

ROHA



Natural Food Colours Guide



NATURAL FOOD COLOURS

Colours you choose, we provide

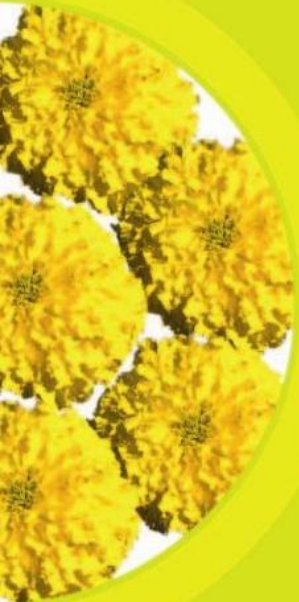
The Art of going *'Natural'*

Today, natural dyes and colourants have gone beyond an art form to a highly regulated and technically advanced industry. With an increasing awareness of what goes into a can or cosmetic product, natural food colours are not just capturing the imagination, but also have a burgeoning market base.

Natural food colours are obtained from a variety of herbs, spices, vegetables and minerals. Natural colour pigments extracted from their raw material origin, transfer the natural goodness of their inherent qualities onto the products that they colour.

contents

●	Our Organisation	
●	Turmeric/Curcumin	E100
●	Riboflavin	E101
●	Lutein	E161b
●	Beta-Carotenes/Carotenoids	E160a
●	Annatto	E160b
●	Paprika	E160c
●	Lycopene	E160d
●	Cochineal/Carmine	E120
●	Beetroot Red	E162
●	Anthocyanin	E163
●	Chlorophyll	E140 / E141
●	Caramel/Malt	E150
●	Carbo Vegetabilis	E153
○	Titanium Dioxide	E171
●	Iron Oxides	E172
●	Natracol Product Range - Stability Properties	
●	Global Network	



natracol



NATURAL FOOD COLOURS

ROHA is the world's leading manufacturer of food colours, specialising in the Food, Cosmetics and Pharmaceutical Industries and servicing all applications of colouring for the past thirty years.

The portfolio of Natural Colours offered by ROHA is one of the most comprehensive in the world, combining expertise in extraction and application with high quality service and price competitiveness.

The Product Range

Full portfolio of Natural Colouring for foods.

Complete technical and legislative support.

Ability to adjust colour to a customer's specific requirements.





Our Organisation

Global distribution network through our own offices across 5 continents

Turnover in excess of US\$ 145 million

Technical Service Centres on every continent

Production facilities conforming to ISO 22000, BRC, FDA, HACCP, cGMP and AIB standards



Turmeric/Curcumin

NATRA COL™

E100

Turmeric is extracted from the spice *Curcuma Longa L.*, a member of the ginger family. The root plant is native to India and is widely used to spice and colour food. It has gained popularity in the West in products such as curry powders.

The Oleoresin is extracted and purified to give the principal pigment known as Curcumin.

In addition to its colouring characteristics, Turmeric also displays anti-oxidant properties.

Turmeric has a bright yellow to greenish yellow hue and is very tolerant to heat and pH extremes.

Typical Applications

• Cereal	• Ice Cream
• Icing	• Salad Dressing
• Chewing Gum	• Baked Goods
• Yogurt	• Dairy Applications
• Fruit Preps	• Dry Soup Mix
• Confectionery	• Seasonings
• Pickles	• Mustard
• Margarine	• Jam

Colour Shade



pH Performance Range

3.0 | 8.0

Product Forms Available

- Oil Soluble Liquids and Powders
- Water Soluble Liquids and Powders

Recommended Usage Level

0.01% - 0.1% depending on product strength

Note: The primary weakness of Turmeric/Curcumin is light stability. Prolonged exposure to sunlight will cause the product to fade. Light stability can be increased in some cases by specific treatment, and the customer should make ROHA aware of this requirement when choosing a product.



POSSIBLE SHADE RANGE



Riboflavin

E101



Riboflavin is yellow or orange-yellow in colour and in addition to being used as food colouring, it is also used to fortify some foods. The product is also known as Vitamin B2 or Vitamin G.

Naturally occurring in milk, cheese, leafy green vegetables, liver, yeast, almonds and mature soybeans; Riboflavin is a good source of Vitamin B2.

Exposure to light destroys Riboflavin in the natural sources. Supplied commercially in a Nature Identical format, it is difficult to incorporate Riboflavin into many liquid products as it has poor solubility. Hence there is a requirement for E101a Riboflavin-5'-Phosphate, a more expensive but more soluble form of Riboflavin.

Riboflavin has good heat stability and moderate light and pH stability.

