

oterra™



# The Essential *Color* Book

Together towards natural

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Use of raw materials is subject to local food regulations.  
For more information, please consult your Oterra sales manager.



Doughnut. Color from black carrot in icing and filling

# Making natural colors *easy* for you

## Oterra is the largest provider of naturally sourced colors worldwide

Oterra's roots trace back to Chr. Hansen A/S, a Danish bioscience company with a remarkable legacy. Since our first color launch in 1876, we have been committed to natural colors. Today we develop, produce and sell natural colors and coloring food products to customers across the food and beverage industry. We are a vertically integrated operation with the widest portfolio in the market, focused exclusively on natural colors and coloring foods.

Our entire business is founded on the belief that 'nature got it right'. Sustainability lies at the heart of Oterra's operations. We recognize the crucial link between nature and health, understanding that the well-being of our planet directly impacts the well-being of its inhabitants.

Oterra's commitment to a global mindset is embedded in our identity. Our international presence and diverse team contribute to a dynamic environment, which fosters a culture of adaptability and innovation, where we embrace change. In a world that is constantly evolving, our international perspective equips us to navigate the complexities of the global market.

## Global reach, local touch

Oterra's impact is felt across -130plus countries, serving over 3,100 customers. Even though we cover such a vast area, our team takes pride in offering localized solutions and customized support to our customers. Oterra is present in more than 25 countries. The map shows where we have office, lab, or production facilities.



● = Oterra



## Sustainability is in our DNA

As a company deriving its products from nature, sustainability is central to our corporate agenda and features prominently in our company mission of 'making natural food and beverage easy for a healthy and sustainable world'. We have thought carefully about our impacts and where we can make the biggest difference- for people, the planet, and our customers.

Through meticulous analysis of our value chain, beginning from the sourcing of raw materials and extending all the way to the end consumer, we have taken a comprehensive approach within our sustainability strategy covering environmental, social and governance matters.

Oterra  
sustainability  
strategy



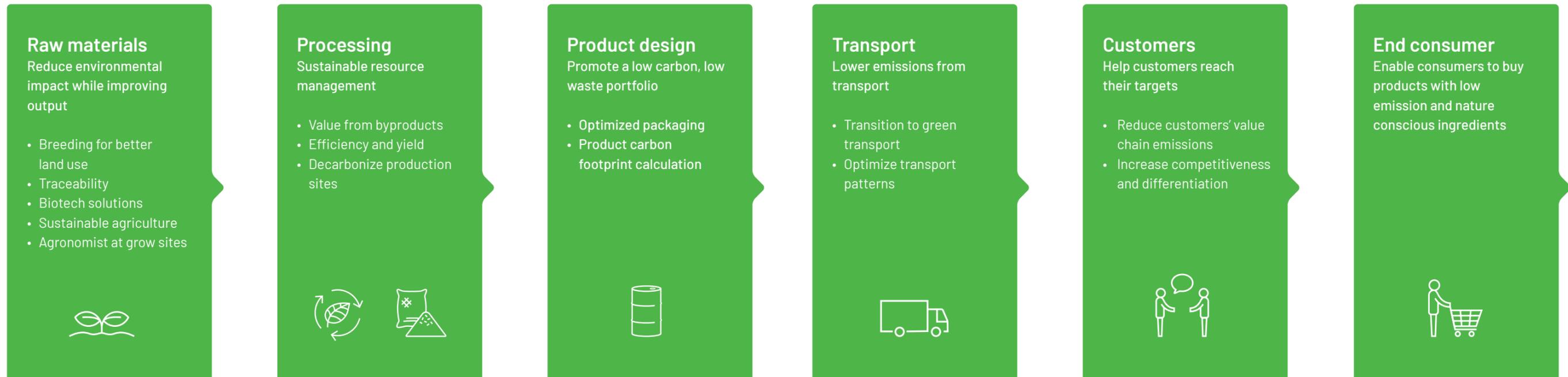
## Commitments and memberships

Central to our strategy is climate action. We have set ambitious, SBTi- validated targets to reduce our impacts by 2030, and we are proud to source 100% renewable electricity across Oterra. By active engagement we demonstrate our commitment to sustainability, transparency, and responsible business practices.



ecovadis

## The sustainable value chain



## Shaping how the world *colors* food

Color products come in different formats and for different purposes:



