

Documentation of decomposition and detection of sprayed materials in groundwater

In Denmark, we have a unique water supply and politicians have determined that the groundwater must be clean. This means that you must be able to pump it and use it directly by use of simple water treatment (aeration and filtration). However, this practice is in danger, as the water supplies in Denmark are facing a great challenge. It is especially the decomposition products of previously used pesticides that are causing trouble. One of the problematic pesticides is the decomposition product desphenyl chloridazon. In approx. 10% of bore water tests the presence of desphenyl chloridazon above the criterium for groundwater quality has been observed. Desphenyl chloridazon is a decomposition product of the previously used chloridazon pesticide.

It is the regions who are responsible for examination and rinsing of plots that are polluted with pesticides so that the Danish groundwater will continue to be clean for future generations. The regions have several cases related to soil and groundwater that include pesticides and which can be difficult to complete, and that is because the risk assessment that have been carried out often ends with statements such as "it cannot be rejected that there may be a risk in relation to the groundwater or water supply going forward." That is why an extra tool is required for completing an efficient and solid risk assessment. This may lead to a more qualified prioritisation of purification of pollution, if any, and supplemental examinations. An assessment of the potential for natural decomposition is an important parameter in this connection. Natural decomposition takes place when pesticides are "eaten" by a natural germ in the aquifer storage.

Stabile isotopes are the naturally present isotopes of carbon, for example. Isotopes are almost identical molecules with a different number of neutrons, which means that a molecule may be lighter or heavier. Germs would rather "eat" the lightest molecule, which is why they eat these first. In this way, by analysing different isotopes it is possible to assess whether there is a potential for natural decomposition. This is the knowledge that the method is based on.

In the past 20 years, stabile isotopes have been used to document the decomposition of more well-known pollution components, for example chlorinated solvents which have previously been used in dry cleaners and for removal of metal parts before painting. A development of this method is required so that it can also be used for "new" problematic pesticides. Thus, the purpose of the project is to develop a commercial and accessible method of analysis for stabile isotopes on desphenyl chloridazon. In addition, it must be examined if the method can be used as an important tool for detection and documentation of decomposition in relation to two cases in the Region of Southern Denmark and Region Zealand.