

Overlooked substances in our groundwater. Identification of previously unknown contaminants in groundwater and drinking water

How contaminated is our water? What substances remain undetected? Year after year, we find new foreign substances in our groundwater and drinking water. Today, water analyses are mainly based on so-called target analyses where you select which substances to target in your analysis. Any other substances in the sample are not measured, meaning that new, previously unknown substances will never be discovered using this technique. In recent years, non-target analyses were introduced to supplement target analyses. This technique allows you to analyse samples without prior specification of which substances to target. Before conducting a target or non-target analysis of substances, you often need to do sample preparation. Until now, one of the problems has been that very water-soluble and very small substances were lost during sample preparation, rendering them unable to analyse. Unfortunately, these small substances are often transported all the way to the groundwater, making them especially important to include in analyses.

Ulla E. Bollmann and Nora Badawi with Geological Survey of Denmark and Greenland (GEUS) applied for funds for a multiport condenser. The condenser is used for sample preparation and is based on the sample evaporating under vacuum. That allows for very gentle evaporation of a water sample. In the course of the project (July 2020 to December 2021), we will examine whether this gentle concentration of groundwater samples can overcome the issue of loss of small water-soluble substances. Following validation of the concentration method using small, water-soluble, known groundwater contaminants such as DMS and BAM, we will analyse groundwater samples using non-target analysis to search for previously unknown contaminants in the water. We will focus on urban areas to see what substances infiltrate the groundwater along with stormwater, and on pesticide washing-out from agricultural land. Furthermore, the method will be implemented in the warning system for pesticide washing-out to groundwater (VAP, www.pesticidvarsling.dk). Regarding VAP, knowing what substances wash out will help us select which substances to monitor. In the long term, the project will increase knowledge about contaminants in our groundwater and, thus, our drinking water resources, and contribute to targeting future groundwater monitoring programmes.