Typical Applications

• Soups	• Sauces
• Milk Products	• Confectionery
• Baby Foods	

Colour Shade



pH Performance Range

3.0 8.0

Product Forms Available

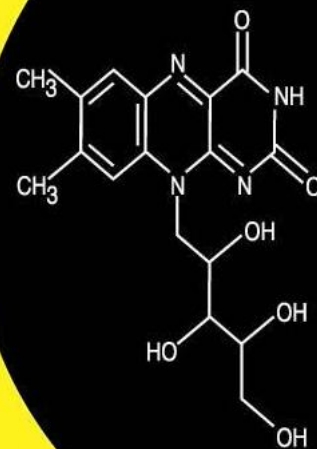
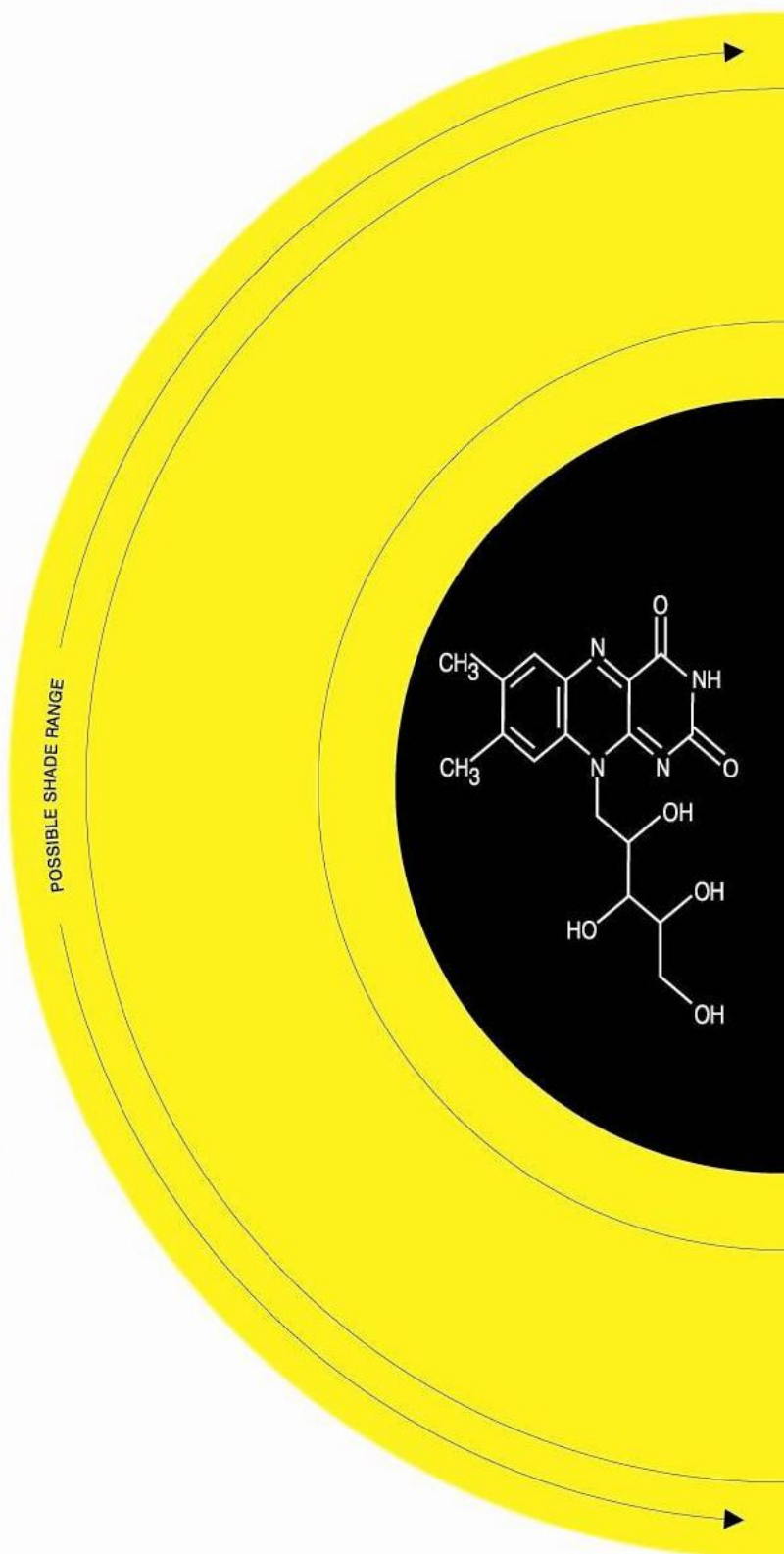
- Water Soluble Powder and Liquid
- Oil Soluble Powder and Liquid

Recommended Usage Level

0.05% to 0.1% depending on product strength



Note: Supplied commercially in a Nature Identical format, it is difficult to incorporate Riboflavin into many liquid products as it has poor solubility. Hence there is a requirement for E101a Riboflavin-5'-Phosphate, a more expensive but more soluble form of Riboflavin.



Lutein

E161b



Lutein is extracted from Marigold flowers - *Tagetes erecta*, grown abundantly throughout South America.

The pigment is a Carotenoid and belongs to the group called Xanthophylls.

Lutein is oil soluble and is also used in functional foods due to its antioxidant properties.

The colour has good stability towards light, heat and pH, and gives a warm yellow colour.

Typical Applications

• Functional Foods	• Biscuits
• Beverages	• Sugar Confectionery
• Sauces	• Cheese
• Cakes	

Colour Shade

Low dosage



High dosage

pH Performance Range

2.5

8.0

Product Forms Available

- Water Soluble Liquids
- Oil Soluble Liquids

Recommended Usage Level

0.01% - 0.1% depending on product strength



Note: The range of yellow colours offered by Natracol can be extended by blending with other colours, such as green and red.

Beta-Carotenes/Carotenoids

NATRA COL™

E160a

The Carotenoids are a group of pigments which are extracted from various edible vegetable sources.

Natural Carotene is extracted from the fruits of the palm oil tree *Elaeis guineensis* and is the richest source of mixed Carotenoids. It has traditionally been used by Pacific islanders for local cuisine.

