The Effect of Red 40 on the Aggression of Subsequent Generations of Drosophila melanogaster

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The U.S. Food and Drug Administration mandates that Red 40 must be listed by name on food and product labels. Red 40 is made from plant, animal, or mineral sources. Red 40 has been linked to hyperactivity, ADHD, and even higher incidences of aggressive behaviors in children. Using cultures of Drosophila melanogaster that had been raised in Red 40 media, I tested the hypothesis that subsequent generations will show an increase in aggressive behaviors. Drosophila melanogaster was cultured in media that contained 0.05 mg of Red 40. Pupae were collected from the first and second generation and were then placed in isolation tubes to allow for maturity. Two male flies were put into fight chambers with a decapitated female. After a 5-minute acclimation period, two aspects were measured. The first is the latency to fighting which is the time of the first aggressive contact. The second is the fighting index which is the number of aggressive movements during a 30-minute period. A two-tailed t test was used to analyze the data. Compared to the first generation of D. melanogaster (mean latency to fighting 808 sec, SD 106.3 sec, mean fighting index 30%, SD 5.5%), the second generation of showed a lower latency to fighting and a higher fighting index (mean latency to fighting 405 sec, SD 95.6 sec, mean fighting index 54.3%, SD 8.1%). This study showed that continuous exposure to Red 40 does increase aggressive behaviors in subsequent generations of D. melanogaster. Further experiments will clarify if the increase in aggressive behaviors continues in later generations or if the effect reaches a plateau.

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