

Innovation **naturally**



 **Plant-Ex**
Ingredients Ltd

NATURAL COLOURS



Innovation **naturally**



NATURAL COLOURS & COLOURING FOODSTUFFS

Available In Powders, Liquid & Paste Form

Years of experience in the Natural Colours sector combined with a development team curious to explore how the stability and performance of colours can be enhanced means that Plant-Ex has a knowledge base which is unrivalled in the industry.

Creation of micro-milled pastes, beverage-stable emulsions and bespoke spray-dried powders are some of the specialised products that have been created by the team.

Colouring Foodstuffs also comprise a large proportion of the portfolio supplied by Plant-Ex, meaning that the colours division are ready to offer a complete selection of options to customers, regardless of the application.

NATURAL COLOURS

E140 Chlorophyll		E161b Lutein
E160b Annatto	E141 Copper Chlorophyllin	E160c Paprika
E150 Caramels	E153 Carbon Black	E100 Curcumin
E171 Titanium Dioxide	E120 Carmine	E160a Natural Beta Carotene

COLOURING FOODSTUFFS

Safflower	Spirulina	Red Beet
Black Carrot	Radish	
	Pumpkin	Sweet Potato
Elderberry	Green Shades	Carrot

LABELLING

In general, there are three predominant classifications for food colours:

Artificial Colours:

Chemically synthesized

Selectively Extracted Additive Colours:

Originate from a natural source and undergo selective extraction, often through the use of chemicals, to create a functional additive (e.g. beta-carotene, carmine, annatto extract).

Colouring Foods:

Edible raw materials that have not undergone selective extraction of the naturally occurring pigments.



What are Natural Colours?

Natural Colours used in the food industry originate from a wide range of sources like vegetables, fruits, plants, minerals and other edible natural sources. They impart colour when added to food or drink.

Natural Colours are preparations obtained from foods and other edible natural source materials obtained by physical and/or chemical extraction, resulting in a selective extraction of the pigments relative to the nutritive or aromatic constituents.

The use and labelling of Natural Colours colours as food additives is governed by the EU Legislation 1334/2008.

Where a Natural Colour is used, its function must be declared on the product labelling. For example, 'Colour: E160a' or 'Colour: Beta Carotene'.

Natural Colours tend to have higher concentrations of the active pigments meaning a more intense colour, as well as being more stable in a wider variety of applications.



What are Colouring Foodstuffs?

Colouring Foodstuffs are food ingredients used by the food industry for the primary purpose of imparting colour to food and beverage products. They are manufactured from fruits, vegetables, flowers, spices, algae and/or other edible source materials.

Colouring Foodstuffs are considered 'Clean-Label' ingredients, and offer an alternative to using colours as food additives in a wide variety of food applications. They appeal to producers/customers who want a food product which is based on ingredients that consumers can easily relate to.

The criteria for a food extract with colouring properties to be classified as Colouring Foodstuffs (and not as food colour additive) are:

- The primary extract is added during the manufacturing of compound foods with the primary effect to deliver colour to the compound food. If the primary extract is used because of its aromatic, sapid or nutritive properties together with a secondary colouring effect, the primary extract is either a food or a flavouring;
- The source material must be a food or a characteristic ingredient of food which is normally consumed as such within the EU;
- The pigments present in the source material must NOT undergo selective, physical and/or chemical extraction relative to the nutritive and aromatic constituents.

Where a Colouring Food is used in a food product, its function is not required on the labelling. Instead it is listed as an ingredient. For example: "Fruit and Vegetable Extracts (Radish Concentrate, Apple Concentrate, Blackcurrant Concentrate)"

These criteria are defined in the EU Guidance notes on the classification of food extracts with colouring properties (29.11.2013, Version 1), which was adopted by the European Standing Committee on the Food Chain and Animal Health. The Guidance Notes provide a working tool for business operators and enforcement authorities to consider whether a substance is a food colour additive or a "Colouring Food". The EU Guidance Notes include a decision tree (Annex I) and a checklist (Annex II) to facilitate the classification. The reference values for the source materials (Annex III) remain to be completed and NATCOL continues to support this work.

