

MARE NOSTRUM





“MARE NOSTRUM”
COMENIUS MULTILATERAL PROGRAMME

CONSTANTA, ROMANIA
JANUARY 2014

3rd Junior High School of Acharnes



Topic

Qualitative detection of water

Information

The experiments were performed in our
school science laboratory

within the classes of Physics and

Chemistry

A project of:

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In this project we studied the water quality of
three regions of Attiki:

1st team: Agkonas,

2nd team: KalamosHarbor,

3rd team: Oropos

With our teachers' help we analysed
amount of: 1) dissolved
oxygen 2) nitrate oxygen 3) PH
4) phosphate 5) BOD 6) coliform
bacteria

Intro ducti

on

After the experiment for each of the ab
cases we compared the different sam
of water and ended up in the follow
conclusions.

AGKONAS WATER TEMPERATURE: 18 celcius

KALAMOS HARBOUR WATER TEMPERATURE: 18 celcius

OROPOS WATER TEMPERATURE: 18 celcius

Dissolved oxygen

It is important for the health of aquatic ecosystems. All aquatic animals need oxygen to survive. Natural

waters that have high levels of dissolved oxygen are probably healthier and more stable environments capable of supporting a variety of aquatic organisms. Natural and human changes in the aquatic environment may affect the availability of dissolved oxygen.

- Take a small test tube and fill it up with water.
- Pour two measurement tablets (Dissolved Oxygen Test Tabs) and immerse the tube leading to overflow.
- Close the tube with the lid and stir for about 4 minutes until the tablets are dissolved.
- Wait another 5 minutes for the water to get the right color to distinguish the results.

1) Dissolved Oxygen

- With the help of an expert guide with paint samples, compare the color of the water and define the quantity of Dissolved Oxygen in ppm.

Dissolved oxygen: result of experiment

Agkonas Coastline: 1ppm
Kalamos Harbor: 2ppm
Oropos Coastline: 5ppm

Comments

We conclude to the positive result that Oropos has large quantities of dissolved oxygen compared to the other two areas.



2) Nitrate

en

- Nitrates are nutrients necessary for all the aquatic plants and animals in order to make protein. The decomposition of dead plants and animals and the excretion of living organisms make nitrates in the aquatic ecosystem. Possible nutrients such as nitrates increase plant growth and their decomposition, promote bacterial degradation and therefore weakens the amount of available oxygen in the water.
- The waste is the main source of the (possible) nitrates added to natural waters, while the fertilazer and agricultural runoff also contribute to high levels of nitrates .
- Drinking water containing high nitrate levels can affect their ability to transport oxygen in our blood . This has particular importance for children who drink soft drinks

- Fill a test tube with water as the 5ml.
- Pour in a tablet measuring tube (Nitrate Wide Range CTA Test Tab).
- Close the tube with the cap and stir until dissolved tablet .
- Wait 5 minutes until the water getting red.
If this is not done and the water is colorless or yellow then the measurement result is 0 ppm.
- With the help of a driver with paint samples (of Nitrate Oxygen) define the amount there of in ppm.

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1) Agkonas:
0 ppm

2) Kalamos:
1,5 ppm

3) Oropos: 0
ppm

Comments:

Agkonas and Oropos don't have nitrates unlike Kalamos which lags behind, although there are no high levels of nitrates.



3) PH is a measure of how much of the acidity or alkalinity of water. The scale starts at PH 0-14 while 7 corresponds to neutral water (0-7 water is acidic and alkaline 7-14). The PH of natural water usually takes values from 8.2. Most aquatic organisms are adapted to a specific PH level and may die if the PH of the water changed even slightly. The PH can be affected by industrial waste, agricultural runoff or drainage wrong mining minerals.

- Add a tablet measuring (PH Wide Range Tes Tab).
- We tap the tube and stir to dissolve the tablet.
- With the help of a driver with paint samples (the PH) we define this

PH:Experi- ment result s

Agkonas:7,5

Kalamos:7

Oropos:7



Comments-

Conclusions:

We observe that
the PH of the
three areas
are suitable
for aquatic
life (neutral).



4) Phosphate

Phosphate is a nutrient necessary for growth of plants and animals as well as a fundamental element in metabolic reactions. High levels of these nutrients can result in overgrowth of plants increased bactericidal activity and reduced levels of dissolved oxygen. The Phosphate comes from many sources including human and animal waste, industrial pollution and agricultural waste.

- Fill a test tube with 10ml water.
- Add a tablet measuring (Phosphorus Tes Tab).
- Put the cap on the tube and stir to dissolve the tablet.
- Wait 5 minutes until the water getting blue.
If the water remained colorless then the measurement result is 0 ppm.
- With the help of a driver with paint samples (of Phosphate) define the quantity in ppm.

Phosph
ate:
results
of the
experim
ent



1) Agkona:

3) Oropos:
0ppm



Comments:
Notice that Agkonas and
Kalamos have
a greater quantity of
nutrients unlike Oropos
something that makes it
more suitable for aquatic
life.

It is a measure of the dissolved oxygen has been used from the bacteria as they interrupt the organic waste. In rivers contaminated with very slow flow of the available dissolved oxygen consumed by bacteria, thus depriving other aquatic organisms for which survival is necessary.

5) Biological (Biochemical Oxygen Demand (BOD))

- Fill a small test tube with water to the top.
- Wrap the tube in foil and leave in a dark place for 5 days at room temperature .
- Unwrap the tube and add two tablets measurement (Dissolved Oxygen Tes Tabs), close the lid and stir until dissolved .

- Wait for 5 minutes.
- Comparing the color of the water with the help of the color sample measure the ppm.



Faecal coliforms, which are found in the digestive tract (large intestine) of humans.

It is indicative of contamination, or the presence of sewage. The same is not pathogenic but shown with intestinal microbes, which are harmful.

6)

Coliform
bacteria

- Dip a small test tube, to which we add a tablet measuring water until filled to the 10ml.
- Close the tube with the cap.
- Hold the tube in an upright position with the tablet at the bottom.

- Maintain the tube upright in a dark place at room temperature (21-27 celcius) for 48 hours.
Meanwhile the tube should not be tangled or moved from its original position.
- Compare the water with the picture the guide with color samples (of Coliform) and characterize the result as positive or negative.
 - Removal of the tube
- Remove the cap of the tube and add 1ml quickly bleach, immediately after the closing.
- Allow the tube upright for 4 hours
 - Withdraw the tube in the trash without opening it.



positive:

The liquid above the gel is clear.

The gel remains in the bottom of
the test tube,

The liquid becomes red or
yellow bubble.

negative:

There are lots of bubbles.

The gel rises to the surface.

The liquid bottom of the gel is
foggy.

The liquid becomes yellow.

Agkonas:

- A few (several) bubbles

The gel rises to the surface.

The liquid bottom of the gel is foggy.

The liquid is yellow.



The gel rises to the surface.
(Positive)

Oropos:

The liquid above the gel is clear.

The gel remains in the bottom of the tube.

The yellow liquid with few bubbles.
(Negative)

After the experiments in our school laboratory under our teachers guidance, we arrived at the conclusion that Oronos is the region of highest quality.



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Our Company's activities