Hydrological measurements at Varemurru in August 2021

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Purpose

The purpose of our research was to explore and analyze the hydrochemistry of water bodies. We analyzed seawater, water from a natural bio-pond and an artificial bio-pond (Fig. 1 & 2). Our research locations were located near Varemurru Holiday Village (Fig. 3).

Figure 1. Analyzing data

Figure 2. Measuring process

Research locations

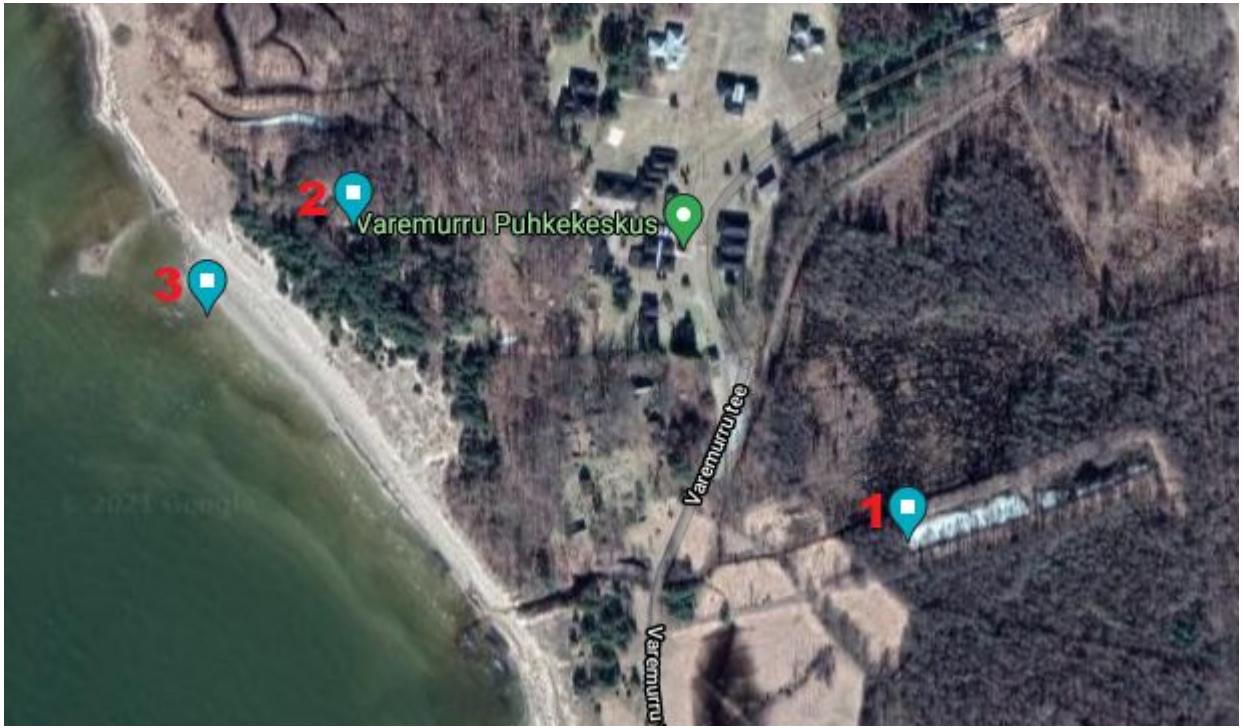


Figure 3. Research locations: 1-natural bio-pond; 2-artificial bio-pond; 3-The Baltic Sea

Hypothesis

We suggested that there are differences between sea water and water of bio-ponds.

1. Actively using a pond increases the amount of nitrates in the water.
2. The content of dissolved oxygen decreases with the increase of temperature.
3. Seawater has a higher electrical conductivity than the water in the bio-ponds.
4. Water alkalinity decreases with the decrease of the pH level.
5. Water transparency is better in the sea than in the artificial bio-ponds.

Figure 4. Analyzing the problem

Figure 5. Analyzing the data

Methods

We analysed the dissolved oxygen and the water temperature in sampling site. We had a special kit of tools with us, thanks to which we could analyze the data right away.

After we came back to our campsite where we analyzed the rest of the parameters (Fig. 4, 5 & 6)

We used both chemical test kits (Fig. 7) and electronic probes to analyze the water samples.

Figure 6. Measuring process

Tools used

Vernier pH Sensor PH-PTA

Vernier Conductivity Probe CON-BTA

Vernier Stainless Steel Temperature Probe TMP-BTA

Visocolor HE Oxygen SA 10

Visocolor HE Alkalinity AL 7

Visocolor ECO Nitrate

Transparency tube

Figure 7. Kit for measuring O_2

Results

Results of analysed samples are compiled into Table 1.
Graphs of different water parameters are in Figures 8-11.