The mixed Carotenoids (Alpha, Beta and Gamma Carotene) are oil soluble and have Pro-Vitamin A activity.

Mixed Carotenoids are perceived as healthy by today's consumers and is becoming a very popular colour for a range of applications.

Natural Carotene is yellow to yellow/orange in shade and offers excellent light, heat and pH stability.

Typical Applications

• Ice Cream	• Beverages
• Soups	• Sauces
• Spreads	• Functional Foods
• Confectionery	• Dairy Products
• Margarine	• Jam
• Jellies	• Pharmaceuticals

Colour Shade



pH Performance Range

3.0 8.0

Product Forms Available

- Water Soluble Liquids
- Oil Soluble Liquids

Recommended Usage Level

0.01% - 0.1% depending on product strength

Note: Beta-Carotene, Nature Identical - ROHA also offers the complete range of Beta-Carotene products as a compliment to the Natural Carotene range. The difference is that Beta-Carotene is produced synthetically to replicate the Natural Pigment and contains mainly Beta-Carotene.



POSSIBLE SHADE RANGE



Annatto

NATRA COL™

E160b

Annatto is extracted from the resinous coating on the surface of the seeds of the *Bixa Orellana L.* shrub grown in South America, Africa, and the Caribbean.

The Annatto seeds have long been valued as a spice for colouring and flavouring savoury dishes.

The main pigments are the water soluble norbixin and the oil soluble bixin, producing colour ranges from light yellow to dark orange.

Annatto has good stability towards light and heat.

Typical Applications

• Cereal	• Icings
• Ice Cream	• Snacks
• Baked Goods	• Sausage Casings
• Ice Cream Cones	• Smoked Fish
• Cheese	• Margarine
• Eggnog	• Fruit Preps
• Salad Dressings	

Colour Shade



pH Performance Range

2.5 | 10.0

Product Forms Available

- Oil Soluble Liquids and Suspensions
- Water Soluble Powders and Liquids
- Water Soluble, Acid-proof Liquids
- Emulsions Oil and Water Miscible
- Excludes Acid proofing, which renders stability down to pH 2.5



Recommended Usage Level

0.01% - 0.1% depending on product strength



Note: Annatto is commonly blended with E100 Turmeric to impart a more wholesome yellow shade.



POSSIBLE SHADE RANGE



Paprika

E160c



Paprika is extracted from the Red Pepper *Capsicum annum L.* that is grown around the world in countries like Spain, Africa, Hungary, China, USA and South America.

It is well known as a spice and is an important ingredient in many recipes, especially through the Indian sub-continent.

Paprika naturally gives a reddish-orange hue, with the major pigments extracted being the oil soluble Carotenoids, Capsanthin and Capsorubin.

Paprika has good stability towards light, heat and pH.

Typical Applications

• Salad Dressings	• Popcorn
• Extruded Snack Foods	• Processed Cheese
• Coatings	• Soups
• Baked Goods	• Sauces
• Marinades	• Ready Meals
• Meat Products	• Seafood (Surimi)

Colour Shade



pH Performance Range

3.0 | 8.0

Product Forms Available

- Paprika Oleoresin
- Concentrated Oleoresin that contains Colour and Flavour
- Deflavoured Paprika Oleoresin
- Water Dispersible
- Emulsified Liquids
- Concentrated Oleoresin where most of the flavour components have been removed

Recommended Usage Level

0.01% - 0.1% depending on product strength



Note: All Paprika products supplied by ROHA are sold with a guarantee of HPLC testing for Sudan I, II & IV, whereby only those products with a complete absence of non-permitted dyes are supplied.



Lycopene

E160d



Lycopene is the red pigment extracted from Tomatoes. The product has excellent associated health benefits, as well as good stability to heat, light and pH.

Typical Applications

• Savoury Foods	• Nutraceutical Formulations
• Sauces	• Confectionery

Colour Shade



pH Performance Range



Product Forms Available

- Water/Oil Dispersible Powder
- Oil Soluble Liquids
- Water Soluble Liquids

Recommended Usage Level

0.01% - 0.1% depending on product strength



Note: Lycopene is an excellent natural antioxidant.

Cochineal/Carmine



E120

Cochineal and Carmine both contain the red pigment, Carminic acid. The pigment is obtained from the insect *Dactylopius coccus costa*.

The insect is found predominantly in Peru, Chile, Bolivia and Mexico and feeds on selected types of cacti. It has been used as a food and textile dye since ancient times.

Cochineal is an aqueous extract providing colour shaded from orange to red and is generally used in low pH applications.

Carmine is the water insoluble calcium aluminium lake of Cochineal extract. It exhibits a brilliant red hue and has excellent light and heat stability.