Powder

Liquid

Emulsions



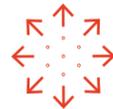
### Water soluble colors

- Dissolve in water and are soluble in the water-portion of the application
- Typically transparent in water



### Oil soluble colors

- Dissolve in oil and are soluble in the oil-portion of the application
- Typically transparent in oil



### Dispersible colors

- If insoluble in the application, the pigment can be formulated to disperse
- Usually cloudy in appearance



Red beverage. Color from Hansen sweet potato™

Our natural color range is available in a number of different color formulations and technologies, developed to improve the functionality of the pigments we work with:

### FruitMax®

Clean and simple: Our FruitMax® range is made from a wide variety of mainly fruit, vegetable, and plant concentrates. Minimally processed using gentle production methods, FruitMax® colors can be clearly and simply labelled on ingredient lists and could help you position your food and beverage products as less processed and more natural.

#### Why choose FruitMax®:

- Minimally processed with coloring properties from natural raw materials like fruit, vegetables, and edible plants
- Recognizable ingredients support clear, easy-to-understand labelling
- Opportunity for brand re-positioning and revitalization
- Suitable for vegetarians, halal, and kosher diets



Steel-cut oats. Color from spirulina

### Organic FruitMax®

With consumers increasingly seeking healthier and more sustainable options the Organic FruitMax® range is perfectly positioned, offering coloring foods products made from only the best, all-natural ingredients.

#### Why choose Organic FruitMax®:

- Minimally processed using natural, organic ingredients that are cultivated in compliance with organic farming standards
- Suitable for a broad range of food and beverage applications
- Available as single colors but possible to combine for additional shades
- Authorized under FDA Organic and European organic programs



Jellies. Colors from orange carrot, black carrot, caramelized sugar, and spirulina (Organic FruitMax®)

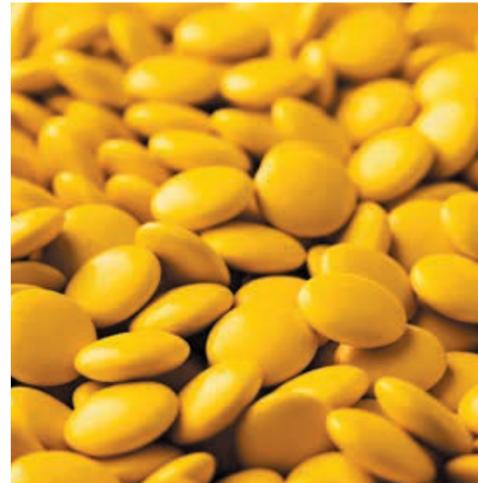


## CapColors®

Vivid, encapsulated, stabilized colors. CapColors® offer exceptional color performance. The encapsulated formulation improves the functionality and stability of the natural color pigments and helps retain their brightness and intensity in your food or beverage.

### Why use CapColors®:

- High resistance to light, heat, and oxidation
- Increased color potency ensures intense, vibrant shades at a lower dosage
- Limits color migration in layered products
- Supports smooth and even coverage of panned products and reduces drying time



Dragees. Color from turmeric

## I-Colors®

Vibrant instant powder colors for enhanced product appeal. I-Colors® have excellent plating abilities which ensure instant, vibrant, and spotless colorization in powder-based products like powdered beverages, instant desserts, pressed candy and snack seasoning. In fat-based applications like fat-filling and compound coating more intense colors with no specking can be achieved with lower dosage.

### Why choose I-Colors®:

- Easy to dose and dissolve/disperse
- Plates and colors evenly
- No dephasing, lumps, or spots in powder blends
- Ideal alternative to synthetic lakes



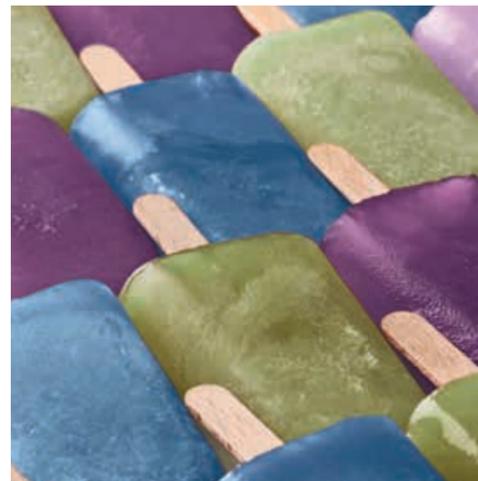
Mix of snacks. Seasoning color from Hansen sweet potato™ (I-Colors® Red 125WSP)

## ColorFruit®

High strength, multi-purpose colors from nature. Versatile and easy-to-use, our general purpose ColorFruit® range spans the full palette of bright, stable natural colors.

