

Water Pollution and Effects on the Vinegar Eel, *Turbatrix aceti*

Materials (per team)

- 1 depression slide
- 10 ml distilled water
- 1 sterile plastic pipette
- 1 dissecting microscope

Common Materials

- *Turbatrix aceti* culture
 - Bottle (A) Silver nitrate 0.25 M AgNO_3
 - Bottle (B) Mercury (II) Nitrate 0.01 M $\text{Hg}(\text{NO}_3)_2$
 - Bottle (C) Nickel Nitrate 1.0 M $\text{Ni}(\text{NO}_3)_2$
 - Bottle (D) Lead Nitrate 1.0 M $\text{Pb}(\text{NO}_3)_2$
 - Bottle (E) Aluminum Nitrate 1.0 M $\text{Al}(\text{NO}_3)_3$
 - Bottle (F) Copper (II) Nitrate 1.0 M $\text{Cu}(\text{NO}_3)_2$
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Assessing the Effects of Water Pollutants

1. Prepare a control by placing 2 drops of distilled water on a slide, followed by one drop of the vinegar eel suspension. Observe the normal movement of this organism under the dissecting microscope. Pay attention to the vigor of the wriggling and the animals progress as it moves forward.
2. Place one drop of distilled water in each of the six wells of the depression slide. In the first depression, add one drop from bottle A, followed by a drop from the eel suspension. Record the time then observe the amount of time it takes for the eels to lose their ability to swim in one direction, and the time until they begin to form coils. Make your observations until both of these changes in behavior occur. If after five minutes you do not see a change, record a negative result for that pollutant.
3. Repeat the above procedure for the remaining five pollutants and record your results.

Purpose: Effects of Pollutant	Drops of Distilled Water	Drops of Pollutant	Drops of eel suspension	Time until the eels stop forward motion	Time until the eels form coils
A- AgNO ₃	1	1	1		
B- Hg(NO ₃) ₂	1	1	1		
C- Ni(NO ₃) ₂	1	1	1		
D- Pb(NO ₃) ₂	1	1	1		
E- Al(NO ₃) ₃	1	1	1		
F- Cu(NO ₃) ₂	1	1	1		

Positive Synergy Between the Pollutants

1. Clean the depression slide and re-run the above experiment, but this time add one drop each of two solutions as outlined in the following table. Again, record the amount of time it takes for the eels to stop their forward motion and/or curl up.

Drops of Pollutant B- Hg(NO ₃) ₂	Drops of second pollutant	Synergy tested	Drops from eel suspension	Time until the eels stop forward motion	Time until the eels form coils
1	1 A- AgNO ₃	Hg(NO ₃) ₂ + AgNO ₃	1		
1	1 C- Ni(NO ₃) ₂	Hg(NO ₃) ₂ + Ni(NO ₃) ₂	1		
1	1 D- Pb(NO ₃) ₂	Hg(NO ₃) ₂ + Pb(NO ₃) ₂	1		
1	1 E- Al(NO ₃) ₃	Hg(NO ₃) ₂ + Al(NO ₃) ₃	1		
1	1 F- Cu(NO ₃) ₂	Hg(NO ₃) ₂ + Cu(NO ₃) ₂	1		

NOTE: To answer some of these questions you'll have to do an internet search for some of the terms.

1. Which solution(s) exhibited no toxic effects over the five-minute test period?
2. Rank the remaining solutions as to their toxicity (from least to most-toxic).
3. Which solution(s) showed synergy when combined with Hg(NO₃)₂? Rank them from least to most synergy. Which solutions showed no evidence of synergy with Hg(NO₃)₂?
4. Effects of pollutants are usually tested on higher animals, such as mice and rats. However, biological amplification may complicate this situation. Explain.
5. Because of the complexity, the toxicity of a pollutant is usually tested in the absence of other pollutants. Explain why this method would be suspect.