

Questions

Collaborate with your group to obtain data for all concentrations of your toxicant. Complete your data table on the last page with the following information on toxicant concentrations and then answer the questions.

| | Ethanol | Caffeine | Nicotine |
|-------------|---------|------------|---------------|
| Solution #1 | 0.25% | 0.08 mg/mL | 0.00055 mg/mL |
| Solution #2 | 2.5% | 0.33 mg/mL | 0.00275 mg/mL |
| Solution #3 | 10% | 1.0 mg/mL | 0.011 mg/mL |

1. Exposure occurs when an organism comes in contact with a toxicant. Exposure frequency refers to how often, exposure duration refers to how long, and exposure concentration refers to how much. Using this terminology, describe each for your investigation.
2. Two types of toxicity tests can be performed. Acute toxicity tests are a high single exposure for a brief duration. Chronic toxicity tests are usually a persistent and longer exposure (depending on the organism's lifespan) at a lower concentration than the acute test.
 - a. Based on this information, which type of test was done in this investigation?
 - b. What are the benefits of using an acute toxicity test?
 - c. What are the benefits of using a chronic toxicity test?
3. Using the data from your assigned toxicant, design a chronic toxicity test that you might perform on the blackworms. Predict what your results might be.
4. The exposure pathway is how a toxicant enters the body. What was the exposure pathway for your toxicant?
5. Toxicity is affected by both intrinsic and extrinsic factors. Extrinsic factors, such as temperature or barometric pressure, occur outside the body. Intrinsic factors, such as age, metabolism, and genetic differences, are inherent to an individual organism. Using the following factors, predict how you think each could affect the results with your toxicant. Be specific!
 - a. temperature
 - b. age
 - c. metabolism
 - d. genetic difference
6. Your concentrations represent sublethal concentrations of the toxicant. Explain what you think this means.

7. The potency of a toxicant is the measure of its strength. Paracelsus (1493–1541) is quoted as saying “The dose makes the poison.” The more potent the toxicant, the less it takes to evoke a response. Based on the concentrations listed above and your observations, which toxicant do you think is the most potent and why?
8. Based on your toxicant, what body systems do you think were affected and why?
9. At the end of the 24-hour recovery, you can generally determine whether the effects of your toxicant are reversible or irreversible. Based on the toxicant that you used, tell whether the effects were reversible or irreversible at each concentration.
10. Did all of your worms (at each concentration) demonstrate the same behavior? Assume that one worm demonstrated normal behavior and the other four demonstrated abnormal behavior. How would you explain this?
11. The investigation that you did was a controlled experiment.
 - a. What was the control?
 - b. Why is a control necessary in a scientific experiment?
12. Risk assessment of a toxicant is the estimate of severity and the likelihood of harm to human health or the environment that occurs from exposure to a risk agent (toxicant). The toxicants that you tested apply to human health. Name some toxicants you might test that would harm the environment and thus pose a threat to the worms.
13. How do lifestyles play a part in risk assessment of human health toxicants?
14. Can the results of your tests be applied to humans or other vertebrates? Why or why not?
15. Based on what you have learned from your investigation and your answers to the questions above, analyze your data and summarize any conclusions that can be drawn from the results.