INTEROFFICE MEMORANDUM

TO: PROFFESOR MARGARITA OTERO-DIAZ

FROM: ISRAEL DUQUE

SUBJECT: ENGR 351 INTRODUCTION TO WATER QUALITY

DATE: FEBRUARY 28, 2018

Introduction

The presence of nitrate in water is from the oxidation of ammonia. Nitrate can be found in surface waters and groundwater. An ion selective electrode are used to measure the nitrate concentrations. Concentrations of nitrite are low because it converts to nitrate very quickly. Nitrate is primarily caused by fossil fuels and fertilizers that enter the water throughout the atmosphere or through runoff. It is important to limit nitrate to 10mg/l to protect the health of people Nitrate is dangerous because it causes methemoglobinemia. The objective of this lab were to analyze the water samples from the Arcata Waste water treatment plant to determine the concentration of nitrogen, phosphorus, and ammonium.

Methods

The water samples were taken February 15, 2018: from the Arcata waste water treatment plant representing the cleaning process as the water goes through the plant. Procedures for determining Nitrate was the following in accordance with *standards method* procedure 4500 and diluting to gain a new concentration.

Results

The nitrogen, ammonia, and phosphorus concertation results are presented in Tables in the appendix, The estimated concentrations of nitrate and ammonia were computed with a calibration curve by taking the log of concentrations in the x-axis and mv in the y-axis. Phosphorus was estimated by using a graph of concentration vs absorbance. Because this was the first time diluting samples, one of the concentrations was taken out of the chart for a smaller chance of error.

Table 1: concentrations results from calibration curve

Sample location	Concentration of nitrate (mg/L)	Concentration of ammonia(mg/L)	Concentration of phosphorous(mg/L)
Arcata waste water treatment plant (post wetland treatment)	-.12	0.1	3.18

Discussion

The determined concentration for the Post treatment wetland water sample, was (-.12 NO^-_3 -N mg/L) does not qualify the standard methods because the concentration is negative. Meaning that the calibration curve was incorrect. This could have been a factor done by concentration that was not plotted. but this calibration curve is not of by a lot. Either way, the concentration of nitrate is be fairly small if the lowest dilution was taking in to account. Therefor there is no concern about this body of water because the concentration is lower than 10 mg/l of NO_3^- -N that will cause blue baby syndrome (Otero-Diaz et al., unpublished data 2018). Because the Arcata post treatment wetland was negative, the concentration was smaller than 10mg/l even if the error were to be corrected.

The determined amount for ammonia was (0.1 mg/l NH_3^-N). The concertation was found by using different concentrations of ammonia. After finding the millivolts of the concentrations, we could find the concentration of our water sample. By using the reading of millivolts for our sample, we could solve using the calibration curve.

The water sample's concentrations for phosphorus was 3.18 mg/L. This concentration is reasonable because phosphorus makes plant growth occur quicker. This is a problem at the Arcata wastewater plant treatment wetland because the nutrients are absorbed by the plants. This makes the plants die and raise the amount of BOD needed.

Conclusion

The nitrogen concentration -.12 mg/L is incorrect, but if the concentration error was small, it would fall under 10mg/L making it safer. The Arcata wastewater is being affected by the concentration of phosphorus, as it decreases the plant life. The amount of ammonia concentration is very small.

Possible errors in the measurements are mistakes in the dilutions process, taking reading of the millivolts to early, or leaving concentration out of calibration curves to get better results. The most likely to cause an error is the dilution process causing the concentrations to be incorrect for nitrogen.

Reference

Standards Methods for the Examination of Water and Wastewater, 18th Edition, p. 4-77, Methods 4500 NH3 B and H (1992).

