

Carotenoid colours – the better alternative to artificial dyes

By the end of 2009 new EU legislation mandates labeling of six artificial colourants (Tartrazine E102, Quinoline Yellow E104, Sunset Yellow E110, Carmoisine E122, Ponceau 4R E124 and Allura Red E129). Products containing these colourants must then include the following statement in the labeling section: “**may have an adverse effect on activity and attention in children**”. Since this obviously is not a very good advertisement to have on the products, it can be expected that most food and beverage manufacturers will seek for alternative colourants. In fact, some very large manufacturers have already published their intentions to reformulating their products accordingly.

It is foreseeable that this trend will expand beyond the borders of the EU countries. For instance in the US, The Center for Science in the Public Interest (CSPI) has already formally petitioned the FDA to require warning labeling on foods that contain eight artificial colourants: Sunset Yellow, Tartrazine, Allura Red, Blue 1 E133, Blue 2 E132, Green 3 E143, Orange B and Erythrosine E127.

When legislation or other factors require changes to existing products, the alternative is often only second best. But in this case, when a phase-out of certain artificial colourants is the task at hand, the alternatives can be quite obvious and definitely not second best. The solution is in many cases found in carotenoid colours!

Matching the colour shades with carotenoids

Carotenoids provide a wide array of bright and appealing colours – typically ranging from yellowish to reddish tones. This enables them to match the colour shades of many of the abovementioned artificial colourants. Through sophisticated formulation technologies and by varying the dosage level, different colours can be achieved.

Additional benefits

Contrary to the artificial colourants, the carotenoids provide other benefits in addition to the colour properties. Many carotenoids ie. Beta-carotene and Apocarotenol are known as pro-vitamin A. It means that their molecules are cleaved into vitamin A by the human organism – but only at the rate needed. This makes them safe to add to food products without having to consider the possible risk of vitamin A toxicity. A FAO/WHO definition of the vitamin A activity in carotenoids is established, which enables food manufacturers to claim vitamin A on the label when certain carotenoids are used.

Also, numerous studies have established

some of the carotenoids, particularly Beta-carotene, as physiological antioxidants, with potential positive properties against certain diseases.

Last but not least it should not be forgotten that carotenoids are nature's own colourants. Therefore, replacing artificial dyes with carotenoids significantly enhances the healthy profile of the products that they colour.

Breaking the tradition

Historically one of the major drivers for using the artificial dyes over the carotenoids has been their relative low cost. In certain products and segments it has therefore become a tradition to blindly using these dyes.

Carotenoids are indeed more expensive, but the cost implications are arguably often blown out of proportions. As an example the cost of adding 10 ppm of Beta-carotene to a product is less than 1 Euro cent per kg (typical dosage rates in food and beverages are 5-10 ppm). When comparing this cost with the amounts spent on packaging, distribution and advertisement of food and beverages, it should put things in perspective and lower the barriers for change.

Carotenoid formulations

Carotenoids are commercially available in different formulations, which allow them to be added to practically any food and beverage product. Generally four delivery forms are on the market: emulsions, cold water dispersible powders, oil suspensions and oil solutions.

Not only do these forms make them compatible with water, fat or dry phases, but the formulations also serve to protect the active carotenoids against degradation. Furthermore it is interesting to note that via the formulation technology it is possible to generate different colour shades even though the same active carotenoid is being used.

Food manufacturers who seek to replace their existing artificial dyes with carotenoids should therefore consult with a carotenoid company for a solution. Choosing the right formulation with the appropriate dosage rates, can then result in a seamless transition to the new colourant.

Allied Biotech Corporation

As The Carotenoid Company, Allied Biotech Corporation is a leading manufacturer of carotenoids for the food and beverage industries. Allied's comprehensive portfolio of carotenoid formulations is unrivalled and makes it possible to use carotenoid colours in practically any food product. The portfolio is particularly strong towards the beverage segment with its “Non-ringing” emulsion technology.



Figure 1: From left to right – Altratene Apocarotenol 3% FT (2 ppm), Sunset Yellow (50 ppm), Altratene Apocarotenol 3% FT (5 ppm)



Figure 2: From left to right – Altratene Apocarotenol 3% FT (10 ppm), Allura Red (20 ppm), Altratene Apocarotenol 3% FT (20 ppm)



Figure 3: From left to right – Altratene Apocarotenol 3% FT (20 ppm), Ponceau 4R (50 ppm), Altratene Apocarotenol 3% FT (50 ppm)

Lars B Rasmussen
Allied Biotech Corporation
Taageskovej 21, 4733 Tappernoeje, Denmark
Tel: +45 32 62 1234 • Fax: +45 32 62 1235
Email: rasmussen@altratene.com • www.altratene.com