Northern Michigan Researchers Discover Effective Use of Hemp Plants in PFAS Remediation

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June 21, 2023

Per- and polyfluoroalkyl (PFAS) pollution has presented challenges to companies, governments and landowners worldwide. However, a recent study conducted by researchers at Northern Michigan University discovered a possible cleanup method from an unlikely source: hemp. Well known for its role in ropes, textiles, clothing and food, hemp has been shown to have an additional use, assisting in PFAS remediation. Phytoremediation, the process of using plants to restore soil, has been used broadly in leaching heavy metals from abandoned mines, and absorbing pesticides from defunct orchards. As such, researchers and experts are optimistic this efficacy may extend to PFAS remediation.

Inspired by a similar experiment at Loring Air Force Base in Limestone, Maine, Professor Lesley Putman first tested this approach to see whether smaller, non-toxic PFAS, such as perfluorobutanoic acid (PFBA), could be successfully absorbed by hemp plants. Without having any negative effect on hemp growth, the plants were able to absorb PFBA in the water in which plants were grown hydroponically. Subsequent growths showed that hemp plants were able to absorb PFBA from water introduced into the soil in which plants were grown naturally. The plants successfully absorbed PFBA into their root systems, stems, leaves and flowers. Further, unlike traditional remediation methods, such as use of activated carbon, the hemp plants not only absorbed the PFAS, but began to degrade them, a process that otherwise would take thousands of years.

Several concerns still remain. More complex compounds, such as perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), were only absorbed into the root systems of hemp, decreasing the efficiency of remediation. Further, the resulting grown plants present disposal issues, as the result of remediation is a PFAS-filled hemp plant. Despite these concerns, researchers are optimistic that continued experiments will yield methods that further degrade PFAS, including the introduction of fungi to assist degradation via mycoremediation. Further, while hemp remediation is generally costly, estimates show it is 75 percent less than the costs for current remediation methods. While some questions remain, the research is clear: hemp is far more useful than it appears.

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