ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

Sampling for volatile compounds

in soil and water

Volatile compounds like BTEX and chlorinated aliphatics are commonly found in nature as a result of industrial and domestic pollution. When sampling such compounds for subsequent laboratory analysis, it is of paramount importance that due care is taken to avoid losses. One important factor to avoid samples being compromised is use of appropriate sampling containers. Sampling directly into head-space vials is the best way of assuring minimum loss of VOCs during transport and handling at the laboratory.

Over the last years, there has been a significant change in the approach on how to sample volatile organic compounds in soil and water. An improved way of sampling and shipping of samples to the laboratory is now the standard for ALS Analytica.

Standard protocol for sampling of volatile compounds in soil has for a long time been use of either glass jars or so called diffusion bags. Such kind of sampling will always leave a head-space in the container for volatile compounds to evaporate into, leading to a loss of the target compounds during transport and preparation in the laboratory. Similar problems are encountered when sampling water in standard bottles.

The size of the loss is dependent on such parameters as temperature and handling time in the laboratory. Conventional sampling techniques will lead to false results that can be minimized by using a different sampling strategy. ALS recommends use of head-space vials when sampling volatile compounds. Such vials will eliminate loss of volatile compounds during transport and handling at the laboratory. When sampling water, it is crucial that aeration of the sample is kept to a minimum. This is best done by using a small flow pump or passive sampling, avoiding the likes of Bailer tubes.

Normally when samples arrive for testing, an aliquot of the submitted sample is taken for analysis. The aliquot is transferred from the original sample container to a head-space vial. The sample preparation takes place under standard conditions in the laboratory, where temperatures are kept at around 20°C. During the preparation steps the samples are exposed to air at ambient temperature. Under such conditions, loss of volatile compounds is unavoidable even if the handling is minimized.

If samples are submitted in head-space vials, no sample treatment is needed. Internal standard for recovery check is added to the sample through the septum, avoiding losses of VOCs.

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Sampling instructions

Water

Two HS vials should be used for each sample. Fill the first vial to approximately 50 % while the second is filled to max. Seal the vials using the crimper. The second vial will only be used in case of a faulty run on the first vial.

Soil/sediment

Two HS vials should be used for each sample. Approximately 5 grams of soil/sediment should be added to each vial using a syringe or similar, see picture below. Vials should be sealed using a crimper. Please note that a subsample needs to be submitted in order to determine dry weight.

HS vials can be ordered from ALS Analytica. The crimper may be rented from us (500 SEK). Note that we can not guarantee that the crimper is available at all times. For larger projects or projects with a limited time frame we recommend that a crimper is purchased.

One additional method is available for sampling of soil according to ISO 12255. This method prescribes sampling into a pre-weighed vial containing methanol. The disadvantage of this method is that the LOQ will increase approximately 10 times due to dilution.

For further information please contact Morten Christensen.