Typical Applications

• Cereal	• Ice Cream
• Beverages	• Seafood (Surimi)
• Yogurt	• Icing
• Fruit Preps	• Meat Products
• Confectionery	• Pharmaceuticals
• Dairy Products	• Cosmetics

Colour Shade



Cochineal

pH Performance Range



Colour Shade



Carmine

Product Forms Available

Cochineal

- Water Soluble Liquid
- Water Soluble Powder

Carmine

- Water Soluble Liquid (Acid stable available)
- Water Soluble Powder
- Oil Soluble Liquid
- Lake Powder

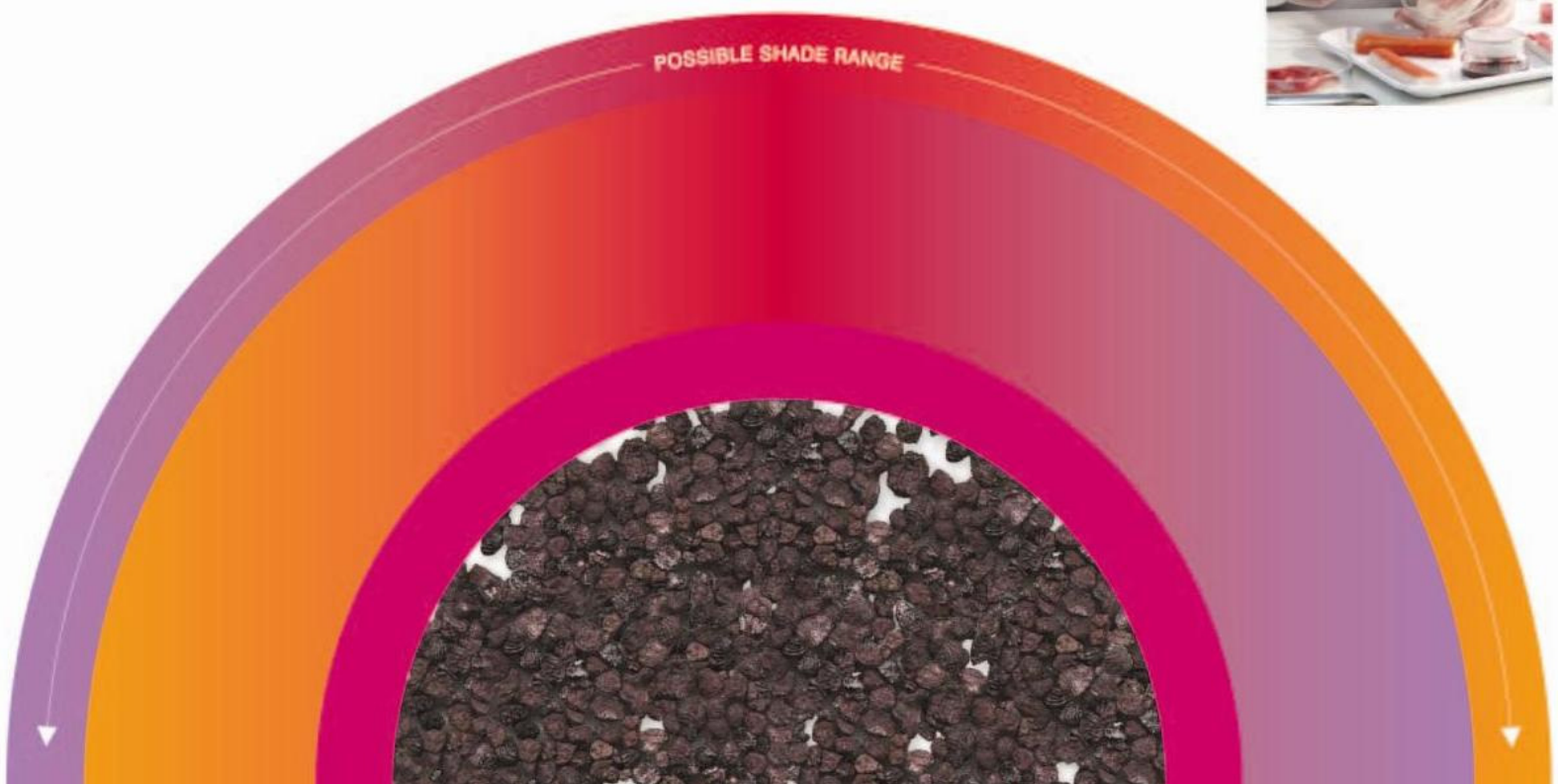
Recommended Usage Level

0.01% - 0.1% depending on product strength

pH Performance Range



Note: Further shades of red can be gained by blending with yellow and orange.



Beetroot Red

NATRA COL™

E162

Beetroot Red is obtained by extracting the juice of Beetroots - *Beta Vulgaris*, and then concentrating and pasteurising the liquid. Beetroot is grown in all regions around the world and is eaten cooked or raw.

Beetroot Red gives a bright red to bluish red colour depending on application and pH. It is most stable between pH 3.5 to 5.0.

Beetroot Red shows good light stability, but should not be exposed to prolonged heating above 90°C.

Typical Applications

• Yogurt	• Ice Cream
• Packet Mixes	• Frozen Desserts
• Confectionery	• Fruit Preparations

Colour Shade



Product Forms Available

- Water Soluble Liquid
- Water Soluble Powder

Recommended Usage Level

0.01% - 0.1% depending on product strength

pH Performance Range

2.5 7.0



Note: ROHA can offer a semi-heat stable Red Beetroot extract for certain applications on request.

POSSIBLE SHADE RANGE



Anthocyanin

E163



There are over 300 different types of Anthocyanin occurring naturally. They are responsible for the red to blue colours of a variety of fruits and vegetables, such as Grapes, Black Carrots and Red Cabbage.

They are natural pH indicators, changing from a strawberry red at pH 3 to a deeper blue/red as the pH increases.

Grape and Blackcurrant Anthocyanins are best suited to low pH applications, whereas, Black Carrot and Red Cabbage can be used in both high and low pH environments.