Labelling of Colouring Foodstuffs must be in accordance with Food Information Regulation (EU) No 1169/2011. The labelling needs to be clear and understandable to the consumer and should not be misleading. However, the labelling must be assessed case-by-case by the food manufacturer. Possible labelling on the ingredient list of the final food within the EU are for example "Colouring Food (Carrot Concentrate)" or "Red Beet Concentrate".

Colouring Foodstuffs do not need to be designated like food colour additives, i.e. by the name of their category "Colour" and an E-number.

YELLOW

Curcumin E100

Lutein E161b

Safflower



Curcumin E100

Curcumin is a naturally occurring pigment extracted from the roots of the Turmeric plant *Curcuma longa*, a member of the ginger family. Turmeric has been widely used as a food ingredient for thousands of years, providing a warm, earthy flavour and bright yellow colour.



Turmeric oleoresin is an extract used for its flavour and bright yellow – orange colour. The oleoresin contains up to 30% Curcuminoids and can be made oil or water soluble to suit a wide variety of savoury food applications. Turmeric oleoresin is also spray dried into a water-soluble powder for use in dry food applications.

High strength Curcumin extracts are made by grinding the dried Turmeric Rhizome, yielding an extract with up to 95% Curcuminoids. With a low-flavour and high-colour impact Curcumin extracts are suited to sweet as well as savoury applications.

Curcumin extracts are available as clear or cloudy water-soluble liquids, as well as spray dried into water-soluble powders.

Turmeric/Curcumin has good heat stability but is not stable to light, so is best suited to products with opaque packaging. Made by finely milling the Curcuminoid crystals, Plant-Ex is able to offer highly light stable Curcumin solutions for bakery and confectionery applications.

Lutein E161b

Lutein is a yellow - orange, oil-based pigment extracted from the flowers of the Marigold plant *Tagetes erecta*.

Lutein is a Xanthophyll, and is part of the Carotenoid family. The naturally occurring pigment is found in many plants and green leafy vegetables such as Spinach and Kale, as well as being responsible for the orange – yellow colour of egg yolks.

Lutein is also known for its use as a health supplement, particularly for maintaining healthy eyes.

Lutein provides a warm, lemon yellow colour at lower dosages with a more orange hue at higher dosages. It has good stability to heat and light, with a pH range of 3 – 8.

Available in both oil and water-soluble liquid formats, as well as water-soluble powders. Suitable for use in applications such as beverages, confectionery, bakery, snacks and sauces.



Safflower

Safflower, also known as *Carthamus*, is a water-based colour extracted from the plant *Carthamus tinctorius*. Used as a food ingredient around the world, Safflower produces a clear, bright yellow colour with a mild, honey-like flavour in a variety of sweet and savoury applications.

Safflower concentrates are simply processed juices, made without the use of solvents or chemical processing, and can therefore be classified as Colouring Foodstuff.

Safflower has excellent stability to heat and light with a pH range of 3 – 8. It is suitable for use in a wide variety of sweet and savoury food and beverage applications.

Available in water-soluble liquid formats, or spray dried into a water-soluble powder.



ORANGE

Carotenes E160a

Paprika E160c

Annatto E160b

Bixin (i), Norbixin (ii)



Carotenes E160a

- E160a (i) Synthetically derived Beta Carotene
- E160a (ii) Mixed Carotenes from plant and vegetable sources, typically Palm derived
- E160a (iii) Fungal derived Beta Carotene by fermentation of *Blakeslea trispora*
- E160a (iv) Algal derived Carotene from *Dunaliella salina*



Carotenes are a versatile group of orange pigments found widely throughout nature. Carotenes are extracted from fungi, plants, vegetables and fruits, but can also be produced synthetically and are commonly used to colour food under the E number E160a. Beta Carotene, also known as Vitamin A, is the most common Carotene pigment used in the food industry. They can be further subdivided according to the source material the pigment is extracted from. While the source of Carotenes may vary, the performance and colour shade of different Carotene types is similar.

