



**PearlEdge™**  
COLORS FROM NATURE

**Giving Bright  
White a Place  
in the Rainbow**





# Table of Contents

- 3 What's Up with White Color?
- 7 Application Challenges
- 9 Filling in the Gap and Leading the Market
- 11 Nature is Our Starting Point
- 13 Introducing PearlEdge™ Silk
- 17 More Applications, More Benefits
- 20 ADM's Approach

# The brilliance of cleaner label white.

Bright white signals freshness, goodness and purity to food and beverage consumers, but achieving it can be a challenge. In the past, many food and beverage manufacturers used titanium dioxide ( $\text{TiO}_2$ ) as their go-to whitening solution.  $\text{TiO}_2$  is used as coloring for food (E171) and known for its intense whitening and opacifying effect, which is also present and used in products such as dietary supplements, medicines, cosmetics and even paints.

However, in response to a variety of concerns including governmental regulation, consumers' desires for cleaner labels, and potential employee health concerns, many manufacturers want  $\text{TiO}_2$  removed from their products and their labels.



## What is titanium dioxide $TiO_2$ ?

- White inorganic compound created by titanium reacting with the oxygen in the air.
- Fine, white powder that provides a bright, white pigment.
- Whitening agent used to whiten foods or give a cloudy appearance to drinks.
- Also used in a range of industrial and consumer products.
- Due to public concern, EU passed legislation to take  $TiO_2$  out of products and off ingredient statements by August 2022



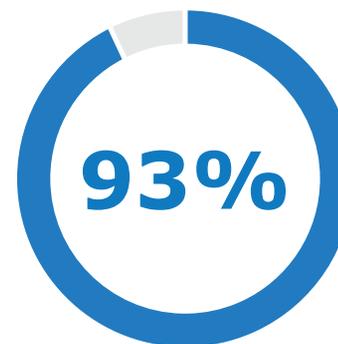


Other ingredients—including modified starch, calcium carbonate and calcium phosphate—can be possible alternatives to  $\text{TiO}_2$ , but each has their own specific drawbacks, from cost, to performance, to negative consumer perception. Since these current alternatives are either not clean label friendly or fail to deliver performance and stability, there has been a market gap for effective white colors from natural sources, until now. ADM is adding bright white into the full rainbow of naturally sourced ingredients in our Colors from Nature™ portfolio.

## What do consumers expect from bright white in their applications?

As consumers continue to move away from  $\text{TiO}_2$ , it makes space for an increasing number of bright white alternatives. However, there are certain alternatives that are increasingly recognized as undesirable ingredients, such as modified starch, calcium carbonate, and calcium phosphate.

Consumer drivers, such as the growing desire for clean, clear labels and ingredient transparency as the foundation of consumer trust, have laid the groundwork for an evolving market landscape. In response to this shift in consumer desires, manufacturers have moved towards the removal of titanium dioxide off labels, and have switched to easy-to-read, easy-to-understand ingredients.



**of consumers have negative comments online in reference to Titanium Dioxide in food products<sup>1</sup>.**

***"It just doesn't sound like something that would be healthy for you to eat."***

Consumer, re:  $\text{TiO}_2$ <sup>2</sup>

<sup>1</sup>Brandwatch, social listening, 2021

<sup>2</sup>ADM Outside Voice, Dec. 2020

<sup>3</sup>ADM Outside Voice, Dec. 2021



## **Challenges and solutions for confection applications & beverages.**

As the popularity for bright white color alternatives continues to grow, there is an increased need for color solutions that can ensure that challenges are met while simultaneously addressing consumer concerns. Notably, there are common challenges with white hues amongst confection and beverage applications that often make it difficult for manufactures to ensure that their products are visually appealing and meet consumer expectations for clean label appeal and ingredient transparency.

Issues such as a noticeably uneven texture and lack of brightness are common challenges that are hard to meet with  $\text{TiO}_2$  alternatives. Other white color  $\text{TiO}_2$  alternatives tend to complicate the panning manufacturing process as the alternatives increase the viscosity of the sugar syrup and contribute to uneven coating and texture. Additionally, difficulty with emulsifying can lead to issues with color and texture for beverage applications.

While some major brands have already shifted away from  $\text{TiO}_2$ , current alternatives in the market are not clean label friendly or have failed to deliver on promised performance and stability.

- Modified Corn / Food Starch – chemically modified
- Calcium Carbonate – chemical sounding ingredient, used in blackboard chalk and antacids





## **Bold whitening capabilities.**

**Filling in the gap and leading the market with white color solutions.**

With ADM's innovative PearlEdge™ portfolio for bright white hues, you can achieve superb whitening in food and beverage with solutions that enables whiteness of similar intensity to  $\text{TiO}_2$  while providing a cleaner label. PearlEdge™ solutions are made through applying our proprietary technology and processes to vertically integrated raw materials, so you no longer need to rely on  $\text{TiO}_2$  or other unwanted ingredients for whitening or opacity.