Appendix

Table 2: calibration curve for nitrate

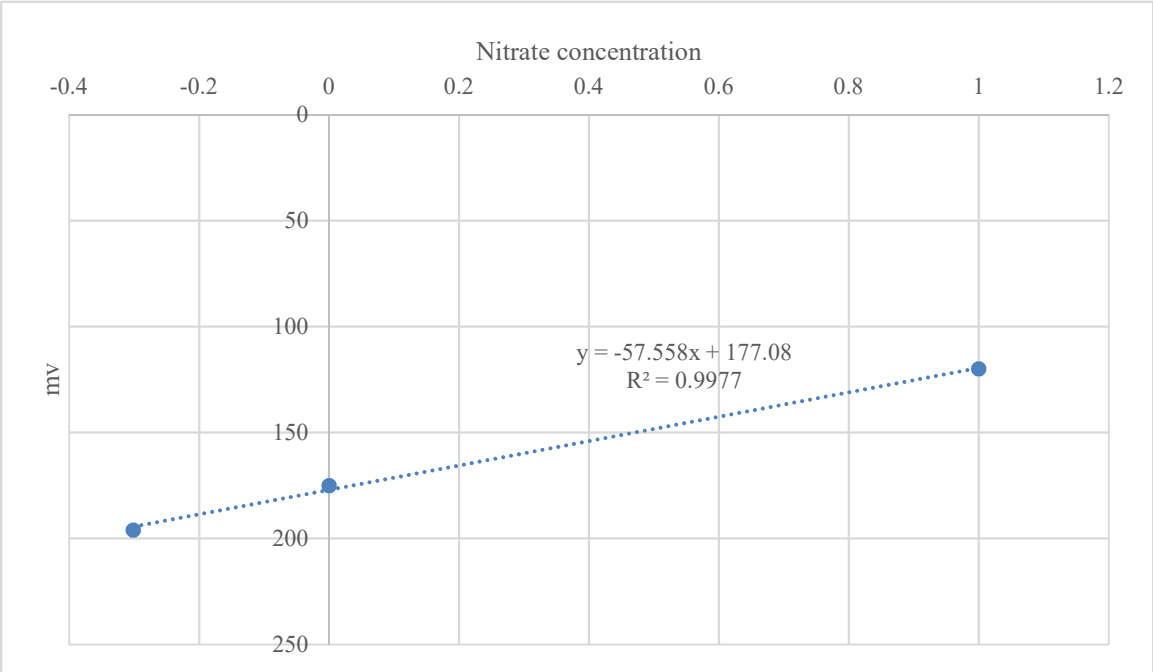


Table 3: Calibration curve for Ammonia

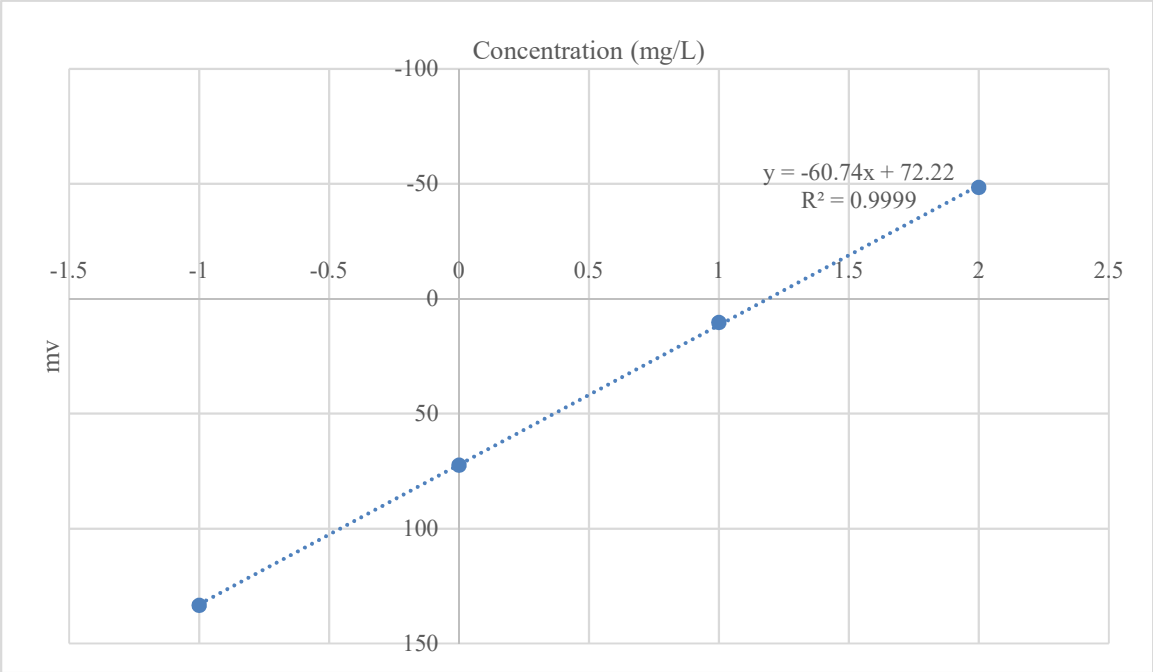
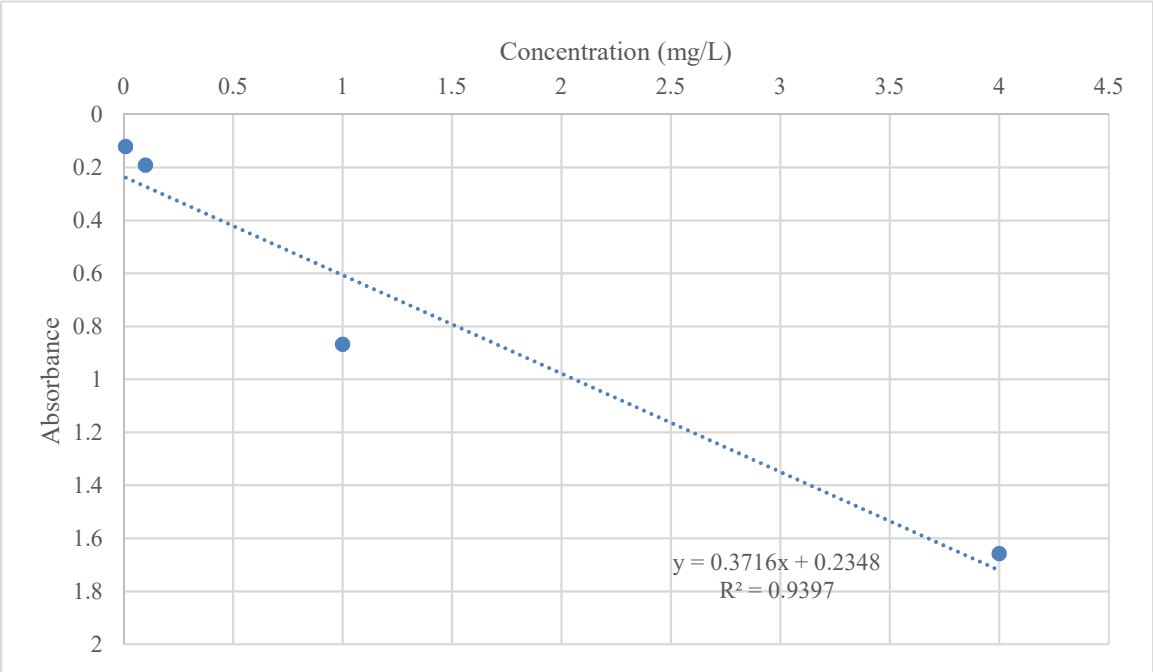


Table 4:curve for phosphorus



Dilutions-

Original stock-100mg/l

$C_1V_1=C_2V_2$

Concentration of 10mg/l V_1=(10mg/l)(250ml)/(100mg/l)=25.0ml

Concentration of .1mg/l V_1=(.1mg/l)(100ml)/(10mg/l)=1ml

Concentration of 0.5mg/l V_1=(0.5mg/l)(100ml)/(10m/l)=5ml

Concentration of 1 mg/l V_1=(1mg/l)(100ml)/(100mg/l)=1ml

Sample water from Post treatment wetland

Nitrate mv=184

Ammonia mv=1.19

Phosphorus=0.1 absorbance