Marine Ecosystems

Investigation Data Sheet

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How Are Brine Shrimp Affected By Salt Concentration?

Common brine shrimp (artemia) are small, aquatic crustaceans which have adapted to survive in saltwater of changing concentrations. They produce fertilized eggs that are capable of drying out and remaining viable for many years. As soon as the eggs are exposed to water, the hatching process begins.

Objective

Investigate the effects of various saline concentrations on the hatching of brine shrimp eggs and determine the optimal salt concentration brine shrimp need to survive.

Materials

__ water (tap water that has sat uncovered for 24 hours or bottled water with no chlorine)
__ measuring cup or graduated cylinder
__ five plastic cups
__ an indelible marker
__ rock salt or non-iodized salt (DO NOT USE iodized salt.)
__ measuring spoons or metric balance
__ wooden or plastic stirring sticks
__ brine shrimp eggs
__ plastic wrap
__ rubber bands
__ dry yeast
__ an eye dropper
__ five Petri dishes
__ a magnifying glass or a microscope
__ a shoebox

Safety Notice: All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

Procedure

1. Label the plastic cups from 1 to 5.
2. Pour 250 milliliters of dechlorinated water into each cup. Do not add any salt to cup number 1. Determine the concentration of salt in cup number 1. (Example: 0 g NaCl/ 250 mL H_2O = __% salt concentration) Record it in the data table on the next page.
3. Add 11 grams (approximately one teaspoon) NaCl to cup number 2. Determine the salt concentration and record it in the data table on the next page.
4. Add 22 grams NaCl to cup number 3. Determine the salt concentration and record it in the data table on the next page.
5. Add 55 grams NaCl to cup number 4. Determine the salt concentration and record it in the data table on the next page.
6. Add 110 grams NaCl to cup number 5. Determine the salt concentration and record it in the data table on the next page.
7. Using separate stirring sticks for each cup, stir until the salt has dissolved.
8. Measure a quarter teaspoon of brine shrimp eggs and place in cup number 1. Place the same amount of brine shrimp eggs into the other cups and cover each with plastic wrap. Hold the plastic wrap in place with rubber bands.
9. Place the cups into the shoebox and store it overnight in a place where the temperature and lighting conditions remain constant.
10. The next day, uncover cup number 1 and gently stir the water. Using the eyedropper, squirt a .5 mL sample of water into a petri dish and observe with a magnifying glass or microscope.
11. Carefully count all the eggs and any hatched shrimp, and record your observations in the data table.
12. Repeat steps 10 and 11 with each numbered cup. (Remember to use a clean stirrer and petri dish for each cup.)
13. Observe the cups each day for a total of four days. Record your daily observations in the data table.
14. Once the shrimp hatch, feed them by adding a small amount of dry yeast (< .5 g) to the cup as nourishment.

Other Observations

Did anything happen that could have had an impact on your results? If so, explain what happened.

Conclusions

Based on the collected data, what can you conclude about the optimal salt concentration for hatching brine shrimp?

Describe two unique adaptations that brine shrimp have to help them survive.

What was your control in this experiment?

What variables could you change in another version of this experiment?

See data table on the next page.

Data Table

Number of Hatched Brine Shrimp and Eggs Per 0.5 mL Sample									
		Day 1		Day 2		Day 3		Day 4	
Cup	Salinity	# of eggs	# of shrimp	# of eggs	# of shrimp	# of eggs	# of shrimp	# of eggs	# of shrimp
1									
2									
3									
4									
5									