

Phytoavailability of PFAS

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We optimized the extraction protocol for soils and plant tissues to analyze a series of 70 target PFAS using LC-HRMS on an Orbitrap instrument. We settled on a methanol with ammonium acetate extraction with excellent recoveries ranging from 82.8% to 93.6 for PFOS and from 90.4% to 101.7 for PFOA. Precision (CV) for PFOA and PFOS varied from 0.2% to 6.2%.

We analysed 117 soils and 108 crop tissue samples (winter wheat, sugar cane and corn) from matching experimental plots. All soil samples were positive for PFOA and PFOS (detection frequency of 100%). The observed concentrations varied in soils from 0.009 à 1.34 ng/g for PFOA (median : 0.16 ng/g) and from 0.033 to 16,6 ng/g for PFOS (median : 0.54 ng/g).

Unlike soils, detection frequency of PFOA and PFOS were relatively low in plants tissues, between 12% and 19%. The observed concentrations were also relatively weak and systematically below 0.5 ng/g, which tends to suggest a relatively low desorption from the soil and limited uptake into plants. PFOA and PFOS are C8 compounds (with 8 carbon atoms within their structure), which might explain their tendency to stay sorbed to the soil and limiting translocation into plants. Characterization of other types of PFAS is underway, including some short chain PFAS that are known to be more mobile and could show higher phytoavailability.