Artificial Dyes In The Foods We Consume And Feed To Our Children

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Artificial dyes can be found in more foods than you might expect. It is easy to see brightly colored candies and drinks and know instantly that they contain artificial dyes, but careful reading of ingredient labels reveals artificial dyes in many potentially surprising food items such as cheese, butter, yogurt, condiments, crackers, pastry, pie crust, red grapefruit, prepared entrees, vitamins and even salmon, to name a few.

Some firmly believe that consumption of artificial dyes, particularly in children, causes symptoms such as attention deficit, allergies, asthma, behavioral changes, hyperactivity, gastric upset, migraines, skin manifestations, and sleep disturbances including night terrors, but others say there is no proof of such effects.

Artificial dyes are derived mostly from petroleum and do not provide any taste or nutritional value to foods. Their benefit to manufacturers lies in making foods appear more ripe, fun or appetizing.

During the early 1900s nearly 80 different artificial dyes were in use. One by one many were systematically removed from the market throughout the 1930s, 50s and 70s due to identified health risks and issues. 1

Today, only seven federally approved artificial dyes are certified for use in U.S. foods including FD&C Red #3, Red #40, Yellow #5, Yellow #6, Blue #1, Blue #2 and Green #3.

In addition other color agents such as caramel and carmine are exempt from certification because they are derived from natural sources. These too have been associated with health concerns.

Despite the overall reduction in the number of approved dyes, the consumption of artificial dyes has increased five times within the U.S. since 1955. 2

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Artificial Dye Effect On Behavior

A multitude of studies have focused on whether artificial coloring in food leads to behavioral issues in susceptible children. Of these, a 2007 United Kingdom study linked hyperactivity in children to artificial food colors and prompted the Foods Standard Agency (FSA), the European version of the Food and Drug Administration (FDA), to recommend a voluntary ban on use of artificial coloring in foods. 3

In the U.S. the topic led the FDA Food Advisory and Safety Committee to meet in 2011 to review available literature, evaluate scientific studies, and consider both expert and public opinion to determine “whether available relevant data demonstrate a link between children’s consumption of synthetic color additives in food and adverse effects on behavior”. 4

Results of the hearing suggested that more study be undertaken to examine the effects of dyes on behavior, but scientific study aside, there are many who report personal stories that artificial dye consumption results in behavioral issues including hyperactivity, attention deficit, irritability, and lack of attention. Arguably, these symptoms could also roll up to larger behavioral problems such as altered relationships with peers, decreased performance in school and/or negative effects on home life in general.

As mentioned, the U.S. has seen a five fold increase in the use of artificial dyes in foods over the past 50 years.5 Of note, it was not until the 1960s and 1970s that Attention Deficit (ADD) and Attention Deficit Hyperactivity Disorder (ADHD) symptoms were first formally recognized in the medical and academic settings and incidence has increased since that time. 6

3 BBC News. Europe-wide food colour ban call. April 10, 2008
http://www.ehow.com/about_5071166_history-discovery-adhd.html
4 FDA Food Advisory Committee Meeting Transcripts. March 30 and March 31, 2011.
http://blogs.webmd.com/health-ehome/2012/05/do-food-dyes-warrant-a-warning-label.html
6 eHow. History and Discovery of ADHD. Cat Carson.
http://www.ehow.com/about_5071166_history-discovery-adhd.html
Health Effects by Color

Red Dye (FD&C Red #40 and Carmine)

FD&C Red Dye #40 is known also as Red 40 or Allura Red. It is one of the most commonly used artificial food dyes in the U.S and is found in items such as beverages, candies, ice pops, meats, cheeses, salmon, and over the counter medications as well as liquid suspensions of prescribed medicines generally indicated for use with children.

Red Dye #40 is a highly refined petrochemical and based on potential ill-effects including headaches/migraines, hyperactivity, decreased concentration, sleep disturbances and a feeling of “crawling out of one’s skin”, its use in foods has been reduced or banned from use in other countries.

Carmine, is derived from a process which extracts color from insect bodies. It is known as Natural Red Dye, Crimson Lake, and cochineal and produces a bright red or purple food coloring that is used frequently in beverages, yogurts, candies and gums on supermarket shelves today.

Issues surrounding carmine include allergic reactions and a concern for some people who may unknowingly be consuming the insect parts that make up carmine, which could violate their dietary requirements and/or religious beliefs.

Yellow Dye (FD&C Yellow #5 and Yellow #6)

Two artificial yellow dyes currently are approved by the FDA for use in foods, drugs and cosmetics. These include FD&C Yellow #5, also known as Yellow 5 or Tartrazine and FD&C Yellow #6 also known as Yellow 6 or Sunset Yellow. Both have been associated with potential negative health effects.

FD&C Yellow #5 (Tartrazine) is a water soluble artificial dye and it is found everywhere. A partial list of the foods that may contain FD&C Yellow #5 includes cake, pudding, biscuits, cookies, muffins, bread, pie crusts, frostings, candy, gums, ice cream, beverages, cereal, instant waffles, yogurt, chips, crackers, salad dressing, pickles, cheeses, dips, fast foods,
prepared dried and frozen entrees and sides. It is also found in vitamins, soaps, and shampoos.