As the Anthocyanins are a source of polyphenols; attention is drawn to the possible health benefits of these products.

The colours offer good light and heat stability.

Typical Applications

• Juices	• Beverages
• Jams	• Jellies
• Confectionery	

Colour Shade



pH Performance Range



Product Forms Available

- Water Soluble Liquid
- Water Soluble Powder

Recommended Usage Level

0.01% - 0.1% depending on product strength



Note: A Natural Blue - It is possible, using certain Anthocyanins, to create a blue colour at pH 6.5 to 7.5.

For further information please contact our sales team.



Chlorophyll E140 / E141



Chlorophyll is the green pigment found in leaves, grass, vegetables and all organisms capable of photosynthesis.

Chlorophyll is an oil soluble pigment obtained from Lucerne, Nettle, Spinach and Grass, providing an olive green colour.

Chlorophyllin is obtained by the addition of copper and then hydrolysis, resulting in Copper Chlorophyllin. This is water soluble providing a green/blue to yellowish green colour.

The Cu Chlorophyllin pigment is very stable towards light and heat, whereas standard Chlorophyllin has poor stability in both of these conditions.

Typical Applications

• Ice Cream	• Beverages
• Dairy Products	• Sauces
• Confectionery	

Colour Shade



pH Performance Range

4.0 8.0

For E140 Chlorophyllin

2.5 10.0

For E141 Cu Chlorophyllin

Product Forms Available

- Water Soluble Liquid (Acid stable available)
- Water Soluble Powder
- Oil Soluble Liquid

Recommended Usage Level

0.01% - 0.1% depending on product strength



Note: A wide range of green shades can be obtained by blending with yellow colours, e.g. E100 Turmeric and E161b Lutein.

POSSIBLE SHADE RANGE

Caramel is made by the controlled heating of food-grade carbohydrates, and is one of the most common natural colourings. There are four different types of Caramel distinguished by how they are produced, identified by the suffix a, b, c and d.

Caramel has a warm brown hue and has excellent heat, light and pH stability.

Malt is produced from roasted barley and has a mild flavour. It has a natural dark brown colour and has superb heat, light and pH stability. Please note that whilst Malt delivers a similar shade to Caramel, it is a Colouring Foodstuff and therefore does not carry the E150 classification.

Typical Applications

• Ice Cream	• Beverages
• Bakery Products	• Sauces
• Cereals	

Colour Shade



pH Performance Range



Product Forms Available

- Water Soluble Liquids
- Oil Soluble Liquids

Recommended Usage Level

0.01% - 0.1% depending on product strength



Note: When mixed with other colours, brown works to dim the brilliance of the hue. Blending with yellow can extend the Natracol range of dark colours.

POSSIBLE SHADE RANGE



As its name suggests, Carbo Vegetabilis (or Carbon Black) is made from fine particles of carbonised vegetable material. The most common application form for this product is a water dispersible suspension. Colour shades range from grey to black, depending on the dosage rate used.

Carbon Black offers excellent pH, light and heat stability.

Typical Applications

• Ice Cream	• Liquorice
• Confectionery	• Cheese Coatings
• Cosmetics	

Colour Shade



Product Forms Available

- Water Dispersible Powder
- Water Dispersible Liquid Suspension
- Water Dispersible Paste



Recommended Usage Level

0.5% - 2.0% depending on product strength



Note: Carbon Black powder is very fine. ROHA recommends the use of the paste products to avoid undue mess within the customer's production facility.



Titanium Dioxide E171



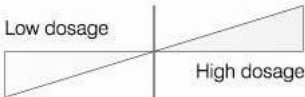
Titanium Dioxide is manufactured from the ores *Ilmenite* or *Rutile*, and is produced as a brilliant white pigment with many uses. It is the white colourant of choice in food, drug and cosmetic uses.

TiO₂ pigments are inert and thus have excellent light, heat and pH stability. It is an excellent product for panning or tablet coating.

