Criterion

Marks

Intro

1-2 paragraph summary of research question. Summary should be clear, concise, and complete. Present your hypotheses here! 10

Calculating LOEC and NOEC

In toxicology understanding the impacts that a chemical has at a given concentration is critical. To further this goal toxicity tests are carried out in which test organisms are exposed to a known concentration of a chemical in order to see the effects. By comparing the impacts of different concentrations of the chemical we can determine what levels are harmful and what levels don’t have any observable effect. In order to do this NOEC (no observed effect concentration) and LOEC (lowest observed effect concentration) are used. The LOEC is the lowest concentration that results in statistically significant results from the control. The NOEC is the highest concentration that was not significantly different from the control (one concentration lower than the LOEC).

The goal this report will be to determine the NOEC and LOEC of an acute (48 hour) toxicity test of Sodium nitrate of Daphnia magna in a hardwater media. In order to do this an analysis of variance (ANOVA) will be performed in order to separate the data into groups based on the exposure concentration and to determine if any are significantly different. After, two different tests will be used, the Tukey test and the Dunnett test, in order to determine which concentration is the first to be significantly different from the control. Based on a cursory glance at the data it is clear that at the highest concentrations there was a large impact but at the moderate concentrations it is difficult to say where the differences would begin to be significant. Given that I hypothesize that the NOEC would be at 7g/L and the LOEC would be at 10g/L.

Background

2-3 paragraph summary of your two statistical approaches describing how

they work and how they differ. Requires enough detail to completely replicate your analyses. Fully explain any jargon and/or acronyms. 20

The two different statistical approaches use are the Tukey test and the Dunnett test. These two methods are

Methods

For this report the data used is a modified version of results collected by Stephanie Marshall. The results were modified to include additional replicates due to original data containing only two replicates. While this is not legitimate data the methodology and statistical tests run is correct for the type of experiments run.

Complete record of annotated R code used to complete analyses (share your Github project with Dr. Gray)10

Results

Tables and figures necessary to understand the results of your statistical

analyses. Tables and figures should be numbered, labeled with a caption, and referred to in the text.10

Inclusion of tests to ensure data meet the assumptions required for the

statistical methods used. Be sure to describe how these tests were carried out. Include your R code. 10

Discussion

1-2 paragraphs describing your results and referring to your tables and figures. 20

1-2 paragraphs describing how the results of your two statistical approaches differ. For example, do they provide different insights into your data? 10

Conclusion

1 concluding paragraph summarizing your work 10

Total

100