### Why choose ColorFruit®:

- Very wide range of raw materials and shades
- Suitable for a broad range of food and beverage applications
- Stable and robust
- Authorized under various regulatory frameworks



Water ice. Color from Jagua fruit and more

## DairyMax®

Developed to help you achieve more profitable cheese production, our DairyMax® range of oranges and yellows colors ripened cheese with minimal color transfer to the whey.

### Why choose DairyMax®:

- Perfect match for annatto shades
- Uses patented WhiteWhey® technology
- Low color transfer to whey eliminates the need for bleaching
- Produces more valuable whey for use in infant formula and protein powders



Different cheeses. Color from annatto and orange carrot

## Red Strawberry Fragaria®

Award-winning red for fruit preparations for the dairy industry. Red Strawberry Fragaria® is a robust, highly concentrated carmine for red fruit preparations in yogurt and other fermented dairy applications. The extremely stable, patented formula enables you to color both the dairy and the fruit with no risk of shade shifting.

### Why choose Red Strawberry Fragaria®:

- Excellent fruit staining ability
- Exceptional performance and process stability
- Concentrated, cost-efficient carmine formulation
- Minimizes batch to batch color variability



Yogurt. Color from carmine (Red Strawberry Fragaria 100WS)



In the lab: comparison of fruit prep color migration



## Targeted *color* solutions and application expertise for F&B industries

Over the past 145 years, we have developed the largest and most vibrant natural color portfolio in the industry and built up an extensive global presence.

All of our natural colors have unique characteristics and properties that make them ideal for a wide range of applications, including:



We work closely with our customers to develop solutions tailored to their specific industry and application needs. Whether the challenge is converting from synthetic to natural colors, customizing formulations and blends according to other ingredients, or creating a plant-based variant, we can help.

### Dairy & fruit prep

- Expertise in coloring a broad range of dairy products: dairy and plant-based yogurt, fruit-preparations, UHT acidified milks & desserts, cheese & processed cheese, and yellow fats & spreads
- Extensive knowledge of process conditions (e.g. UHT) and ingredients that may impact color performance, stability and shelf life
- Conversion from synthetic color to natural color
- Optimization of color performance, color labeling, cost-in-use and stability



### Ice cream

- Technical expertise with colors in all types of edible ice: dairy and non-dairy-based ice, water-based ice-lollies and soft-serve ice cream
- Extensive knowledge of processing condition's impact on color performance (e.g. heat, homogenization, holding time, and pH)
- Impact of ice cream base ingredients on color stability and performance
- Conversion from synthetic color to natural color
- Support with optimization of color performance, match to flavor profile, cost-in-use and stability





## Confectionery

- Technical expertise with colors in all types of confectionery ranging from boiled candy, to panned, pressed, extruded, aerated or fat-based candy
- Deep knowledge of impact of processing parameters such as heat, holding time, pH on color performance and stability
- Conversion from synthetic color to natural color
- Support with optimization of color performance, cost-in-use or stability



## Savory and meats

- Expertise in coloring a broad range of savory and meat products: Snacks, seasonings, condiments, noodles, ready-to-eat soups and sauces, sausage, casings, surimi and batters
- Extensive knowledge of process & storage conditions as well as ingredient interactions that may impact color performance and stability
- Expert in-house snack extrusion capabilities for lab trials
- Conversion from synthetic color to natural color
- Optimization of color performance, cost-in-use and stability



## Beverage

- Technical expertise in all types of beverage applications from carbonated soft drinks and juice-based drinks to instant powders and alcoholic drinks
- Extensive knowledge in prevention of ringing, sedimentation, oxidation and fading of colors during storage
- Knowledge of pigment interactions with ingredients for compounding
- Conversion from synthetic color to natural color
- Optimization of color performance, cost-in-use and stability