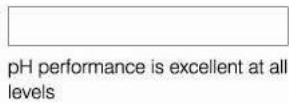
Typical Applications

• Cosmetics	• Pharmaceuticals
• Confectionery	• Dairy Products
• Pet Food	

Colour Shade



pH Performance Range

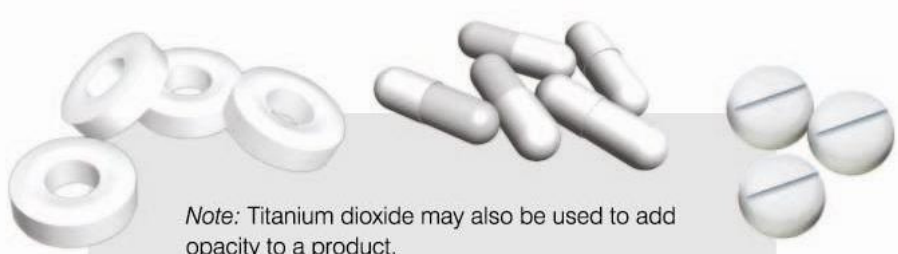
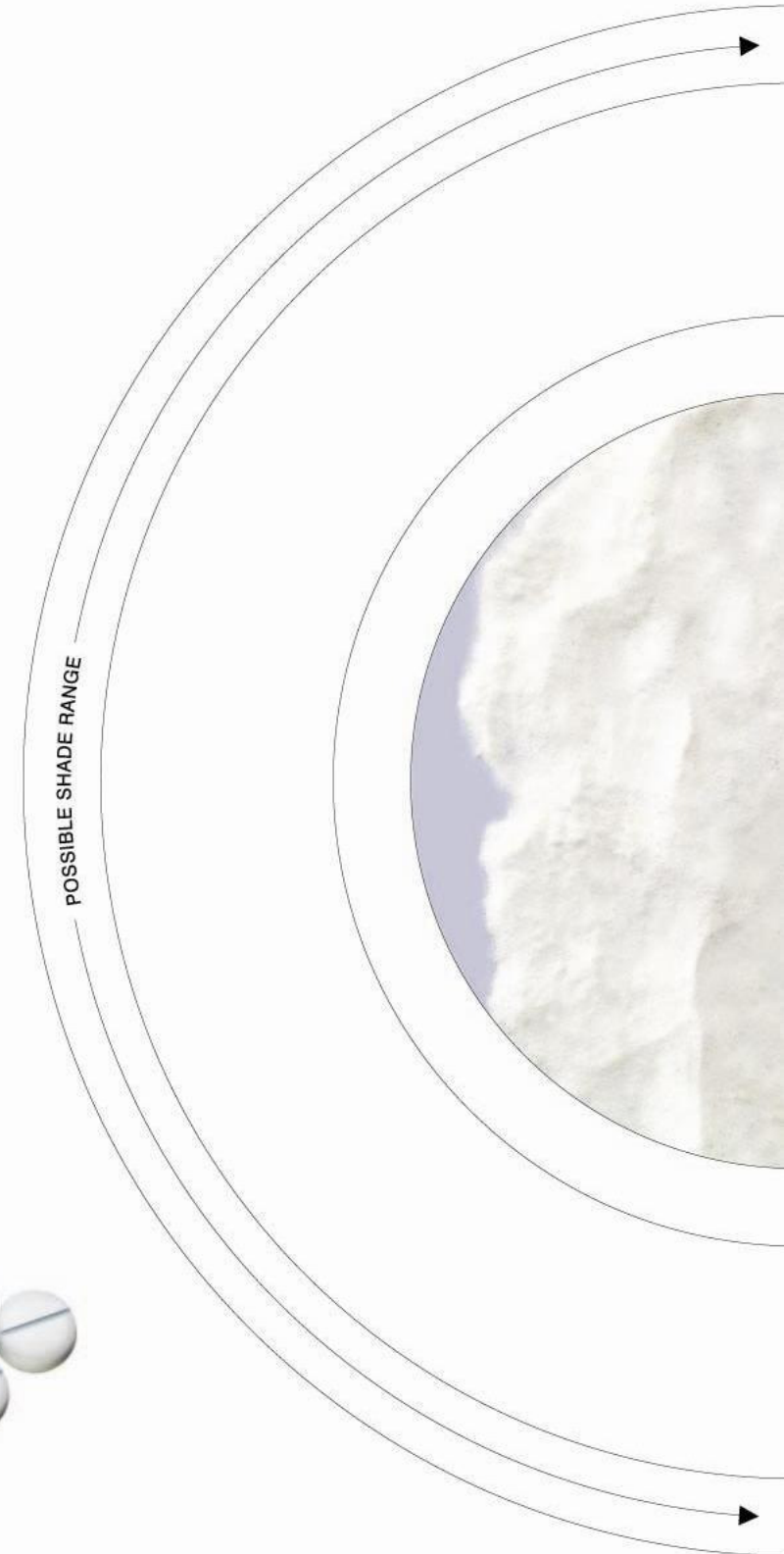


Product Forms Available

- Water/Oil Dispersible Powder
- Water Dispersible Liquid Suspension
- Water Dispersible Paste
- Oil Dispersible Suspension

Recommended Usage Level

0.5% - 2.0% depending on product strength



Note: Titanium dioxide may also be used to add opacity to a product.



Iron Oxides are naturally occurring pigments, ranging from black, yellow, red and brown in colour.

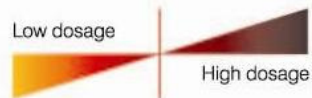
The Natracol ranges of Iron Oxides are synthetically produced versions of nature's pigments.

They are manufactured to extreme tolerance limits for particle size, colour properties, purity and uniformity providing super hiding power, maximum tinting strength, durability and excellent chemical resistance.

Typical Applications

• Cosmetics	• Packet Sauce Mixes
• Meat Casings	• Pharmaceuticals
• Pet Foods	• Cheese Coatings