ADM's PearlEdge™ solutions not only help you easily achieve bright white shades with cleaner and clear labels, they also give you an edge when it comes to better stability, performance and appearance in a variety of applications. Through our unique capabilities of adding value through supply chain reliability and complete vertical manufacturing integration, ADM executes with excellence, providing you the industry-leading quality solutions required to give you an edge for bright white products.



## **Brighter solutions.**

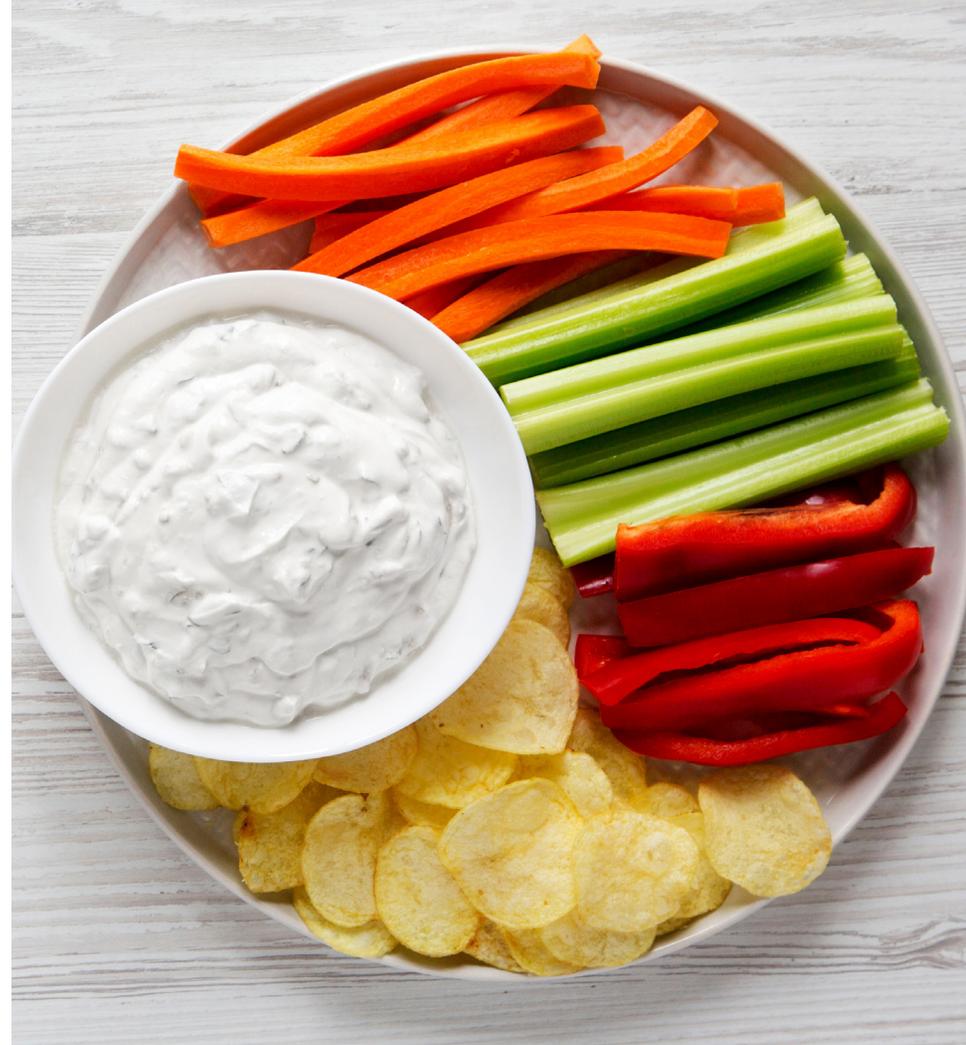
- Vertical integration
- USA & EU Based Ingredient – native corn starch
- Global footprint and supply chain network
- High surface area, controlled quality throughout process
- Solutions for cleaner labelling
- Superb whitening in food and beverage

## Nature is our starting point.

We transform elements present in nature by using patent pending and proprietary technologies to provide unique bright white solutions for our customer's needs in the Food, Beverage, Supplements and Pet Food industries.

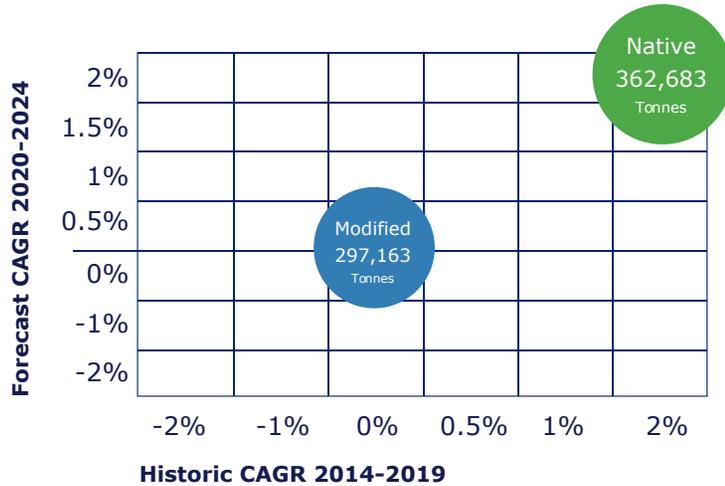
## Complete vertical integration.