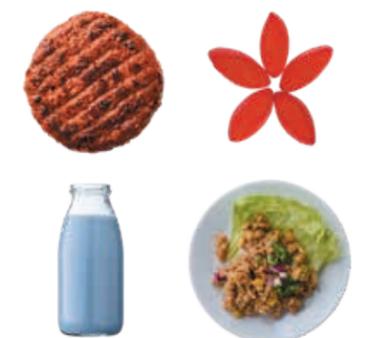
## Bakery and cereals

- Expertise and color insights in a broad range of baked goods and fillings, frostings, powder desserts, and extruded cereals
- Superior insights and heat stability data with baked goods
- Expert in-house cereal extrusion capabilities for lab trials
- Conversion from synthetic color to natural color
- Optimization of color performance, cost-in-use and stability



## Plant-based alternatives

- Experience in a range of applications from meat analogs to non-dairy products, frozen desserts and confections
- Expertise in mimicking the browning of meat and fish during thermal processing
- Several 'off the shelf' solutions for a wide range of plant-based applications





## Pet food

- In depth knowledge of wet and semi-moist pet food considering high moisture, packaging style, and fresh and frozen types
- Expertise in dry pet food production methods and relevant requirements for extruded kibbles, food toppers or freeze-dried food
- Technical understanding of baked treats, different requirements to achieve the crunchy treats, biscuits or training bites
- Experience of background color and impact from other ingredients in the recipe, e.g. dry meat or different types of flour may impact the shade and color brightness of the final application



## Tablets and capsules

- Oterra color products for food and beverage can also be used for coloring of dietary and nutritional galenics/delivery systems like tablets and capsules
- With both powder and liquid food color options, we are able to provide you with the exact coloring product for your production needs
- Solutions for the coloring of compressed tablets, functional gummies, capsules, and instant powder drinks





## From *earth* to color

Nature's true colors are the focus for all our Oterra food color products. The pigments come mainly from fruits and vegetables, but they aren't the varieties typically grown for food. Our varieties are specially bred to produce the greatest color content with the smallest agricultural footprint. That's good for people. Good for the planet. And good for your business.

Our agricultural research team conducts agronomy programs and collaborates with leading universities to improve crops and farming methods. It's a long-term investment to produce the most suitable plants for natural color production. But both farmers and food manufacturers benefit from the improved yields of robust crops that mature quickly with high color content.

Our Oterra sourcing team is on the ground wherever our crops are grown and maintains long-term relationships with growers and suppliers. They transfer knowledge to improve methods and ensure the actual farm work and local processing is conducted safely and sustainably. Being close to the source also allow us to monitor crops throughout the season and conduct fair and accurate price negotiations that take into consideration the harvest and quality of the overall crop.

Our environmentally conscious, global logistics system handles the crops grown on five continents, color production at specialized factories, and then shipment to food manufacturers around the world. At Oterra, we really do go to the ends of the earth to bring you the best natural food colors.

*Use of raw materials is subject to local food regulations.  
For more information, please consult your Oterra sales manager.*

### Quality assurance you can rely on

Certification, quality control, documentation and consistency are key to ensure food safety. Color is a small part of your finished products. However, it plays a big role in appearance. We ensure our quality management processes save you time and money.

Global Food Safety Initiative (GFSI) is an industry-driven global collaboration to advance food safety. All Oterra color factories have an FSSC 22000 certificate recognized by GFSI.



[mygfsi.com](http://mygfsi.com)



About QA

## Pumpkin

Carotenes



Warm yellow



 Used in coloring foods

Known for

- Good heat and light stability
- Low off flavor
- Unaffected by pH
- Cloudy in transparent applications

Mainly used for

- Confectionery
- Dairy
- Fruit preparation
- Prepared food

## Safflower

Safflower yellow



Cold yellow to bright yellow



 Used in coloring foods

Known for

- Good heat and light stability
- Unaffected by pH
- Off-flavor may develop depending on dosage and application
- Transparent

Mainly used for

- Beverage
- Confectionery
- Prepared food
- Tablets and capsules

## Turmeric

Curcumin



Cold yellow to orange



 Used in natural colors

Known for

- Good heat stability
- Unaffected by pH
- Poor light stability unless encapsulated
- Off-flavor may develop depending on dosage and application

