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Section 01

TA: Supriya

Measurement of Dissolved Oxygen in Passion Puddle

	Dissolved Oxygen	Max	Pts
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Abstract:

Through this experiment tap water was found to have .1 SA, be 20.3°C and a dissolved oxygen concentration of 7.65 mg/L. For Puddle sample 1, it was found to have .2SA, be 16.6 °C, and have a dissolved oxygen concentration of 7.53 mg/L. For Puddle sample 2, it was found to have .2SA, be 16.7 °C, and have a dissolved oxygen concentration of 7.25 mg/L. For seawater, it was found to have 31.9 SA from the meter and 30.71 SA from the theoretical calculation, along with being 19.2 °C, and having a dissolved oxygen reading of 7.37 mg/L.

Introduction:

Passion Puddle is located on the Cook/Douglass campus in Rutgers University – New Brunswick. This Puddle is a small pond that is located behind the Douglass Student Center and adjacent to the Red Oak Lane bus stop. In order for aquatic life to be able to live within the water, about 5 to 6 mg Oxygen/L. Not having the correct concentration of dissolved oxygen severely hurts the aquatic ecosystem which can increase the rate that eutrophication occurs.

Experimental Methods:

This lab required two different samples of the Passion Puddle water. These samples of water were to be collected around an hour before the lab so that the water would not become stale. The water was used to collect the amount of dissolved oxygen and the salinity of the two different samples compared to tap water and deionized water.



Figure 1. Sample sites in relation with Passion Puddle and the measurements of dissolved oxygen at the two sites. Site 1 had only grass around the shore, while Site 2 had a large amount of trees, shrubs, and grass.

Results and Discussion:

Table I: Raw Collected Data

Salinity: Calibrated by Chris	Measurement	Temperatures
Model Number:	Orion 135A Advanced Waterproof Conductivity Meter	
Tap water	.1 SA	20.3 °C
Puddle 1	.2 SA	16.6 °C
Puddle 2	.2 SA	16.7 °C
Seawater	31.9 SA	19.2 °C
Oxygen Meter: Calibrated by Lauren		
Tap water	7.65 mg/L	20.2 °C
Puddle 1	7.53 mg/L	16 °C
Puddle 2	7.25 mg/L	15.8 °C
Seawater	7.37 mg/L	19 °C

Table I contains the measurements for salinity meter and oxygen meter as well as the respective temperatures of each.

Table II: Oxygen Meter Readings

Model Number:	Thermo Scientific Orion Star A223
Slope:	1.6 Torr / % Sat
Pressure:	748 mmHg
Temperature:	22.5 °C
Partial Pressure:	159.29 Torr

Table II contains the readings for the oxygen meter that was used in the lab.

Calculations:

Table III: Salinity and Chloride

Gravimetric Chloride ppt:	17.000 ppt
Chloride ppt from Meter:	17.66 ppt
Salinity calculated:	30.71 ppt

Table III includes the calculated salinity and Chloride concentrations

$$\text{Salinity} = 1.80655 \times \text{Cl}^- \text{ ppt}$$

From gravimetric method of analysis: 17.000 ppt

$$17\text{ppt} \times 1.80055 = 30.71 \text{ ppt}$$

$$\text{Chloride concentration from meter: } 31.9 \text{ ppt} / 1.80655 = 17.66 \text{ ppt Cl}^-$$

Comparing the salinities, the one from the meter read 31.9 ppt while the calculated value with the gravimetric method of analysis of Chloride and the equation given was about 30.71 ppt. Using the 31.9 ppt to calculate Chloride concentration, the value is about 17.66 ppt which is .66

ppt of a difference. Between tap water and the Passion Puddle samples, tap water had a dissolved oxygen measurement of 7.65 mg/L and compared to sample 1 and 2, the samples had 7.53 mg/L and 7.25 mg/L respectively. The difference in dissolved oxygen from tap water to the samples were due to different salinity measures of .1 SA for tap water and .2 SA for both samples of the Passion Puddle water.

Lab Questions:

1. Bubbles can increase the amount of dissolved oxygen in the bottle if temperatures get colder.
2. A rise in temperature decreases dissolved oxygen content and when temperature decreases and increase of dissolved oxygen content is observed.
3. The inverse relationship is due to the gas' energetic nature. The more energy, higher temperature, the more the gas would want to escape the dissolved solution creating a lower content. Having the temperature allows for the gasses to "chill" down which allows more to be within the water or liquid.
4. Filtering the water allows the temperature for the samples to rise, which leads to losing dissolved oxygen content. If sample is not filtered, some sort of residue that is from the Puddle can ruin the data.