MSc Project

Can plants and trees clean up PFC contamination in groundwater?

Perfluorinated compounds (PFCs) in groundwater have become Sweden's most acute and severe environmental contamination problem. The primary culprits are some perfluorinated alkyl acids (PFAAs) such as perfluorooctane sulfonate (PFOS). They have been used in firefighting foams and released to the environment in large quantities at firefighting training sites at airports. There they have entered the groundwater, contaminating drinking water supplies and surface water.

In situations where contaminated groundwater is constrained to a shallow aquifer, plants have been used to purify the groundwater of chemicals that are readily taken up by the plant roots and transported to the vegetation. By harvesting the plant vegetation and sending it to destruction, the chemicals are removed from the ecosystem. This technique is known as phytoremediation.

Our research and that of others has shown that PFAAs are readily taken up by the roots of plants and then transported to the leaves where they accumulate. Thus PFAAs could be good candidates for phytoremediation. On the other hand, the transport of PFAAs from groundwater to surface vegetation opens the possibility of contaminating terrestrial ecosystems. When organisms feed on the contaminated vegetation, they are exposed to PFAAs. They can take up and accumulate these chemicals, and this contamination can be passed on up the food web.

Together with you, a Masters student interested in environmental and analytical chemistry, we would like to explore these issues. The project will be conducted together with Niras, a consulting company working with PFAA contaminated sites.

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