Beta Carotene has excellent heat and pH stability and can be stabilised to light with the addition of natural antioxidants.

High stability, water-soluble Beta Carotene emulsions are commonly used to add visual appeal to Orange and Citrus flavoured drinks. By utilising different production methods and ingredients, Plant-Ex can offer crystal clear Beta Carotene emulsions, or cloudy emulsions to give a more natural, fruit-based appearance. Beta Carotene can be used to add yellow and orange tones in applications such as bakery, sports nutrition and confectionery, as well as dairy and fat based applications, such as ice cream and margarine.

Available as oil or water-soluble liquids, as well as water-soluble powders.

Paprika E160c

Paprika oleoresin is an oil-based extract with a high concentration of Capsanthin and Capsurobin, these pigments are part of the Carotenoid family and responsible for the bright orange and red colours.



Paprika is a natural orange colour made from the dried fruits of the sweet Bell Pepper plant *Capsicum annum*.

Available in both oil and water-soluble liquids, Paprika can be used in a wide range of food applications. Oil based liquids give a red Chilli colour to savoury snacks and coating applications, whereas water-based emulsions produce vivid, clear and cloudy orange hues in confectionery and sauces.

Spray-dried powder is also available to give a vibrant orange colour in powdered food applications such as spice rubs, coatings and seasoning blends.

Cold pressed Paprika extract is made without the use of solvent extraction, and is therefore considered a food ingredient. It gives a bright orange, Clean-Label option and is available in oil and water-soluble formats.

When blended with natural antioxidants, Paprika has good heat and light stability, with a pH range of 3 – 8.

Annatto E160b Bixin (i), Norbixin (ii)

Annatto is a food colour derived from the seeds of the Achiote tree *Bixa orellana*. In some parts of the world, Annatto is used for its mild spicy flavour, as well as its intense orange-red colour.



The pigments responsible for the orange-red colour hue are known as Bixin and Norbixin and are part of the Carotenoid family.

Bixin is an oil-based pigment extracted from the outside of the Annatto seed and produces deep orange-red colours.

Norbixin is a water-soluble pigment obtained using aqueous alcoholic extraction of the Annatto seed. It is used to produce warm yellow-orange colours.

Annatto is available in oil or water-soluble formats, as well as a water-soluble powder. Annatto has very good heat stability with the Norbixin based colour particularly suited to dairy applications such as ice cream, and the Bixin based colour suited to cheese manufacturing.

Annatto is used in a wide variety of other food applications, such as bakery, confectionery, beverages, snacks and seasonings.



RED

Anthocyanins
Red Beet
Carmine E120



Anthocyanins

Anthocyanins are a family of naturally occurring, highly concentrated pigments found in dark fruits and vegetables. They are responsible for producing the intense red-purple shades associated with Berries and red fruits.

High quality Anthocyanin-rich fruits and vegetables such as Black Carrot, Radish, Blackcurrant and Grapes are used in the manufacture of Colouring Foodstuffs. The juices are extracted using mechanical processing methods such as chopping and pressing, before being filtered and concentrated and the colour standardised for shade and strength.

They can be used to produce a range of red-pink shades and are ideally suited for use in acidic food and beverage applications, where they offer excellent heat and light stability.



Red Cabbage: Botanical source – *Brassica oleracea*. Extracted from the leaves of the plant; Red Cabbage Concentrate is used to produce a reddish pink hue in acidic applications, turning blue in neutral applications. Labelling Declaration: Red Cabbage Concentrate.



Black Carrot: Botanical source – *Daucus carota*. A root vegetable cultivated primarily in Turkey; Black or Purple Carrot produces a deep red colour and has a wider pH range than some Anthocyanins. Labelling Declaration: Black/Purple Carrot Concentrate.



