

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: Soil sampling

Work instructions

Task: Take soil samples at a selected location for chemical analysis.

Theory

Soil sampling is a set of activities that lead to the collection of a representative sample. The choice of procedure depends on the purpose, nature of the sampling material, and indicators to be sampled. The sampling is carried out to determine the agrochemical properties of soils—type of soil, soil reaction, content of carbonates, phosphorus, potassium, magnesium, calcium, but also risk substances in the soil.

Samples are taken in spring until May 31st or in autumn until September 30th. Punctures are made by a pointed probe from the surface of uniformly managed land. One sample is 30 punctures. The depth of puncture is 15-40 cm. If the soil is covered with greenery it is removed. From an area of 2×2 m, 5 punctures are taken (the number of punctures is also carried out according to the requirements of the customer). The collection can be:

- local collection,
- cross-sectional sample collection,
- sampling from several places at once.

Equipment: tape measure, plastic bags for 1.5-2 kg samples, glass sampler containers, plastic foil 1×1 m, spade, shovel, sampling rod, plastic containers for homogenization, disinfectant for tools, labels, documents, protective work aids (gloves, glasses, coat, ...), cooling box

Procedures:

Creating a sampling plan

1. According to the sampling plan, the location and size of the area are selected. A representative sample is obtained by a checkerboard collection from several sampling points. The description of the area and sampling is written into the protocol.

Taking samples

1. At one place, 200 g is taken at a marked place to a depth of 15 cm, 30 cm along the profile. The size of one unit is 2×2m. If the land is very large, the number of collections is reduced.

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2. Samples are homogenized in a plastic container—manually mixed with a little shovel.
3. Then they are poured onto foil into a circle (or square), with a thickness of 1-2 cm. It is divided into 4 quadrants. Two opposite parts are removed, the remaining two are joined, again homogenized, and again quartered to 1-2 kg (or as needed).
4. Such a sample is labelled and sent to the laboratory.

Storage and transport of samples

1. Samples are transported in a cooling box. They are stored at temperature of 4-8°C for maximum of 3 months.

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.

Sample preparation

1. Samples are processed according to methodology for individual elements and groups of substances determined in soil.

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.
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 soil sample and prepare a 1 kg of soil sample by quartering.

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.