenging, as their bases can vary and have different degrees of quality.

Shaping and delivering citrus tastes across the globe

With so many different applications that can be infused with individual citrus flavors using our **Corefold™** technology, the next step is to tailor each format to the regionally desired flavors consumers are seeking. And since our research has shown that citrus flavor profiles consumers want can be quite varied, understanding what flavor notes consumers desire is essential to translating these preferences into actionable flavor languages.

Flavor preferences by region

EUROPE



United Kingdom

Consumers in the United Kingdom prefer exciting but recognizable elements. Lime and blood orange have high awareness, but consumption is moderate, so upgrading flavor notes for a brighter taste can help raise engagement.



Germany

With 22% of German consumers identifying as unenthusiastic about citrus, a way to create more excitement and engagement is through flavor profiles that sit outside traditional flavors, like blood orange, mandarin, and pink grapefruit.



France

French consumers respond well to more sophisticated, exciting, and stimulating citrus through more refreshing notes in flavors like lime and clementine.

ASIA / PACIFIC



China

Consumers in China are interested in the evolution of more traditional flavors, such as lemon and orange. They're especially interested in flavor profiles like Meyer lemon, bitter orange, and blood orange.



Japan

The Japanese market is interested in citrus varieties with provenance like Sicilian lemon, Tahitian lime, and Valencia orange, with red citrus varieties like pink grapefruit and blood orange also appealing to consumers.



Australia

Australian consumers seek new (though not foreign) narratives around more traditional citrus flavors. They consider orange to be more interesting than lemon, with variations like bitter orange being particularly appealing.

NORTH AMERICA

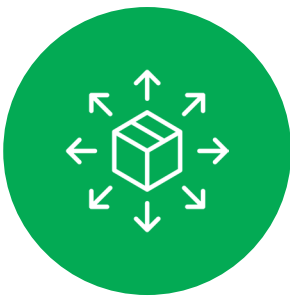


United States

A large portion of American consumers finds flavors like lemon and ruby red grapefruit to be boring and less appealing. However, they do have a higher interest in varieties like Tahitian lime, Meyer lemon, and bitter orange.



WHY ADM?



OUR SUPPLY

Thanks to our access to a large supply of citrus, we can create a wide-ranging portfolio of citrus flavors developed for all the regional tastes consumers seek. As a flavor supplier with broad raw material access and two citrus production sites, we have the quantity, quality, supply security, and bandwidth to produce and scale citrus flavors both globally and regionally.



OUR APPROACH

Our collaborative approach to technical development, along with our global and regional flavorists, allows us to produce a robust portfolio of flavors that can deliver the true-to-fruit citrus taste consumers crave. These flavors are tailor-made for your consumers in-house by using specialized ingredients to ensure the desired functionality in its final application — with the versatility to be utilized in any desired format.



OUR INNOVATION AND PARTNERSHIP

On a molecular level, nature is at the core of our expertise. We offer a full spectrum of solutions that starts right in our own groves. From access to superior raw ingredients that can create a plethora of flavor experiences, to flavorists who can produce each distinct citrus flavor that excites consumers, to developers who can apply these flavor profiles to consumer-preferred formats, we help you every step of the way. When you work with us, we can help you ideate, develop, and craft the highest-quality products that can maintain their true-to-fruit authenticity and are quick to hit the market.



CONCLUSION

Partner with us for your citrus product development

Ready to infuse something amazing into your product portfolio? Whether you're looking to enhance your existing products or you need assistance creating something entirely new that disrupts the market, our portfolio of ingredients, superior formulation expertise, and technical know-how can help you capture the essence of citrus for all your product development needs.

To get started, visit us at www.adm.com/citrus for more information.