How Do Various Controlled Substances Affect Daphnia magna?

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The purpose of this experiment was to determine if hydrocodone affected a daphnia's heart rate and/or heart rhythm, and if these effects were amplified with ethanol. The independent variables were chosen to the individual components (ethanol and hydrocodone) to their effects combined as well as to account for the acetaminophen present in the hydrocodone pills, and the levels of the independent variable were chosen to have amounts below the LD50 to ensure viable test subjects, yet different enough to study the effects of increased amounts. It was hypothesized that 30% of the LD50 of ethanol would reduce a daphnia's heart rate the most. To determine this, solutions were made of hydrocodone, acetaminophen, ethanol, nutrient water, and hydrocodone and ethanol, and then diluted to form 20% or 30% of the LD50.15 Daphnia were then exposed to the mixtures for thirty minutes before heart rates were recorded under a microscope. These data supported the hypothesis as Ethanol 30% had a lowest average heart rate. Sources of error included: a change in the Daphnia food, slightly incorrect measurements, slight splashing due to dropping of stir bar, difference in temperature of solutions, varying degrees of daphnia's health, pregnancy and size of Daphnia, two trials being tested at different times than the rest of the set, and daphnia's heart rate was not take immediately after 30 minutes. This experiment is internationally applicable because it addresses the effects of drugs, a growing problem among youth especially.

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