Grape skin: Botanical source – *Vitis vinefera*. Anthocyanins extracted from the left-over skins of Grapes used in the wine making process, Grape skin colour produces a dark, berry-like red colour in acidic applications. Labelling Declaration: Colour (Anthocyanins), Colour: E163.



Purple Sweet Potato: Botanical source – *Ipomoea batatas*. Native to the Americas, the Purple Sweet Potato is used to produce a vibrant pink colour in acidic applications, turning purple-violet in more neutral applications. It has good heat stability and is stable over a wider pH range. Labelling Declaration: Purple Sweet Potato Concentrate.



Elderberry: Botanical source – *Sambucus*. Juice harvested from the berries is used to create a reddish-purple hue in acidic food applications. Labelling Declaration: Elderberry Concentrate.



Radish: Botanical source – *Raphanus raphistrum*. A root vegetable cultivated in Asia; Radish produces a bright red-orange colour in low pH, turning pinker in neutral applications. Labelling Declaration: Radish Concentrate.

Red Beet

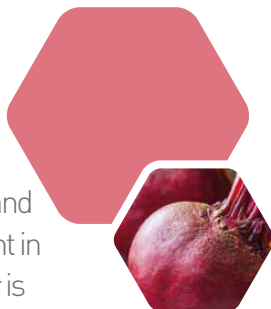
Red Beet is a natural colour made from the juice of Red Beetroots *Beta vulgaris*, and is used to create vibrant pink to red shades in food and beverage applications. The pigment in Red Beet responsible for its colour is called Betanin.

Made using simple processing methods, Red Beet is a Clean-Label, Colouring Foodstuff made from concentrated vegetable juice.

Red Beet has limited heat and light stability and is ideally suited for use in low temperature processed food applications with a pH range of 4 – 7. Heat stable solutions have been developed to cope with higher temperatures and longer processing times, allowing the use of Red Beet in applications where Anthocyanin based colours would not be suitable.

Available as water-soluble liquids and powders, Red Beet can be used in a wide variety of applications such as meat, bakery, icings, sauces and dairy products.

Red Beet is commonly blended with other colouring food ingredients to create a vibrant palette of colour shades, such as intense reds, oranges and violets.



Carmine E120

Primarily grown in South America, Carmine is a bright pink-red colour derived from the female Cochineal beetle *Dactylopius coccus*, a parasite that feeds on the Prickly Pear cactus. The pigment responsible for the colour is extracted from the dried insects as Carminic Acid, before being reacted with Aluminium to produce Carmine Lake, a highly stable deep red colour with excellent stability to light and heat.

Due to its good heat stability, Carmine is often used in neutral pH food applications with high temperature processing, such as confectionery, dairy, meat and bakery products. Available in both oil and water-soluble liquids, as well as spray-dried into a water-soluble powder, Carmine is a versatile product.



BLUE

Spirulina

Spirulina

Spirulina blue is derived from *Arthrospira platensis*, a type of Blue Green algae known as Cyanobacteria. Spirulina is very high in vitamins and minerals - it's used as a health supplement as well as a Colouring Foodstuff in the food industry. With very few existing natural blue shades, Spirulina is a widely used option for achieving Clean-Label blue, green and violet shades.

Being derived from plant-based sources, Spirulina is suitable for vegan, vegetarian, Kosher and Halal diets.

The primary pigment responsible for the dazzling blue colour of Spirulina is known as Phycocyanin, it has limited heat and acid stability so must be used carefully processed to avoid damaging the pigment. Spirulina is commonly blended with other Colouring Foodstuffs to make a range of colours, from greens through to violets. It is commonly used in applications such as confectionery, sports nutrition and icings for bakery products.



Chlorophyll E140

Chlorophyll is a natural pigment responsible for the green colour of many plants and algae. It is primarily sourced from plants such as Grass, Spinach & Alfalfa.

