

Food dyes: What should we know?

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Food dyes are often featured on social media and talked about in the media. Buyers might be confused by the messages they read and hear. Understanding why food dyes are used and how food dyes affect health and well-being can help you make decisions about whether to buy and eat foods that have food dyes.

What are food dyes?

Food dyes are colors added to food, vitamins, medications, or cosmetic products. Food processors might add dye to boost a food's natural color, help make a food look like the flavor (ex. purple for grape), and make colorless food more “fun.” Added color can also fix color loss from light, air, temperature, and storage conditions.

Food dyes can come from natural or synthetic (artificial) sources. Natural sources of color include plants, vegetables, minerals, and animals. Artificial dyes are made from chemical ingredients. It is the artificial dyes that people are concerned about.

Are food dyes regulated?

Before manufacturers can use artificial colors, the Food and Drug Administration (FDA) needs proof that the colors are safe at the intended use level. As of May 2025, the FDA has approved eight artificial colors



for use in food and drinks. These include Blue No.1, Blue No. 2, Green No. 3, Orange B, Citrus Red No. 2, Red No. 40, Yellow No. 5, and Yellow No. 6. Some of these food dyes are also approved for use in other countries. But other countries may use food dyes that the United States has not approved. The use of some food dyes may require warning labels on packages. Each country has different rules. For example, in the European Union, Yellow No. 5, Yellow, No. 6, and Red No. 40 must be labeled with, “May have adverse effect on activity and attention in children.”



What products have food dyes?

The three most used food dyes are Red No. 40, Yellow No. 5, and Yellow No. 6. These food dyes are common in breakfast cereals, fruit-flavored snacks, candies, ice cream cones, icing, juice drinks, and soft drinks. You can also find food dyes in yogurt, cheesy popcorn or puffs, spray cheese or cheese dips, sauces, salad dressing, condiments, dried fruit and trail mix, chips, fruit cups, and meal starter kits.

Are artificial food dyes safe?

The California Office of Environmental Health Hazard Assessment did an in-depth review of studies on the exposure and safety of artificial food dyes. It found that children, pregnant women, and women of childbearing potential have widespread exposure to food dyes. In fact, some consume more than the intended level used for safety testing.

The report reviewed results from all the studies that monitored children's behavior while carefully controlling whether children were on a dye-free diet or one that included food dyes. The researchers concluded there is a link between the typical amounts of artificial food dye that children are exposed to in the food supply and negative behavioral outcomes. The relationship was found among both children who have pre-existing behavioral disorders like Attention Deficit

Hyperactivity Disorder (ADHD) and children who do not. But the dyes do not affect all children the same. Children who are sensitive may show signs of inattentiveness, hyperactivity, and restlessness after eating varying amounts of food dyes that are in a typical U.S. diet.

How would new laws affect the food supply?

Changes in laws about food labeling and food ingredients push the food industry to make changes. Examples of changes include clearly labeling products so buyers can make informed choices and updating products to lower, swap, or remove food dyes. The process of researching, developing, and implementing changes could lead to higher food costs. Changes in one state can influence the types of food products available in other states.

In January 2025, the FDA banned the use of red dye No. 3 in food, beverages, and oral medications. Research showed red dye No. 3 caused thyroid cancer in rats. There was no evidence of a similar effect in humans. But the Delaney Clause in the Federal, Food, Drug, and Cosmetic Act requires banning the use of additives that cause cancer in humans or animals. Companies have until January 2027 to remove red dye No. 3 from their products. Common foods that have this dye include cherries in canned fruit cocktails, maraschino cherries, and seasonal candies.

What can I do to limit exposure to food dyes?

If you have concerns about food dyes, there are several steps you can take to limit exposure for your family.

- Focus on whole foods. Fruit, vegetables, whole grains, and animal and plant sources of protein are less likely to have food dyes.
- If organic is in your budget, this is an option for foods that are free of artificial food dyes.
- Choose water to drink. Infusing water with fruit, herbs, or vegetables is a way to add flavor without adding dyes.
- Check food labels. Be wary of claims on packaging for “healthy” or “natural.” Look at the ingredients list of packaged foods. Products that say “artificial color” or list FD&C (Federal Food, Drug, and Cosmetic Act) dyes have food dyes.

As experts do more research, we will have a better understanding of how bodies absorb, use, break down, and get rid of these food dyes. More research on this topic may lead to changes in rules and laws around the country. In the future, the number of approved food dyes may change. With the elimination of food dyes or the addition of new food dyes, it will take time for food and supplement manufacturers to respond and remove them from their products.

Resources

California Office of Environmental Health Hazard Assessment. (2021 April 16). *Report links synthetic food dyes to hyperactivity and other neurobehavioral effects in children* [Press release]. <https://oehha.ca.gov/risk-assessment/press-release/report-links-synthetic-food-dyes-hyperactivity-and-other>

A CONCURRENT RESOLUTION urging the Food and Drug Administration to mandate and enforce a prohibition on United States food manufacturers producing or selling food containing harmful ingredients that have been banned by several other countries, KY HCR103, Regular Session. (2024). https://apps.legislature.ky.gov/recorddocuments/bill/24RS/hcr103/orig_bill.pdf

U.S. Food & Drug Administration. (2023 July 6). *Color additives in foods*. <https://www.fda.gov/food/color-additives-information-consumers/color-additives-foods>

Human Foods Program. (2025, January 15). *Revoking Authorization for the Use of Red No. 3 in Food/Ingested Drugs*. U.S. Food and Drug Administration. <https://www.fda.gov/food/hfp-constituent-updates/fda-revoke-authorization-use-red-no-3-food-and-ingested-drugs>

Potera C. (2010). The artificial food dye blues. *Environmental health perspectives*, 118(10), A428. <https://doi.org/10.1289/ehp.118-a428>

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