Table 1. Results of analysed samples

	Natural pond	Artificial pond	The Baltic Sea
Water temperature	19.5 C	16.7 C	19.1 C
Oxygen amount	4.5 mg/l	6.25 mg/l	9.3 mg/l
Electrical conductivity	509 uS/cm	409 uS/cm	12862 uS/cm
pH value	7,27	6,71	8,36
Alkalinity	2,8 mmol/l	2,6 mmol/l	2,1 mmol/l
Nitrates amount	0 mg/l	0,2 mg/l	0 mg/l
Transparency	113 cm	greater than the depth of the pipe	greater than the depth of the pipe

Figure 8. Relations between pH and alkalinity

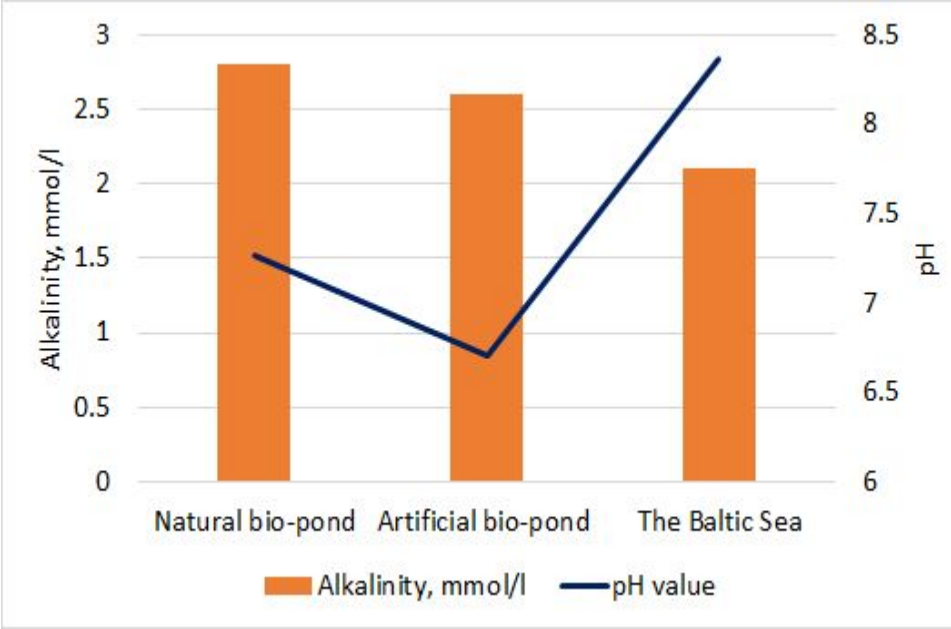


Figure 9. Relations between pH and dissolved oxygen

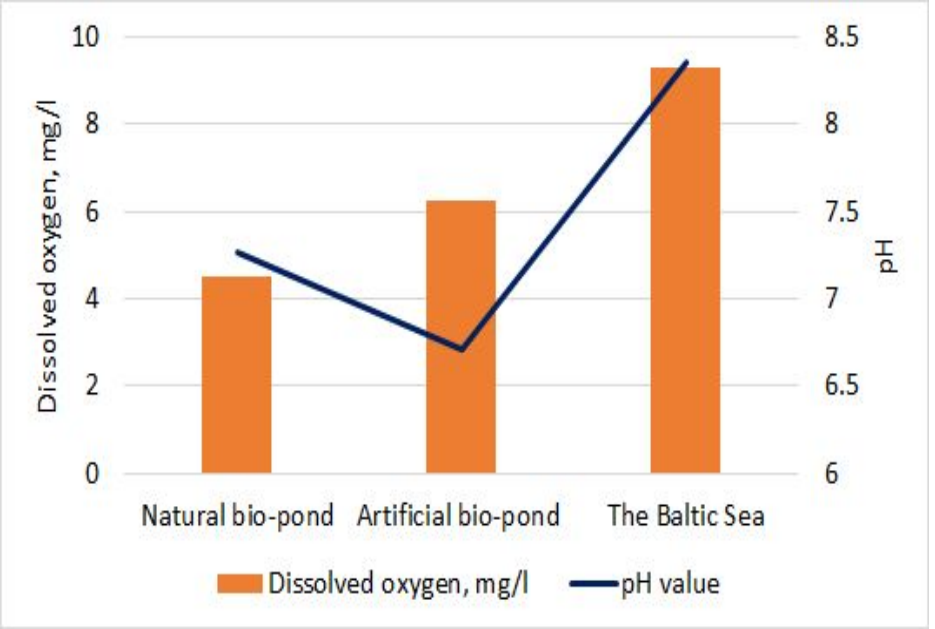


Figure 10. Relation between dissolved oxygen and temperature

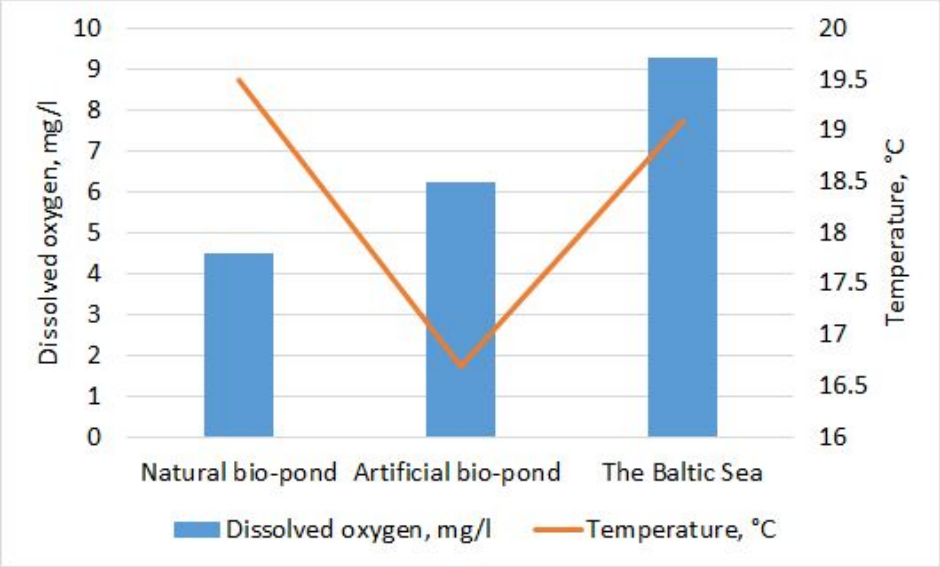
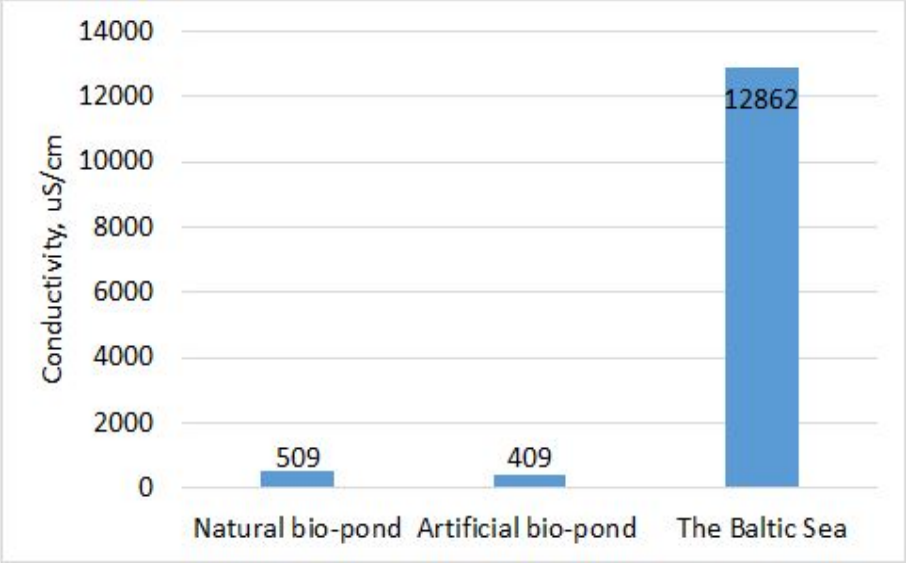


Figure 11. Conductivity in the different water bodies



Conclusions

1. Hypothesis 1 was supported. An actively used artificial bio-pond has more nitrates than a natural bio-pond and the sea.
2. Hypothesis 2 was partially supported. The content of dissolved oxygen decreases with the increase in temperature in bio-ponds but not in the sea. High oxygen values may be result of aeration by the wind.
3. Hypothesis 3 was supported. Seawater has very high conductivity when compared to the water from the bio-ponds.
4. Hypothesis 4 was partially supported. Alkalinity decreases with the decrease of the pH level in the bio-ponds but not in the sea.
5. Hypothesis 5 was partially supported. The sea has better transparency than the natural bio-pond but we do not know if it has better transparency than the artificial bio-pond.

Thank you for listening!