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The Challenges of Switching from Synthetic Colours to Natural Colours

The majority of food and drink manufacturers in Europe are now being forced by their consumers to change the colours they use in their products from artificial or synthetic to natural. The market trends are healthy eating and fewer chemicals in our food and drink. The consumers don't want any artificial ingredients and they don't want E numbers which they perceive to *mean* artificial, even though E numbers are equally applied to artificial and natural colours.

So the consumer is pushing for change, knowing that there are now many 100% natural colours available in the market, and as they are seeing more and more finished products on the supermarket shelves labelled "Contains no artificial colours" or "Only natural colours" then it must be easy for the manufacturer to switch from chemical based colours to natural, right? Wrong!

Switching to natural colours can be a minefield for many food and drink manufacturers, often leading to many lengthy failed production trials before the desperate phone call comes through to our offices "Help me please!"

When I talk to a manufacturer for the first time about switching to natural colours, I warn them that there are five fundamental issues that they will have to take into consideration:

Brightness. There are very few natural colours on the market that are as bright as their synthetic counterparts.
Price. You want natural, you pay for it! Natural colours can cost as much as twenty times artificial colours.
Stability. Certain natural colours are not light stable and will fade quickly on the supermarket shelves, others are not heat stable and will change in colour when heated or baked.
Shelf Life. Most natural colours have a shelf life of around 6 months prior to use in the finished product compared to the many years for artificial colours. Storage conditions need also be taken into account as some natural colours may require cold storage.
Supply. A natural colour that was readily available last year could well become very scarce this year if the raw material has experienced a bad crop.

So how can we go about reassuring the now very depressed manufacturer that it is still possible to make that essential switch to natural colours? Let's look at each of those five points above and try to rationalise the situation:

Brightness. No, natural colours are usually not as bright. Consumers are beginning to understand that a softer, slightly duller shade of colour means natural! Basically if the product glows like a glow-worm in the dark it's probably full of chemicals!
Price. Yes, your unit cost is going to increase, but by how much in real terms? Even if these natural colours are twenty times more expensive than artificial or synthetic, let's look at the quantity being used in the production of one finished product. Some natural colours can be used at a lower dosage than their synthetic counterparts, but it is the actual percentage used in the finished product that is important. A natural red colour made from Purple Sweet Potato for example can have a typical usage level of 0.01% - 0.1%. This means that the other ingredients make up 99.99% - 99.9% of the finished consumer item. Is the switch to natural *really* going to impact that much on the cost?
Stability. As long as you understand your three main stability criteria from the outset then the right natural colour can be selected before starting a series of time consuming and costly 'trial and error' runs. Light stability, heat stability and suitable pH range are not the only things to consider, but can generally help make the correct natural colour source selection in 95% of cases.
Shelf Life. So change your purchasing method. If you are buying 2 years stock of synthetic colours each time you purchase, just understand that you can't do this with naturals and purchase just three month's requirements at a time.
Supply. There is not a lot that anyone can do about a world shortage of a certain raw material, but when using natural colours it is always a good idea to establish a potential alternative natural colour, 'just in case!' For the last year there has been a world shortage of natural red from grape skin extract due to the very poor crop last year. For many manufacturers it was 'back to the drawing board' as supply of grape skin suddenly stopped.

Let's examine some specific issues regarding some of the more popular natural colours used in the Food & Drinks industry.

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Anthocyanins. These are used widely to create a range of shades from pink right through to a deep violet. The range of raw materials used in producing Anthocyanins is vast, but some of the more popular natural sources include: Purple Sweet Potato, Red Cabbage, Black Carrot, Purple Carrot, Red Beet, Grape Skin Extract, Elderberry and Radish.

Anthocyanins are used extensively in beverages and confections, and the fundamentally crucial element in determining the final colour to be obtained is the pH of the finished product. Acidity has a vital role to play in defining the ultimate colour, and the anthocyanin when used in differing acidic solutions can produce astonishing deifferences.

Orange Colour. One of the most commonly used orange colours in the Food and Drink industry is β-Carotene (Beta Carotene). Carotene is the substance in carrots that colours them orange and is the most common form of carotene in plants. Beta Carotene is widely used to colour Orange Drinks. When used as a food colouring, it can be labelled Beta Carotene or E160a. Another example of consumer confusion!

A disadvantage of using β-Carotene in orange drinks is its tendency to 'ring' and 'sediment', frequently leaving an orange stain around the water line or in the bottom of the bottle due to the fact that it is not 100% soluble in water. Recently Food Ingredient Solutions developed the FISclear™ range of micro-emulsions which completely overcome this problem, with a range of colours from yellow through to orange-red.

FISclear™ emulsions are a line of transparent, stable micro-emulsion colours, extracts and oils. They rely on state-of-the-art GMO-free emulsifiers and proprietary processing techniques to produce emulsions with particle sizes in the 50-100 nm range for unparalleled clarity, stability and shelf life. At this particle size range, emulsions are often stable for years and can even be used in some applications which have proven problematic in the past.

Yellows. There is often a fine line between yellow and orange, and many of the orange colours (Beta Carotene and Annato) can produce yellow when used in lower dosages. Carrot Oil, Curcumin (Turmeric) and Saffron can produce some stunning yellow colours, although the use of saffron is infrequent due to its extremely high price.

Greens and Blues. This category of natural colours is probably the most difficult, with choice being limited to only a few products. Perhaps the 'brightest' colour in this category is Green Copper Chlorophyllin, giving an almost 'artificial' green shine, but recently consumer trends have shown a tendency to move away from products containing the word 'Copper'. A good replacement for Copper Chlorophyllin is Alfalfa. Alfalfa is a widely grown forage crop grown in many parts of the world, and produces a duller, more natural looking green. Blues have always been difficult to achieve in the world of natural colours and there are very few on the market today. Spirulina has been produced as a dietary supplement in more recent years, but it can provide a relatively bright blue natural colour that is reasonably stable, if somewhat expensive.

So rather than say "The Traumas of Switching…." I prefer to refer to it as "The Challenges of Switching…." Solutions are out there in the market and I truly believe that in the not too distant future, the food and drink manufacturers can make a total switch to natural colours and reduce even more the chemical intake in our bodies.