Mainly used for

- Beverage
- Confectionery
- Prepared food
- Tablets and capsules

## Gardenia yellow

Crocetin and crocin



Bright yellow



 Used in natural colors

Known for

- Good heat stability
- Low light stability

Mainly used for

- Confectionery
- Prepared food

## Marigold

Lutein



Yellow to warm yellow



 Used in natural colors

Known for

- Fair heat and light stability
- Unaffected by pH

Mainly used for

- Beverage
- Confectionery
- Prepared food
- Tablets and capsules

## Palmfruit

Carotenes



Warm yellow to orange



 Used in natural colors

Known for

- Good heat and light stability
- Unaffected by pH
- Some formulations will be cloudy

Mainly used for

- Beverage
- Confectionery
- Dairy
- Fruit preparation
- Ice cream
- Prepared food
- Spreads
- Tablets and capsules

## Orange carrot

Carotenes



Warm yellow to orange



 Used in coloring foods

Known for

- Good heat and light stability
- Low off flavor
- Unaffected by pH
- Cloudy in transparent applications

Mainly used for

- Beverage
- Confectionery
- Dairy
- Fruit preparation
- Ice cream
- Tablets and capsules



## Annatto

Bixin and norbixin



Warm yellow to reddish orange



Used in natural colors

**Known for**

- Good heat stability
- Shade is unaffected by pH
- Binds to protein, making it more stable
- Can be sensitive to light

**Mainly used for**

- Dairy
- Fruit preparation
- Prepared food
- Meat
- Pet food

## Paprika

Capsanthin and capsorubin



Light orange to reddish orange



Used in natural colors

**Known for**

- Good light stability
- Unaffected by pH
- Fair heat stability
- Off flavor may develop depending on dosage and application unless de-flavored
- Sensitive to oxidation

**Mainly used for**

- Confectionery
- Dairy
- Fruit preparation
- Prepared food
- Meat

## Tomato

Lycopene



Orange red to red



Used in natural colors

**Known for**

- Good heat and light stability
- Unaffected by pH
- Cloudy in transparent applications

**Mainly used for**

- Beverage
- Dairy
- Prepared food

## Fungus carotene

Natural beta-carotene



Warm yellow to reddish orange



Used in natural colors

**Known for**

- Good heat and light stability
- Unaffected by pH
- Shade depends on formulation and dosage
- Cloudy in some formulations

**Mainly used for**

- Beverage
- Confectionery
- Dairy
- Fruit preparation
- Prepared food

## Hibiscus

Anthocyanins



Reddish pink to purple



Used in coloring foods

**Known for**

- Change in pH cause shade shift
- Can be sensitive to light
- Pink in neutral pH

**Mainly used for**

- Color blends

## Cochineal

Carminic acid and carmine



Orange to burgundy shades



Used in natural colors

**Known for**

- Good heat stability
- Very good light stability
- Not suitable for vegetarians

**Mainly used for**

- Beverage
- Confectionery
- Dairy
- Fruit preparation
- Prepared food
- Meat



**Red beet**  
Betanin



**Red to bluish red**



Used in natural colors and coloring foods

**Known for**

- Suitable for low heat applications
- Unaffected by pH
- Sensitive to heat, light, oxygen

**Mainly used for**

- Confectionery
- Dairy
- Fruit preparation
- Prepared food
- Meat

**Hansen sweet potato™**  
Anthocyanins



**Vibrant red and pink**



Used in natural colors and coloring foods

**Known for**

- Heat and light stable
- Performs well in acidic applications
- No to low off-flavor
- Changes in pH cause shade shift
- Very bright red shade compared to other anthocyanins

**Mainly used for**

- Beverage
- Confectionery
- Fruit preparation
- Prepared food
- Meat
- Pet food

**Elderberry**  
Anthocyanins



**Reddish pink to purple**



Used in natural colors and coloring foods

**Known for**

- Fair heat and light stability
- Performs well in acidic applications
- Use if fruit labelling is required
- Changes in pH cause shade shift

**Mainly used for**

- Fruit preparation
- Color blends

**Purple sweet potato**  
Anthocyanins



**Reddish pink to purple**



Used in natural colors and coloring foods

**Known for**

- Heat and light stable
- Performs well in acidic applications
- Changes in pH cause shade shift

**Mainly used for**

- Beverage
- Confectionery
- Fruit preparation
- Ice cream

**Red raddish**  
Anthocyanins



**Vibrant red and pink**



Used in coloring foods

**Known for**

- Heat and light stable
- Performs well in acidic applications
- Changes in pH cause shade shift
- Off-flavor may develop depending on dosage and application

