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THE HEALTH HAZARDS OF FOOD DYES AND RED DYE 40

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Food dyes are widely used in the food industry to enhance the appearance of various products, adding vibrant colors to our favorite foods and beverages. However, while these dyes may make our meals visually appealing, concerns have been raised about their potential health hazards. The purpose of food coloring is to enhance a food's visual appearance and make it more enticing to consumers. However, artificial food colorings contain chemicals linked to many health concerns.

Either synthetic or natural compounds can produce food dyes. Unfortunately, artificial food coloring is much more relevant in producing food products than natural dyes. Artificial dyes derived from petroleum are found in thousands of foods including cereal, candy, snacks, and beverages (Potera, 2010). Synthetic food dyes create more vivid colors, are easier to manipulate, and are much less expensive to process than natural alternatives (Potera, 2010). Natural dyes can be difficult to process in food manufacturing because they are unstable. Unfortunately, artificial food dyes can cause the depletion of minerals such as zinc and iron, which are essential for human growth and development (Potera, 2010). When the brain does not

obtain sufficient amounts of minerals, it can cause chemical changes in the brain as well as cause hypersensitivity. While some synthetic food colorings have been removed from the market, several artificially created dyes are still in use today.

Dangers of Red Dye 40

One of the most prominent of these dyes is Red Dye 40. Red Dye 40, also known as Allura Red AC, is a synthetic food coloring commonly used to give a red or orange hue to a wide range of consumable items, including candies, cereals, beverages, and processed snacks (Potera, 2010). Red Dye 40 can also be found in the production of cosmetics and pharmaceuticals (Gleeson, 2022). This potentially harmful dye is in most fruit-flavored snacks, sodas, and flavored yogurts. Occasionally, it is added to meat products, such as sausages and hot dogs, to make them appear fresh. Besides processed foods, Red Dye 40 can also be found in medication, such as cough syrups and liquid pain relievers. Many European countries have banned the use of Red Dye 40. However, the food and pharmaceutical industries of the United States continue to use this chemical to lure consumers to more visually appealing products. Currently, the Food and Drug Administration (FDA) approves Red Dye 40 in food products. However, there are concerns about its potential impact on human health. According to Potera (2010), there is evidence that links artificial food dyes to behavioral problems. Nevertheless, it cannot be easy to eliminate Red Dye 40 from one's diet, but reducing exposure to Red Dye 40 can improve one's overall well-being.

Red Dye 40 contains two ingredients that can be highly problematic. One of those ingredients is a chemical named propylene glycol. According to the Agency for Toxic Substances and Disease Registry, prolonged exposure to high levels of propylene glycol has been linked to skin irritation, rashes, and even multisystem organ failure (CDC, 2022). Since Red Dye

40 is derived from petroleum, it contains traces of benzene. *Benzene* is a carcinogen that can cause anemia, leukemia, and other forms of cancer. Julia Zumpano, a registered dietitian with Cleveland Clinic, states, "Researchers found tumor growth in animals that consumed high doses of food dyes" (Cleveland Clinic, 2023). The American Cancer Society followed studies regarding benzene. The lab results showed that benzene caused chromosome changes in bone marrow cells and human leukemia cells (*The American Cancer Society, 2023).* Although the small amounts of benzene in Red Dye 40 may not pose a serious health threat such as cancer, the potential risks of consuming Red Dye 40 remain.

Red Dye 40 has also been linked to allergic reactions, experiencing mild to severe symptoms. Symptoms may include headaches, itchy skin, swelling, hives, difficulty breathing, dizziness, fainting, and low blood pressure (Mittler, 2022). Even though individuals experiencing the listed symptoms, Red Dye 40 can be difficult to diagnose (Mittler, 2022). Not only has Red Dye 40 been associated with allergic reactions, but also it can affect the a child's behavior and health. It has been found to increase hyperactivity to the point where kids show symptoms of ADHD (Attention-Deficit Hyperactivity Disorder).