The pigment is selectively extracted using solvents, producing an oil-soluble, yellow-green pigment which can be used in many applications ranging from pet food, extruded snacks and confectionery.

Chlorophyll can be made water-soluble with the use of food grade emulsifiers, such as Polysorbate 80, to suit a wide variety of water-based food applications.

Copper Complexes of Chlorophyllin E141 (i)

Copper Chlorophyllin is a semi-synthetic derivative of Chlorophyll, selectively extracted from Chlorophyll and reacted with Copper to create a dark green water-soluble pigment.

Sodium Copper Chlorophyllin E141 (ii)

Sodium Copper Chlorophyllin is a semi-synthetic derivative of Chlorophyll. It is selectively extracted from Chlorophyll and reacted with Sodium salts, creating a dark green water-soluble pigment with excellent heat and light stability. It is widely used in the confectionery industry for its intense and rich green colour.

GREEN

Chlorophyll E140
Chlorophyllin E141



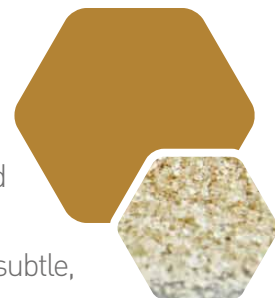
BROWN

Burnt Sugar
E150 Caramels



Burnt Sugar E150a

Burnt Sugar is a Caramel formed by the controlled heating of food sugars without the addition of other ingredients. Utilising the Maillard Reaction, Burnt Sugar is used to produce brown shades in a range of applications, while adding a subtle, Caramel flavour.



Burnt Sugar has very good heat and light stability and is available in liquid and powder formats. It can be used in both sweet and savoury applications and is considered a Colouring Foodstuff when used for its flavour and colour. When used just for its colour, it is declared as a colour under the E-number E150a.

Declarations of caramelised sugars as either Caramel Flavouring and Colouring Foodstuff or Aroma depends on the primary reason for use:

1. If colouring is the sole reason, the product falls under the Food Additives Regulation EU 1333/2008 and needs to comply with definitions and purity as described in EU directive 2008/128/EG.
2. If flavour is the main reason for use, the product is seen as an aromatic preparation, and so falls under the EU Regulation for Aroma's EU 1334/2008. The declaration is then 'Natural Flavouring'.
3. The most common declaration however is as such, naming the ingredient "caramelised sugar" or "caramel" which supplies both colour and flavour.

Declaration of Caramelised Sugar:

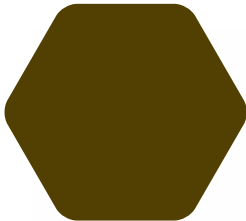
Function:	Colour	Flavour	Colour and Flavour
Legislation	Colouring Component under EU 1333/2008 and 2008/128/EG	Aroma Component under EU 1334/2008	Foodstuff with Colouring and Flavouring purpose under Guidance Notes on the classification of Food Extracts etc.
Labelling	Colour: E150a or Plain Caramel	Natural Flavouring	(Natural) Caramelised Sugar or (Natural) Burnt Sugar or (Natural) Caramel

Caramel

For more intense, darker shades of brown, it is possible to use Caramel Colours, which are produced from food sugars and reacted with various stabilising ingredients to enhance the colour intensity and stability.

- Ammonia Caramel E150c is used for a brown-yellow colour and is ideally suited for use in beverages, such as beer, and sauces.
- Sulphite Ammonia Caramel E150d is the darkest Caramel and is primarily used in soft drinks and pet food applications.

Available as a liquid or powder.

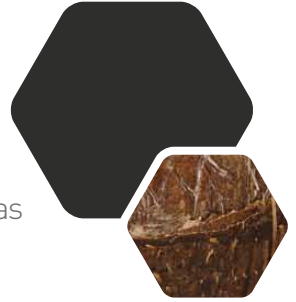


BLACK

Carbon Black E153

Carbon Black E153

Carbon Black is a black colour produced through the burning of plant material such as Coconut Shells and Peat. It is commonly used in the food industry for colouring confectionery products, such as Liquorice.



