Per- and polyfluoroalkyl (PFAS) contamination of irrigation waters in Albania

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Abstract

This research project focuses on investigating per- and polyfluoroalkyl substances (PFAS) contamination of surface and underground water used for irrigation in Albania. The work was funded by the *Research Expertise from the Academic Diaspora Fellowship (READ) program.* We collected water samples (n=93) in regions locations across the country that targeted: a) surface water irrigation sites (e.g. rivers, streams and reservoirs); b) ground water systems (e.g. wells) and c) waterbodies near industrial sites that could potentially use PFAS. Samples were analyzed with liquid chromatography tandem-mass spectrometry (LC-MS/MS). In cooperation with groups that produce nanosensors, PFAS analyzes are being experimented with, so far we have no validated results. From the target list of 47 target PFAS compounds we detected 17 compounds. The highest % detection correspond to PFPrA (C3) at 100% and PFPxH (C6) and 55% all samples. Total PFAS concentrations were the highest in hospital wastewater samples (total PFAS =$2.2*10^6$ ppt) and a natural gas distribution line ($2,5 *10^3$ppt). Irrigation wasters highest levels were measured in Benja Lake (439 ppt) and two wells in Tirane (283 ppt) and Kucove (307 ppt). Overall, the high levels of PFAS in hospital waste and industrial sources was driven mostly by the ultra-short chain PFAS that are less persistent in the environment compared to the long chain PFAS. The most concerning long chain PFOA and PFOS were detectable at small levels only in a few samples. Although these results are good news, they should be interpreted with caution given that this study's samples may not represent every possible emission scenario. This pilot project strengthens Albania's research infrastructure, contributing to future water quality management strategies aimed at mitigating the impacts of industrial and agricultural pollution on human health.

References

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