Colour Shade



pH Performance Range



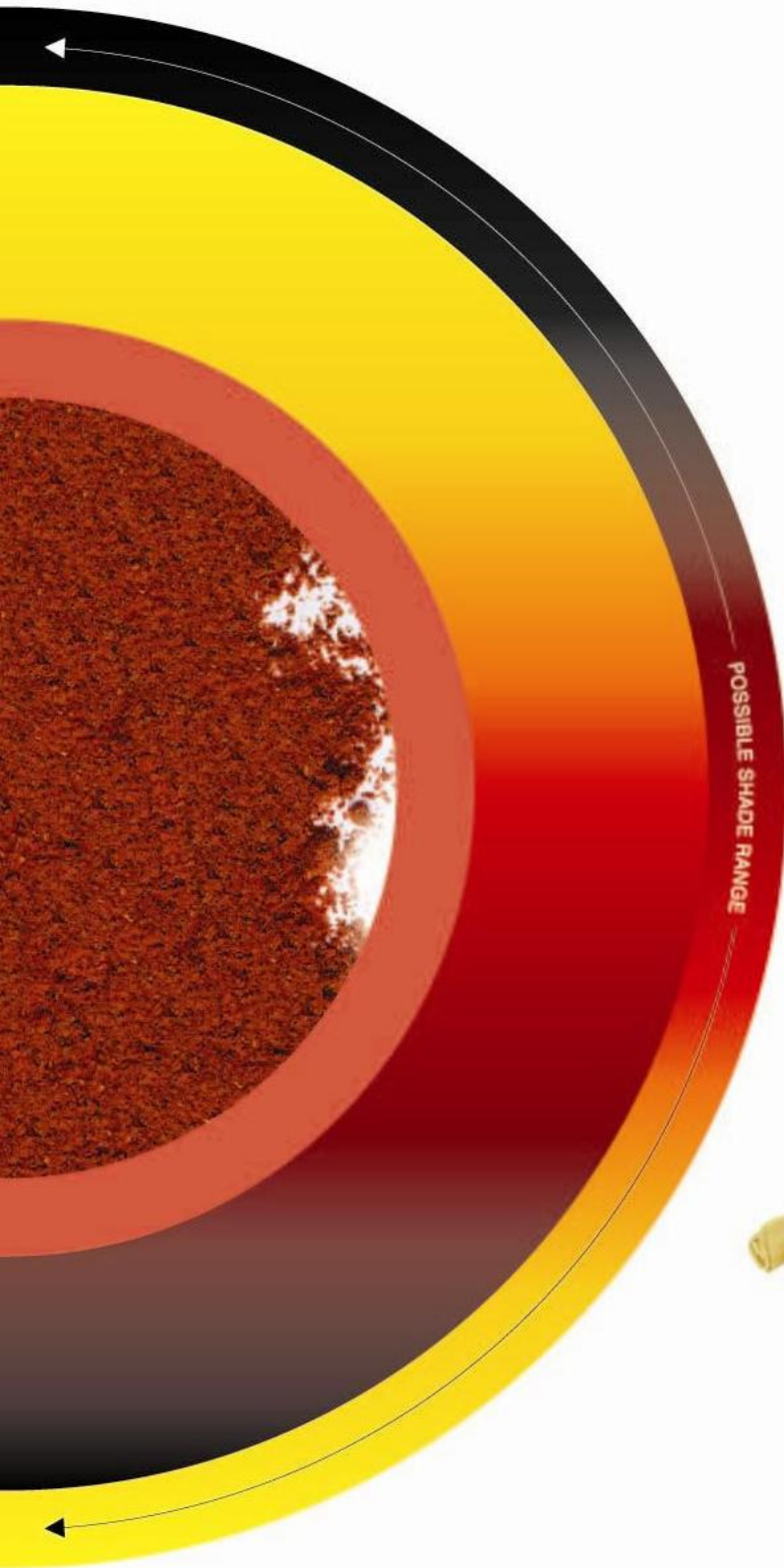
pH performance is excellent at all levels

Product Forms Available

- Water/Oil Dispersible Powder
- Water Dispersible Liquid Suspension
- Oil Dispersible Suspension

Recommended Usage Level

0.01% - 0.1% depending on product strength



Note: Iron Oxides provide a pastel colour shade as opposed to some of the brighter and cleaner shades imparted by other colours.

Table to indicate the basic stability properties of the Natracol™ range ROHA also offers a wide range of custom blended colours to enhance your products

E Number	Colour	Light	Heat	Alkali	Acid	Oxidation/Reduction
E100	Turmeric	Poor	Good	Fair	Good	Fair
E101	Riboflavin	Good	Good	Fair	Good	Good
E161b	Lutein	Good	Good	Good	Good	Good
E160a	Natural Carotene	V. Good	V. Good	Good	Good	V. Good
E160b	Annatto	Fair	Good	V. Good	Precipitates	Fair
E160c	Paprika	Fair	Good	Good	Good	Poor
E160d	Lycopene	Good	Good	Good	Good	Good
E120	Carmine	V. Good	V. Good	Good	Precipitates	V. Good
E162	Beetroot Red	Poor	Poor	Poor	Fair	Fair
E163	Anthocyanin	Good	Good	Poor	V. Good	Good
E140	Chlorophyll	Poor	Poor	Fair	Precipitates	Poor
E141	Copper Chlorophyllin	V. Good	V. Good	Good	Precipitates	Good
E150	Caramel	V. Good	V. Good	V. Good	V. Good	V. Good
	Malt	V. Good	V. Good	V. Good	V. Good	V. Good
E153	Carbon Black	V. Good	V. Good	V. Good	V. Good	V. Good
E171	Titanium Dioxide	V. Good	V. Good	V. Good	V. Good	V. Good
E172	Iron Oxide	V. Good	V. Good	V. Good	V. Good	V. Good

Customers are advised that whilst ROHA will give advice, samples and information, they must take care that the product will work in their application and be an acceptable ingredient within the end products and also in all intended supply markets within the territory in which they operate.

The data submitted in this publication is based on our current knowledge and experience. It does not constitute a guarantee in a legal sense of the term in view of the manifold factors that may affect processing and applications.

For further information on our product range, applications, samples and price quotations, please contact our Technical Service Centre, or our Office nearest to you.

