



## Press Release

California Environmental Protection Agency  
Office of Environmental Health Hazard Assessment  
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## Report Links Synthetic Food Dyes to Hyperactivity and other Neurobehavioral Effects in Children

SACRAMENTO – A state report released today finds that consumption of synthetic food dyes can result in hyperactivity and other neurobehavioral problems in some children, and that children vary in their sensitivity to synthetic food dyes.

The report by the California Environmental Protection Agency’s Office of Environmental Health Hazard Assessment (OEHHA) also finds that current federal levels for safe intake of synthetic food dyes may not sufficiently protect children’s behavioral health. The levels were established by the US Food and Drug Administration decades ago and do not reflect newer research.

The percentage of American children and adolescents diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD) has increased from an estimated 6.1% to 10.2% during the last 20 years. Concerns about increasing rates of ADHD and other behavioral disorders prompted the California Legislature to ask OEHHA to conduct the food dye assessment.

“Evidence shows that synthetic food dyes are associated with adverse neurobehavioral outcomes in some children,” said OEHHA Director Dr. Lauren Zeise. “With increasing numbers of U.S. children diagnosed with behavioral disorders, this assessment can inform efforts to protect children from exposures that may exacerbate behavioral problems.”

The report is the product of a two-year, multifaceted evaluation of seven synthetic food dyes that have been approved by the FDA. OEHHA extensively reviewed existing studies of the effects of these dyes on both humans and laboratory animals.

Overall, human studies indicate that synthetic food dyes are associated with adverse neurobehavioral outcomes in children, and that children vary in their sensitivity to synthetic food dyes. “Challenge studies” placed the children on a dye-free diet for several weeks and measured their behavior. The children were then given food or drinks with dyes added, and measures of their behavior were recorded by a number of standardized methods. These studies demonstrated clearly that some children are likely

to be more adversely affected by synthetic food dyes than others. Animal studies indicate synthetic food dyes affect activity, memory and learning, cause changes in the neurotransmitters (chemicals that carry signals from one nerve to the next) in the brain, and cause microscopic changes in brain structure.

Researchers also found that all of the FDA's Acceptable Daily Intake levels (ADIs) for synthetic food dyes are based on 35- to 70-year-old studies that were not designed to detect the types of behavioral effects that have been observed in children. Comparisons with newer studies indicate that the current ADIs may not adequately protect children from behavioral effects. For some of the dyes, these comparisons indicate that updated levels would be much lower.

OEHHA also collaborated with scientists at UC Berkeley and UC Davis to estimate the levels of exposure to synthetic food dyes by US children of varying ages as well as pregnant women and women of childbearing age. The research team found that children are exposed to multiple dyes in a day, and that the highest exposures are usually from juice drinks and soft drinks. They also found that common exposures to Red No. 3 from a few foods may exceed the existing ADI. If revised ADIs were to be based on newer studies, common exposures to food dyes in foods would exceed the revised guidance.

OEHHA began the study by inviting the public to submit scientific information on the health effects of synthetic food dyes. It then conducted a two-day symposium in September 2019 to foster discussion among researchers in academia, industry and government and the public on potential effects of synthetic food dyes on children. A draft version of the report was released in August 2020 for comment by members of the public and external peer review by experts identified by the University of California Office of the President.

OEHHA's mission is to protect and enhance the health of Californians and our state's environment through scientific evaluations that inform, support, and guide regulatory and other actions.

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