Abstracts – compiled from Society for Science

You can look up additional resources on the following site: http://www.societyforscience.org/page.aspx?pid=310

COMPLETING THE ABSTRACT:
Abstracts are limited to a maximum 250 words and must fit within the predefined area.
The abstract should include the following:
a) purpose of the experiment
b) procedure
c) data
d) conclusions

Title Name School
Purpose of project / experiment: An introductory statement of the reason for investigating the topic of the project. A statement of the problem or hypothesis being studied.
Summarize procedures, emphasizing the key points or steps: A summarization of the key points and an overview of how the investigation was conducted. Omit details about the materials used unless it greatly influenced the procedure or had to be developed to do the investigation. An abstract should only include procedures done by the student. Work done by a mentor (such as surgical procedures) or work done prior to student involvement must not be included.
Detail succinctly observations/data/results: This section should provide key results that lead directly to the conclusions you have drawn. It should not give too many details about the results nor include charts or graphs.
State conclusions/applications.

TIPS ON WRITING A PROJECT ABSTRACT
A project abstract is a brief paragraph or two (limited to 250 words or 1,800 characters) highlighting and/or summarizing the major points or most important ideas about your project. An abstract allows judges to quickly determine the nature and scope of a project.

- Emphasize these aspects: purpose (hypothesis), methods (procedures used), data summary or analysis, and conclusions.
- Focus only on the current year's research.
- Omit details and discussions.
- Use the past tense when describing what was done. However, where appropriate use active verbs rather than passive verbs.
- Use short sentences, but vary sentence structure.
- Use complete sentences. Don't abbreviate by omitting articles or other small words in order to save space.
- Avoid jargon and use appropriate scientific language.
- Use concise syntax, correct spelling, grammar, and punctuation.

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Effects of Marine Engine Exhaust Water on Algae

Mary E. Jones
Hometown High School, Hometown, PA

Purpose

This project in its present form is the result of bioassay experimentation on the effects of two-cycle marine engine exhaust water on certain green algae. The initial idea was to determine the toxicity of outboard engine lubricant. Some success with lubricants eventually led to the formulation of "synthetic" exhaust water which, in turn, led to the use of actual two-cycle engine exhaust water as the test substance.

Methods

Toxicity was determined by means of the standard bottle or "batch" bioassay technique. Scenedesmus quadricauda and Ankistrodesmus sp. were used as the test organisms. Toxicity was measured in terms of a decrease in the maximum standing crop. The effective concentration - 50% (EC 50) for Scenedesmus quadricauda was found to be 3.75% exhaust water; for Ankistrodesmus sp. 3.1% exhaust water using the bottle technique.

Data

Observations

Anomalies in growth curves raised the suspicion that evaporation was affecting the results; therefore, a flow-through system was improvised utilizing the characteristics of a device called a Biomonitor. Use of the Biomonitor lessened the influence of evaporation, and the EC 50 was found to be 1.4% exhaust water using Ankistrodesmus sp. as the test organism. Mixed populations of various algae gave an EC 50 of 1.28% exhaust water.

Conclusions

Applications

The contributions of this project are twofold. First, the toxicity of two-cycle marine engine exhaust was found to be considerably greater than reported in the literature (1.4% vs. 4.2%). Secondly, the benefits of a flow-through bioassay technique utilizing the Biomonitor was demonstrated.

RUBRIC

	Excellent (4 Points)	Fair (2 Points)	Needs Improvement (1 Point)
What question is being addressed	The question to be answered during the lab is clearly identified and stated.	The question to be answered during the lab is identified, but is stated in a somewhat unclear manner.	The question to be answered during the lab is partially identified, and is stated in a somewhat unclear manner.
Methods	Key points summarized appropriately with unneeded details omitted	Key points summarized appropriately but some unneeded details left in	Key points not summarized appropriately
Data/Results	Key results stated that lead directly to conclusion without unneeded detail	A few extra details given not directly related to conclusion	Several details given not directly related to the conclusion
Conclusion	Conclusion accurately and succinctly stated with applications	Conclusion accurate with some applications but wordy	Conclusion has issues and/or is lacking applications.
Use of Science Language	Consistent use of appropriate science language and terminology	Partial use of appropriate science language and terminology	Inaccurate use of science language and terminology

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Examples

WHAT COLOR LIGHT SHINES BEST THROUGH FOG?