Research has linked FD&C Yellow #5 to allergies, asthma, skin rashes, hyperactivity and migraines and its use has been banned in Norway and Austria.⁷

FD&C Yellow #6 (Sunset Yellow) generates an orange to yellow hue in foods and is frequently combined with other artificial colors such as FD&C Yellow #5. A partial list of foods that may contain Sunset Yellow includes orange soda, jams and jellies, baked goods, dessert mixes, cookies, frosting, cereal, candies, gum, beverages, soup mixes, margarine, chips, macaroni and cheese mix, condiments, and prepared chicken nuggets.

Reported side effects of FD&C Yellow #6 include gastric upset, hives, runny nose, allergies, hyperactivity, tumors in animals, mood swings, and headache. It is banned in Norway and Finland. ⁸

Blue Dye (FD&C Blue #1 and FD&C Blue #2)

Blue #1 is used to generate a blue hue in many products including candies, gums, cereals, beverages, spirits, vitamins, medications, toothpaste, shampoo and mouthwash. Blue #1 is sometimes used in combination with FD&C Yellow #6 to create a green hue in products. Both Blue# 1 and Blue #2 are associated with health concerns.

Experts testified at the 2011 FDA Food Advisory hearings that Blue #1 behaves differently than other FD&C colors as it is absorbed more and has been noted to cross the blood-brain barrier.⁹

Representation from the Feingold Association discussed the adverse effects of FD&C Blue #1 on patients in conjunction with enteral feedings (tube feedings of patients unable to eat normally):

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“In 2003, the FDA asked doctors to stop doing that [adding Blue 1 to enteral feedings] since patients were dying, not from their disease, but from the Blue number 1, which apparently caused refractory hypotension and metabolic acidosis, and also, incidentally, turned their colons bright blue.”  

These adverse effects of associated with Blue Dye # 1 led to generation of a FDA Public Health Advisory in 2003.12

Caramel Coloring

Caramel color is used to make many of the foods and beverages we consume more colorful and appealing to the eye. It is used in colas, spirits, sauce mixes, condiments, and cough drops.

Caramel coloring is made by the heating of sugars but different preparations are precise in their production methods and depending on usage needs may require the addition of acetic, citric, lactic or phosphoric acid to achieve desired properties.

For generation of caramel coloring suitable for a cola’s acidic environment the acid- addition step creates a by-product called 4-methylimidazole (4-MEI) which is associated with carcinogenic effects.

4-MEI has been found to be carcinogenic in animal testing13 and in 2011 the by-product 4-MEI was taken quite seriously when a California Court14 ruled that it was lawful to list caramel coloring as a known carcinogen despite opposition from a food industry coalition.

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California has placed a 29 microgram (mcg) limit for 4-MEI and products containing higher levels are required to apply warming labels on product packaging. When cans of cola were tested in 2011 it was determined that they contained up to five times the amount of 4-MEI recommended by the State of California.15

Although the American Beverage Association and others debate whether 4-MEI is carcinogenic in humans, both Coca-Cola and Pepsi have responded to this topic through new research and development aimed at lowering the amounts of 4-MEI in their products. The goal is to meet the 29 mcg maximum recommendations as set by the State of California.16

**White or Light Dye**

It can be easy to detect and avoid foods with artificial dye when they are neon or unusually bright, but foods that appear to be natural, light or white may also contain unexpected artificial dyes.

The goal of using artificial dye in whiten/light foods such as margarine, cake mix, white confections, marshmallows or even medicine tablets is to brighten products which in their natural states may appear off white, grey or have a varying non-uniform shades.

The process to make products appear more white or more uniform may be achieved by the addition of blue, yellow or even red artificial dyes.

A Godiva white chocolate bar includes FD&C Red #40 in its ingredient list and FD&C Yellow #5 and FD&C #6 are used frequently in white to light hued baking mixes, yogurts, and vanilla ice cream. A bag of Kraft Jet-Puffed Marshmallows includes FD&C Blue #1 in its ingredient list.

Excedrin and other tablets use blue dye to make the pills appear bright white. During the public comment session in the 2011 Food and Drug Administration Advisory Committee hearings it was noted that:

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“I got a migraine headache from taking Excedrin……they use blue dye in the white pills, because the blue actually tricks the eye and makes things look whiter” 17

Since artificial dyes do not add nutritional value or taste to foods but may cause serious negative effects why should they be used in the foods that we eat and feed to our children? The potential risks seem to outweigh any possible benefits.

If other countries have seen health concerns and have replaced artificial dyes with those that are naturally derived it seems likely that the U.S. will follow suit. Until such a time the best consumer advice is to read labels, be aware of ingredients and to make informed decisions about the consumption of artificial dyes.

*For additional information about artificial dyes please visit www.whydye.org