SUBMISSION: Select Committee on PFAS (per and polyfluoroalkyl substances)

6 November, 2024

SUMMARY:

Quick-growing, low-THC industrial hemp biomass offers an unmatched ability to remediate contaminated soils through bioaccumulation of contaminates, notably up to 85% of PFAS and <95% of PFOS within an hour. [1]

Backed by peer-reviewed journals and recent CSIRO-backed trials, we have scientific validation of the efficacy and persistence of our Australian-bred hemp varieties in phytoremediation efforts.

INTRODUCTION:

Hemp Farms Australia (HFA) is the nation's largest family-owned and operated breeder of low-THC, non-GMO hemp genetics.

We combine more than 20 years of traditional breeding, data-driven selections and industry expertise to supply premium registered and proven genetics for tropical and sub-tropical climates.

We've dedicated ourselves to developing innovative solutions tailored to our country's unique environmental challenges. Among these solutions is the remarkable potential of industrial hemp crops in remediating contaminated soils.

Our meticulously bred hemp seed varieties have shown exceptional promise in bioaccumulating contaminants such as PFAS, lead, cadmium, magnesium, copper, chromium, cobalt and nickel from soil.

RECOMMENDATIONS:

1. **That future policy concerning PFAS site remediation incorporates industrial hemp cropping.**
2. **That the ADF and other Australian Government agencies further investigate the bioremediation of PFAS-contaminated soil using Australian industrial hemp varieties bred to Australian agronomic conditions.**
3. **That the Australian Government support research investigating methods of disposing/destroying PFAS-contaminated plant biomass.**

[1] https://www.sciencedirect.com/science/article/abs/pii/S0045653519307933

BACKGROUND:

The varieties we breed have higher viability and deliver better agronomic performance in Australian conditions than seed imported from China and Europe, according to nationally coordinated Industrial Hemp Variety Trials (IHVT) overseen by AgriFutures Australia.[2]

A literature review of phytoremediation using industrial hemp suggests:

- that plant roots are instrumental in PFAS/PFOS capture (Putman et al. 2023) [3]
- that particle size affects plant uptake (Haynes, Huang and Lewis 2022)[4]

OVERSEAS RESEARCH:

In Brussels, the Antwerp Fire Brigade and the University of Ghent are researching the efficacy of industrial hemp to remediate a PFAS-contaminated site. [5]

In September, a US$1.6m grant was announced to continue research into using industrial hemp to bioremediate PFAS-contaminated soil at Maine's former Loring Air Base.[6]

The US firm 3M is also investigating hemp's use for bioremediation.[7]

THE GAPS:

There has been no research into the potential of industrial hemp for PFAS remediation in Australian soils.

We are aware of no research internationally into destruction/encapsulation of PFAS-contaminated biomatter, eg: destruction by pyrolysis, hydrothermal liquefaction or encapsulation as inert hempcrete for civil engineering use.

THE OPPORTUNITIES:

Australia's vulnerability to bushfires has seen widespread and concentrated use of PFAS chemicals. This has left a disproportionate legacy of soil contamination, especially around vulnerable water catchments.

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[2] 24-029.pdf Fact sheet: Growing industrial hemp in Queensland | AgriFutures Australia Fact sheet: Growing industrial hemp in Tasmania | AgriFutures Australia Fact sheet: Growing industrial hemp in Northern Territory | AgriFutures Australia

[3] https://news.nmu.edu/nmu-researches-hemps-ability-remediate-pfas

[4] https://mndrive-environment.umn.edu/2023/04/19/forever-chemicals-hemp-and-nanotech-an-unconventional-approach-to-pfas-remediation/

[5] Antwerp Fire Brigade to use hemp to decontaminate PFAS-polluted soil

[6] Mi'kmaq Nation, Passamaquoddy Tribe, UMaine awarded federal grants for forever chemical research • Maine Morning Star

[7] https://hemptoday.net/industrial-giant-3m-exploring-hemp-to-overcome-an-urgent-pollution-challenge/

These areas present useful growing sites for industrial hemp; correct variety selection coupled with optimal agronomy could result in a harvestable crop within weeks.

Hemp's low-cost cropping method is likely to be much cheaper than electrochemical destruction of PFAS contaminants.

Extensive, fast-growing tracts of industrial hemp offer carbon offset possibilities through additionality – a feature unlikely to be matched by other remediation methods.

Compared to the capital investment required for further processing of industrial hemp crops into fabric or seed, soil bioremediation capital expense is low.

Treatment of the contaminated biomass could create cost-offsets in encapsulated hempcrete panelling for non-interactive construction eg civil engineering. Destruction by pyrolysis could offer opportunities as a renewable feedstock for power generation.

Australia could combine technical, scientific and agricultural know-how to create a world-leading specialisation in biomass soil remediation and downstream use.

RECOMMENDATIONS:

1. **That future policy concerning PFAS site remediation incorporates industrial hemp cropping.**
   Endorsement of industrial hemp for soil bioremediation will give confidence to broadacre farmers to invest in plant genetics.

2. **That the ADF and Australian government agencies further investigate the bioremediation of PFAS-contaminated soil using Australian industrial hemp varieties bred to Australian agronomic conditions.**
   Partnering with R&D agencies/universities as part of this program will generate valuable intellectual property.

3. **That the Australian Government investigate disposal of PFAS-contaminated plant biomass.**
   Widespread plantings for biomass remediation will encourage corporate technology to create next-step processing/destruction technologies.

Thank you for the opportunity to present this submission.

Lauchlan Grout,
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Hemp Farms Australia – Seeding a sustainable future