Jed Donald Grow, Andrew Quinn Ross,
Clearfield High School, Clearfield, UT

Temperature inversions and the corresponding fog associated with temperature inversions in northern Utah, decreases visibility and safety conditions. A series of studies were conducted to identify the optimal color of visible light to shine through fog to improve visibility and safety in potentially hazardous conditions. To determine the most effective light color, a box with a known volume was filled with fog, proportional to the average density of an inversion. Six colors (red, orange, yellow, green, blue, and violet) of visible light were tested using forty (40) trials per color. A colored light was stationed on one end of the box. A simplified spectroscope was positioned at the opposite end of the box to measure the intensity of light passing through the fog in mW/cm2. Red produced the highest overall readings; violet the lowest. When the density of fog was increased, there was a corresponding linear declination in each reading for each color. Repeated testing showed that red is the most efficient color to increase visibility and safety when seeking to penetrate fog. Red light could be useful when developing precautionary lights used on highways, harbors, and other areas that frequently experience a decrease in visibility caused by weather conditions, including fog or temperature inversions.

THE EFFECTS OF PESTICIDES ON THE VIABILITY OF MACRO INVERTEBRATES, SPECIFICALLY ARTEMIA FRANCISCANA, PHASE III

Alexa Anne Lunt
Weber High School, Pleasant View, UT

Utah produces over 90% of the world's supply of brine shrimp, which generates over 100 million dollars in revenue annually. This study investigated the effect of pesticides on the viability of brine shrimp life cycle stages in the Great Salt Lake (GSL). Prior research indicated pesticides inhibited or preclude the hatch rates of brine shrimp. Further investigation was conducted to determine the effect of pesticides on the different stages of the brine shrimp life cycle. Tests were conducted on the nauplii, sub adult, and adult stages by exposing brine shrimp to increasing concentrations of two pesticides currently detectable in the GSL: Malathion and Carbaryl. Three measures were used to determine the effect of the pesticides: survival rate (recorded at 10 and 30 minutes, 1 hour, 24 and 48 hours), correlation of effects on incremental concentrations, and analysis of the life cycle. > The data indicated at all concentrations and time increments the pesticide had a detrimental impact on brine shrimp. The data indicated the nauplii stage is most susceptible when exposed to Carbaryl, and Malathion is most harmful to the sub adult and adult stage in the life cycle. The research suggests the effects are more pronounced during the early life cycle stages of brine shrimp. The application for this project is twofold. First, exposure to pesticides induces a negative effect on the viability of brine shrimp. Secondly, efforts to decrease the amount of pesticides washed into the GSL will protect the production of brine shrimp and create a sustainable environment

METAL ION PREVENTION OF INSULIN FIBRIL FORMATION

Frances Loren Hubley
Woods Cross High School, Woods Cross, UT

Insulin stability is critical for diabetics. Fiber formation degrades therapeutic insulin. Single insulin molecules are not stable and combine into small sheets that stack into fibers called Fibrils. Zn2+ ions bind insulin molecules together into hexamers of six molecule groups that are more stable. Because insulin is a folded protein molecule, the size of the ion might be responsible for fitting into the folds to pull the hexamer together. I hypothesized that Co2+ and Ni2+ ions might also provide protection to insulin as they are the same relative size as Zn2+ ions. I designed an experiment using the same molarity as the proven Zn2+ ion to make solutions of Co2+ and Ni2+ ions. One problem is that insulin for human use comes in vials with Zn2+ ions to stabilize itI needed to chelate these added Zn2+ ions before I could then determine if Co2+ and Ni2+ ions would also provide protectionA series of EDTA titrations using Murexide and Eriochrome BlackT, was used to determine the chelation solution strength to "cloak" the vial delivered Zn2+ ions. A pH of 3 and an incubation temperature of 68°C for 90 minutes was used to form fibrils. Turbidimetric and fluourometric methods were used to assay fibril formation. Thioflavin T in a 15 molar excess was used to bind to fibrils and show fluorescenceThe results of my experiment supported my hypothesis:Cobalt and Nickel ions prevent insulin fibril formation. Designing an improved shelf life insulin molecule is a direct application.