The colouring power of Carbon Black is determined by particle size: by finely milling the pigment, the intensity of the colour can be increased while also lowering the dosage. Carbon Black is extremely heat and light stable, and its available in liquid and paste formats.

Titanium Dioxide E171

Titanium Dioxide is a naturally occurring white colour used in the food industry to increase the visual appeal, optical brightness and texture. It can also act as a base coat in panned confectionery and chewing gum.

Titanium Dioxide is water insoluble and is processed into liquids and pastes using high sheer milling techniques to reduce the small particle size and increase the whiteness of the colour. It has excellent heat and light stability.

WHITE

Titanium Dioxide E171





OUR DIVISIONS

A World of Natural Flavours, Colours & Extracts



TOP NOTE FLAVOURS

Sweet

Vanillas
Chocolates
Caramels
Honey
Biscuits &
Desserts

Fruit

Citrus
Green
Tropical
Berry

Diverse

Tobacco

Alcohol

Beers
Wines
Spirits

Herbs

Garden
Mints
African

Savoury

Chicken
Beef
Pork
Smoke

Vegetables

Red Veg
Root Veg
Green Veg



NATURAL COLOURS

Yellow

Curcumin
Lutein
Safflower

Orange

Paprika
Annatto
Carotene
Beta Carotene
Mixed Carotenes

Red

Red Cabbage
Purple Carrot
Red Beet
Elderberry
Radish
Sweet Potato
Lycopene
Carmine

Purple

Grape skin

Blue

Spirulina

Green

Copper Chlorophyll
Chlorophyll
Spinach

Brown

Burnt Sugar
Caramels



NATURAL EXTRACTS

Vinegar Powder

Spirit Vinegar
Malt Vinegar
Balsamic Vinegar
White Wine Vinegar
Red Wine Vinegar
Apple Cider Vinegar
Sherry Vinegar
Acetic Acid

Vegetable Powder

Carrot
Leek
Onion
Beetroot
Cabbage

Oleoresins

Paprika
Turmeric
Black Pepper
Capsicum
Ginger
Coriander

Fruit Powder

Citrus
Berries
Tropical
Tree Fruits

Emulsions

Water Dispersible
Oils & Oleoresins

Encapsulates

Oil Powder
Oleoresin Powder

Essential Oils

Flowery
Citrus
Spicy
Woody
Herbal



FOOD PROTECTION SYSTEMS

**Natural
Anti-Microbials**

**Natural
Anti-Oxidants**

**Texturising
Agents**

**Natural Yield &
Taste Enhancers**

OUR MANUFACTURING EXPERTISE

Independent production sites for liquid and powder processing results in focused teams specialising in delivering high quality products, allowing them to further develop their expertise. In-house spray drying capabilities from laboratory through to bulk production mean that IP is protected, and exacting quality can be maintained throughout batches.

Plant-Ex operates from BRC accredited sites in the UK and Turkey. We specialise in the development and manufacture of Natural Colours, Flavours and Extracts. We have a huge depth of intellectual property and significant technical ability.

Thanks to our quality controls and integrated operating systems throughout production, we guarantee our customers the highest quality products; free from allergens and other contaminating agents.

Black
Carbon Black

White
Titanium Dioxide



Alcohol
Wines
Spirits
Beers
Ciders

Diverse
Honey Powder
Sugar Powder (Molasses Syrup)
Soy Sauce Powder
Worcester Sauce Powder

Innovation **naturally**





 +44 (0)117 982 8464
 sales@plant-ex.com

Plant-Ex Ingredients Ltd, Unit 7c, Access 18
Kingsweston Lane, Avonmouth, BS11 8HT
www.plant-ex.com

Innovation
naturally