Some studies have shown an association between Red Dye 40 and an increased risk of ADHD (Nigg et al*.,* 2012*).* The *Lancet Journal* performed a trial to test whether the intake of Red Dye 40 affects children's behavior. They found that children who consumed foods containing Red Dye 40 were more likely to exhibit symptoms of ADHD (*McCann et al., 2007).* A study published in *The Journal of Pediatrics* found that children who consumed Red Dye 40 were more likely to experience hyperactivity than those who consumed a placebo beverage (*McCann et al., 2007).* The studies have shown that association between synthetic food colors such as Red Dye 40 and ADHD have a strong correlation.

Many children with ADHD struggle to focus in school and tend to display behavioral issues. These struggles can eventually lead to the same difficulties with employment and relationships in adulthood. Children with ADHD tend to display difficulties controlling their impulses which also affects their behavior in school. These impulse issues may sometimes follow kids into adulthood, possibly creating legal problems. "UCLA research has shown that children with attention-deficit hyperactivity disorder are far more likely than other kids to develop serious substance abuse problems as adolescents and adults" (Wolpert, 2011). Unfortunately, ADHD is also treated with chemicals that can cause another plethora of side effects.

Considering the adverse health and behavioral effects of Red Dye 40, this chemical should be banned in the United States, as it is in some European countries. However, Red Dye 40 is still used in many foods sold at supermarkets. People have specific standards when it comes to the color of their food. "If a product does not match the standard they expect, consumers generally perceive it as being of poor quality or no longer fresh" (Gleeson, 2022). Therefore, eliminating food dyes could be disastrous for the food industry and cause social disorder.

On the other hand, the food industry must develop more natural alternatives to harmful dyes. Food scientists accepted this challenge years ago. "In 2013, an industry report showed that natural color sales overtook artificial color sales for the first time" (Gleeson, 2022). If this is the case, why is Red Dye 40 still prevalent in our grocery stores? Products utilizing natural coloring as a supplement to replace Red Dye 40 may not be accessible or affordable to some. For example, organic foods are often more expensive than processed products, making them less accessible to lower-income families. The price disparity between consumers may be an overriding factor in purchasing foods with and without Red Dye 40. In addition, consumers may

lack access to natural colored products in their local grocery stores. As a result, many lower-income families need help accessing fresh, healthy foods due to limited availability in grocery stores around their community due to transportation to other grocery stores and financial constraints. This may make it difficult for families to provide their household with fresh foods free of Red Dye 40.

Conclusion

With the prominence of Red Dye 40 in our everyday food products, the most effective way to avoid the consumption of this harmful chemical is to read the labels and avoid processed foods with Red Dye 40. Red Dye 40 is an artificial dye that is synthetically produced in the laboratory. Synthetically produced color additives provide more uniform color and are cheaper to produce than natural alternatives. Therefore, consumers can see that Red Dye 40 is in most of the foods consumers eat. Consuming high amounts of Red Dye 40 can pose a significant health risks. Despite these risks, Red Dye 40 is still commonly used in many processed foods, beverages, and medications which are not heavily regulated by the government.

Consequently to decrease the intake of Red Dye 40, more government regulation is needed to improve consumers' health, especially developing children. Companies will need to educate themselves to provide the best available products for the consumers. With the use of Red Dye 40 in many food products, manufacturers are profit driven. Thus, consumers will need to educate themselves in the ingredients in their purchases. Consumers will need more education in reading nutrition labels and purchase products that contain natural food coloring from fruit or vegetable extracts.

Food scientists have developed alternatives to artificial food dyes, using beets and tomatoes to make red food coloring. Unfortunately, we have been conditioned to believe that our

foods should be a specific color. More awareness needs to be spread about Red Dye 40. Staying away from Red Dye 40 can help consumers preserve their overall health. Lastly, regulations on marketing products with artificial colors and flavors must be more prevalent. The commercials and labels should have warnings like cigarettes and alcohol. Hopefully, someday soon, we can see these food dyes disappear altogether.

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