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Bio 1520

Lab 4 Report

November 11th, 2017

**Data Indicates No Significant Difference in *Artemia salina* Activity Level in Varying Salt Concentrations**

**Abstract**

We hypothesized that *Artemia salina,* brine shrimp,will have higher activity levels in environments with higher salt concentration. The purpose of this study was to determine the effect of salinity on *Artemia salina* activity to better understand how the fishing industry can utilize salinity in respect to health and fitness of fish, specifically *Artemia salina* in this study. The approach taken to the address the hypothesis included taking three day old *Artemia salina* and placing them in individual wells with varying salt concentrations (treatment levels were distilled water, 35 PPT ocean water, and 75 PPT). Each well included an average of 42 *Artemia salina*, and 5 minutes were given before measurements of activity level were taken. Three replicates of each treatment were taken and activity level was measured on a scale. The statistical analysis we used was an ANOVA and Tukey-Kramer test and the results were found to be not significant (p **≈** 0.113, α = 0.05) and this indicated that there was a no statistical difference between the means of different groups. The Tukey Kramer test found that there was no statistical difference between the groups as well. In conclusion this confirmed our null hypothesis and indicated that salinity levels does not impact activity level of *Artemia salina.*

**Methods**

The experiment conducted was testing the effect of salinity on *Artemia salina* activity level to better understand how global warming which has been increasing ocean salinity levels might affect *Artemia salina.* The first step was to place an average of 42 brine shrimp in a well plate and this was repeated for a total of nine wells. Then 5 ml of the respective treatment level was added to the wells and each treatment level (distilled water, 35 PPT ocean water, and 75 PPT) was added to three wells. Then a drop of algae was added to each well for food supply, and five minutes were given before activity levels were measured. The activity level was measured on a scale of 1-4 (1 – dead, 2 – low activity, 3 – medium activity, 4 – high activity) and the measurements of activity level were measured by each group member and the score recorded was an average of all the measurements for that well. Then an ANOVA test was conducted on all groups and a threshold of α = 0.05. In addition, the Tukey-Kramer test was also ran to find significant differences between pairs of treatment groups and also had a similar threshold of α = 0.05.

**Results**

The overall findings of this study indicate that there is no significant difference in *Artemia salina* activity level and salinity level. An ANOVA and Tukey-Kramer test results were found to be not significant (p **≈** 0.113, α = 0.05) and no statistical differences between any of the treatment groups. The mean activity level for the distilled water treatment level was 2, 35 PPT was 3.33, and 75 PPT was 3.33 as well. (Figure 1)

**Discussion**

We hypothesized that the *Artemia salina* will have higher activity levels in environments with higher salt concentration, and based on the ANOVA and Tukey-Kramer test conducted we found that there was no significant difference in activity level of the brine shrimp. The p-value was 0.113 and was higher than the established alpha threshold value of 0.05. Thus, we failed to reject the null hypothesis and there was no significant difference between the treatment levels.

Similar studies have been conducted, and in specific a study conducted by the University of London found similar results to us in the fact that *Artemia salina* grown in brine solution (140% salinity) and those grown in sea water did had similar magnitudes of oxygen consumption. This corroborates the results of our study because oxygen consumption levels are a much more accurate and quantitative measure of activity level. This basically indicates that salinity does not play a real role in the physical fitness of brine shrimp and that it is not a factor that should be given much importance when growing or utilizing brine shrimp.

Further improvements that can be made to the study are to increase the number of replicates to increase the accuracy of the results and either utilizing image recognition software or measure oxygen consumption to get a more definite measure for the dependent variable rather than a subjective scale. Improvements to these areas can lead to more accurate result and better connected findings. However, this data is important because it provides insight into the behaviors of *Artemia salina* in response different salinity levels.

**Figures and Tables**

**Figure 1. Average Activity Level of *A. salina* Under Different Salinity Levels.** Plastic wells were filled with brine shrimp with varying treatment levels (distilled, 35 PPT, & 75 PPT), and activity levels were measured after 5 minutes. Then an ANOVA test was conducted and no significant difference was found between the groups (alpha threshold was 0.05)

**References**

1. Gilchrist, B.M. Hydrobiologia (1956) 8: 54. https://doi.org/10.1007/BF00047481

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