How Do Artificial Sweeteners Affect C. elegans?

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Obesity increased the occurrence of diabetes in America, leading many to seek “healthier” alternatives and use of sweeteners. This project determined how sugar and different artificial sweeteners affect C. elegans and bacteria of the gut microbiome. It was hypothesized nematodes exposed to sweeteners will show signs of metabolic disorders & changes in structure. It was also predicted artificial sweeteners will affect bacterial growth in the gut microbiome. Five sweeteners: aspartame, sucralose, saccharin, stevia, and acesulfame potassium (Ace-K) were used. Each was combined with C. elegans on NGM plates, while nematodes were observed daily. In Trial 1, nematodes entered the Dauer phase, resulting in inconclusive data. In Trial 2 and 3, nematodes cultured in artificial sweetener plates became hyperactive and were skinnier. Trial 4 utilized second generation nematodes from Trial 3. Reproduction was not affected since the number of larvae was = previous trials. Nematodes appeared to be affected by sweeteners, L1-L2 larvae were less active compared to controls and many L3-Adults were shaky & hyperactive. In Ace-K, nematodes appeared lethargic. Stevia and Ace-K groups showed a decrease in average body width (eyepiece graticule units) when compared to control (2.28 & 2.44:2.69 control). Confirming: Artificial sweeteners affect nematode movement and metabolic processes. Lactobacillus Cultured: Wells + Inoculum Broth + each Sweetener. Test1 and Test3- No significant difference in bacterial growth. Test2 samples containing sweeteners + bacteria had lower optical density than control, showing artificial sweeteners have some effect on bacterial growth, lower OD than control, partially supporting the hypothesis.

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