**Mainly used for**

- Prepared food
- Meat

**Black carrot**  
Anthocyanins



**Red, pink and violet**



Used in natural colors and coloring foods

**Known for**

- Heat and light stable
- Performs well in acidic applications
- Changes in pH cause shade shift

**Mainly used for**

- Beverage
- Confectionery
- Dairy
- Fruit preparation

**Aronia**  
Anthocyanins



**Red, pink and violet**



Used in natural colors

**Known for**

- Fair heat and light stability
- Performs well in acidic applications
- Use if fruit labelling is required
- Changes in pH cause shade shift

**Mainly used for**

- Color blends

**Black currant**  
Anthocyanins



**Red to pink**



Used in natural colors

**Known for**

- Fair heat and light stability
- Performs well in acidic applications
- Use if fruit labelling is required
- Changes in pH cause shade shift

**Mainly used for**

- Beverage
- Confectionery
- Dairy
- Fruit preparation
- Ice cream

**Blue grape**  
Anthocyanins



**Red to burgundy**



Used in natural colors and coloring foods

**Known for**

- Fairly stable to light and heat
- Performs well in acidic applications
- Ideal if fruit labelling is required
- Changes in pH cause shade shift
- Fruit juices are less stable than vegetable juices

**Mainly used for**

- Beverage
- Confectionery
- Dairy
- Fruit preparation
- Ice cream
- Tablets and capsules

**Red cabbage**  
Anthocyanins



**Red to burgundy**



Used in natural colors

**Known for**

- Good heat and light stability
- Off-flavor may develop depending on dosage and application

**Mainly used for**

- Beverage
- Dairy
- Fruit preparation
- Ice cream
- Tablets and capsules

## Gardenia blue

Genipin polymers



Blue



Used in natural colors and coloring foods

**Known for**

- Low acidity can cause precipitation unless it is protected against acid in the color formulation

**Mainly used for**

- Confectionery
- Ice cream
- Prepared food

## Jagua fruit (Huito)

Genipin polymers



Blue



Used in natural colors

**Known for**

- Good heat stability
- Light stable
- Stable at low pH
- Blends into beautiful green and purple shades

**Mainly used for**

- Confectionery
- Dairy
- Ice cream
- Prepared food

## Spirulina

Phycocyanins



Bright blue



Used in coloring foods

**Known for**

- Suitable for products with pH >5
- Bright blue in pH neutral products
- Can be mixed with bright yellow to make green
- Not heat stable

**Mainly used for**

- Confectionery
- Ice cream
- Prepared food

## Green leaf plant

Chlorophyll and chlorophyllin



Yellowish green to bright bluish green



Used in natural colors

**Known for**

- Good heat stability
- Fair light stability
- Requires ascorbic acid in applications with high water activity

**Mainly used for**

- Beverage
- Confectionery
- Ice cream

## Apple

Melanins and melanoidins



Golden brown to brown



Used in coloring foods

**Known for**

- Excellent stability
- Heat and pH stable
- Clean label alternative to caramelized sugar and caramel class 1/A

**Mainly used for**

- Beverage
- Confectionery
- Dairy
- Ice cream
- Prepared food
- Meat
- Pet food

## Caramelized sugar

Melanoidins



Golden to dark brown



Used in natural colors and coloring foods

**Known for**

- Good heat and light stability
- Unaffected by pH

**Mainly used for**

- Beverage
- Confectionery
- Dairy
- Ice cream
- Prepared food
- Meat
- Pet food

## Malted barley

Melanoidins



Greyish to dark brown



Used in coloring foods

**Known for**

- Good heat and light stability
- Unaffected by pH
- Not gluten free

**Mainly used for**

- Beverage
- Confectionery
- Dairy
- Ice cream
- Prepared food
- Meat
- Pet food

## Peat and/or Bamboo

Vegetable carbon



Grey to black



Used in natural colors

**Known for**

- Heat and light stable
- Independent of pH variations

**Mainly used for**

- Confectionery
- Ice cream
- Prepared food

## Limestone

Calcium carbonate



White



Used in natural colors

**Known for**

- Very good heat and light stability
- Not suitable for low pH applications

**Mainly used for**

- Confectionery
- Prepared food

# Consumer demand for *natural* ingredients is at an all time high

Our full palette of raw materials enables us to formulate the right shade for any food and beverage application.



Oterra™

Together  
towards  
*natural*

Check out our website



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