

Name of the project: Digitization of chemistry experiments to improve the quality and support chemistry teaching in secondary schools
Acronym: ChemIQSoc
Project number: 2021-1-SK01-KA220-VET-000027995



Title: Sampling of surface water

Work instructions

Task: Take water samples from a surface running stream and determine the basic physical-chemical indicators.

Theory

When taking surface water, the principle of constant sampling profiles is observed. Sampling and measurement of dissolved oxygen are always performed from the stream's thalweg. Non-standard conditions are not sampled unless required. The quantities of samples are taken as needed.

Sampling can be one-time, zonal, time-based.

Depending on the type of sample, they can be point, mixed, average.

Basic physical-chemical indicators are measured on site with portable devices. The data is recorded in the sampling record.

Equipment:

Instruments

Portable pH meter, oximeter, device measuring temperature, chlorine, conductivity, redox potential. Samples for this measurement are taken into special clean containers.

Cooling box

Sample containers

Can be made of PP, PE, or borosilicate glass. The sample can be poured into several sample containers, which may directly contain a conservative substance.

Sample container type	Determined component
Glass	colour, taste, smell, dissolved O ₂ , O ₃ , Cl ₂ (brown glass), oil substances, surfactants, phenols
PE	B, F, Na, K, Si, dissolved substances

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PE – tested, washed, solved by HNO ₃ 1:10	trace elements, PO ₄ , Fe, Mn, Al
Glass or PE	ANC, BNC, BOD, ammoniacal N, organic N, nitrates, nitrites, chlorides, sulfates

Procedures:

1. A measuring vessel is fixed on the telescopic rod, which is rinsed with running water.
2. From the next sample taken, a separate sample is poured off to measure pH, T.
3. The individual sampling containers are filled from the measuring vessel in such a way that there is no turbulence in the water. The sampling containers are selected and filled according to the sampling plan. Dissolved oxygen and percent of saturation shall be measured in the stream with a probe that has been calibrated prior to sampling. The following parameters may also be measured: chlorine, conductivity, redox potential, etc. The findings shall be recorded in a report.
4. The samples shall be stored at a temperature of 2-5°C and transferred in a cooling box.

Documentation includes:

1. Labelling the sample with a label on the sample container: sample number, sampler name, location, date and hour of sampling.
2. Record in the sample logbook: purpose of sampling, sampling site (map, photo, GPS), name and contact address on site, type of sample, number and quantity of samples taken, sample labelling, date and time of sampling, distribution of samples to the laboratory, method of transport, results of on-site measurements (T, pH...), name of person performing sampling, signature.
3. Record of further manipulation (person who held the sample, for what purpose).
4. Request for sample analysis: name of person who received the sample, sample number according to laboratory book, date of sample receiving, list of requested analyses, assignment of samples to analyst.
5. Accompanying list–sample collection protocol.

Risk reduction measures

Use of personal protective equipment (goggles, gloves, lab coat).

References

1. Kotlík, B. – Langhanse, J. – Bernáth, P.: *Vzorkování v životním prostředí*. 2 THETA ASE s.r.o. Český Těšín, 2015, 178 s.
2. Horálek, V. a i.: *Vzorkování I. Obecné zásady*. 2 THETA: Český Těšín, 2010, 130 s.

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3. Helán, V.: *Odběry vzorku. Sborník přednášek z kurzu*. 1. vydání. 2 THETA: Český Těšín, 2003, 183 s.

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Worksheet

Evaluation

Take a water sample from the surface water stream. Record the physical-chemical parameters found and complete the sampling record.

Documentation includes:

1. Labelling of the sample with a label on sampling container: sample number, name of the sampler, place, date and time of sampling.
2. Entry in the sample logbook.
3. Record of further handling (person who held the sample, for what purpose).
4. Request for analysis of the sample.
5. Accompanying list-sample collection protocol.

Questions

1. Plot the sampling location on a map, record the coordinates using GPS.
2. Record necessary and interesting information from the environment that may help in the evaluation of the analyses (e.g. presence of sources of contamination, weather changes, etc.).

Conclusion

Evaluate the positives and negatives in sampling.