- Clean label friendly - "native corn starch" instead of "modified starch"
- ADM has control over the whole process from seed-to-fork.
- Traceability and control of raw material needed to produce the precise white shade.
- Complete control over specification and all quality parameters of raw material.



## Native starch\* expected to grow in the coming years.

Modified starch volumes flat due to consumer demand for clean label options



The starting material for our PearlEdge™ technologies comes from over 100 years of ADM experience and expertise, building reliable infrastructure and customer trust in corn-based starch products:

- A global supply network and logistics infrastructure
- Conveniently placed assets
- Commitment to quality
- Product manufacturing expertise to ensure our products work for your processing needs

2019 Data Euromonitor \*Functional Native & Native Starch



# PearlEdge™ patent pending technology.

Natural research delivering increased performance.



## Experience PearlEdge™ Silk and Satin.

Made from native corn starch using patent pending technology, PearlEdge™ Silk and Satin enables whiteness of similar intensity as  $\text{TiO}_2$ . They offer the best brightness of the entire PearlEdge™ product range, along with a smooth and glossy surface and fast dispersibility, for:

- Visible benefits in targeted confection applications
- Proven stability and application performance
- Improved texture
- Excellent performance with other hues
- Natural solution with a cleaner label – removing “titanium dioxide”, “modified starch”, and other unwanted ingredients from labels.
- Benchmarked against competitive technologies with superior performance.

## White hues have never looked so smooth.

Derived from nature, PearlEdge™ Silk, Satin and Shine solutions allow you to replace ingredients such as TiO<sub>2</sub> and modified starch with native corn starch on your ingredient list. PearlEdge™ Silk and Satin have been tested in a multitude of application processes to illustrate their superior performance. It keeps in suspension, and in confections, works extremely well in sugar syrup to alleviate uneven texture, blotchy surface and perceived roughness.





## **Innovative solutions for food & beverage.**

Our PearlEdge™ portfolio was designed as an array to solutions to address different applications, markets, certifications and regulatory needs, rather than a one-size fits all approach. Our color scientists and regulatory teams can provide guidance to choose the optimal solution that work well for your specific applications and achieve a desired white target shade.

## Giving you an edge with our technical excellence.

At ADM, we understand the challenges in finding the optimal naturally derived solution to fit your specific application. Not only do we have a broad and unique portfolio of solutions for white, but the technical expertise and technologies to offer the right solution for your specific needs.

- 8 global R&D facilities
- Over 400 food scientist & engineers
- 28 customer innovation & application centers in 22 countries
- 3 color centers of excellence
- Holistic approach to product development & in-house capabilities - Expert guidance through the entire formulation and production process. Expertise in Plant-based solutions.





## **More applications, more benefits.**

PearlEdge™ solutions provide a clean label opportunity to create bright white. They also enable the rest of the rainbow by whitening the base coat of confections and more, so colors applied on top appear brighter and more vivid.

In beverages, PearlEdge™ utilizes industry-leading emulsification technology for a strong whitening and opacifying effect that is compatible with other beverage ingredients, with no ringing, precipitation, sediments or staining.

We support developers with an ever-expanding portfolio of naturally sourced white color solutions for a variety of application areas including:

- Hard and Soft Panned Confections (chewing gum and other types of candy)
- Baked Goods
- Dairy & Plant-Based Alternatives
- Powdered Drinks & Mixes
- Soups, Sauces & Dressings
- Beverages (Alcoholic and Non-alcoholic)
- Meat & Seafood Alternatives
- Pet Food & Treats

## Claims

- FDA Approved
- EU Approved
- Kosher Certifiable
- Halal Certifiable (Islamic Food & Nutrition Council of America)
- Non-GMO





## For Food Applications (powdered format, non-GMO, non-allergenic\*):

- PearlEdge™ Silk
- PearlEdge™ Satin
- PearlEdge™ Shine
- PearlEdge™ Shine+
- PearlEdge™ Star-Lite  
for sugar-free applications

## For Beverage Applications (non-GMO, non-allergenic\*):

- PearlEdge™ Splash for non-alcoholic beverages (liquid format)
- PearlEdge™ Splash+ for alcoholic beverages (liquid format)
- PearlEdge™ Star-Lite for sugar-free applications (powdered format)



\*Allergens vary by region and country. Review with your local regulatory team that these meet your specific requirements

## ADM delivers for you.

ADM unlocks the beauty of nature. The Colors from Nature™ portfolio covers the full rainbow of colors—including bright, cleaner label white— providing beautiful solutions consumers will love across all applications spaces. Our white solutions can be used to create a clean base on top of which we can apply our Colors from Nature™, helping to achieve high quality, stable and vibrant color solutions for any application.

**Count on us to meet any formulation challenge head on and to deliver for you and your consumer every time.**





**Partner with a global leader who gives you an edge.**

ADM is a global leader in coloring foods and beverages, with the technical knowledge to deliver the vibrant colors that consumers demand in all types of products. When it comes to reflecting the beauty of nature with the full rainbow of colors—even in the most difficult application spaces—your edge is our expertise.