Colour shades shown throughout this brochure are only indicative.



NATURAL FOOD COLOURS

Fruit and Vegetable Extracts



To support the drive towards removal of additives within food, ROHA has developed a range of extracts that will deliver colour but are listed as ingredients on the packaging. To put it in another way, - E number free colours.

The Natracol Fruit and Vegetable Colours are whole extracts from recognised foodstuffs within the EU. That is, they are extracted from the source in a manner that maintains the natural and essential characteristics without chemical modification.

In line with all the colouring options available from ROHA, the Natracol Fruit and Vegetable extracts deliver vibrant and stable colour to meet the exacting demands of today's consumer.

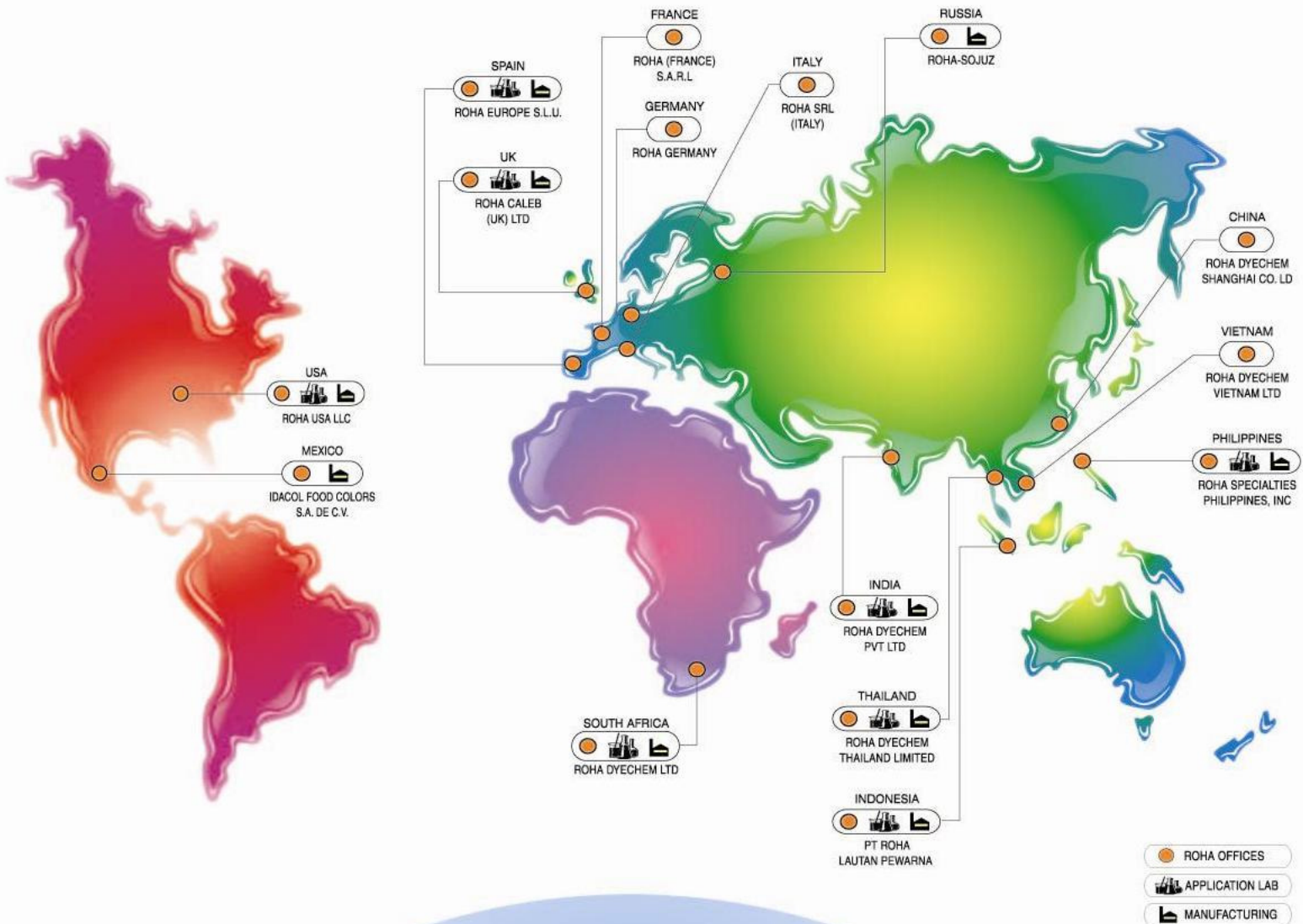
Natracol Fruit and Vegetable Extract Product range

Colour	Botanical Source of Extract
Yellow	Turmeric Safflower
Orange	Carrots Paprika
Red	Elderberries, Purple Carrot, Beetroot, Red Cabbage
Green	Spinach
Brown	Caramelised Sugar Syrup

From these raw material extracts ROHA has applied its formulation expertise to deliver a complete range of products suitable for food and beverage applications.

For more information about the NATRACOL Fruit & Vegetable extract product range, or any natural colour, please contact your local ROHA office.

GLOBAL NETWORK & INTERNATIONAL CERTIFICATIONS



Environment Responsibility:

Environment protection has always played a major part in our industrial development. We must invest heavily in our plants to ensure that our growing activities respect the environment. The company is currently striving to achieve ISO 14001 in recognition of its effluent treatment and waste disposal systems.



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