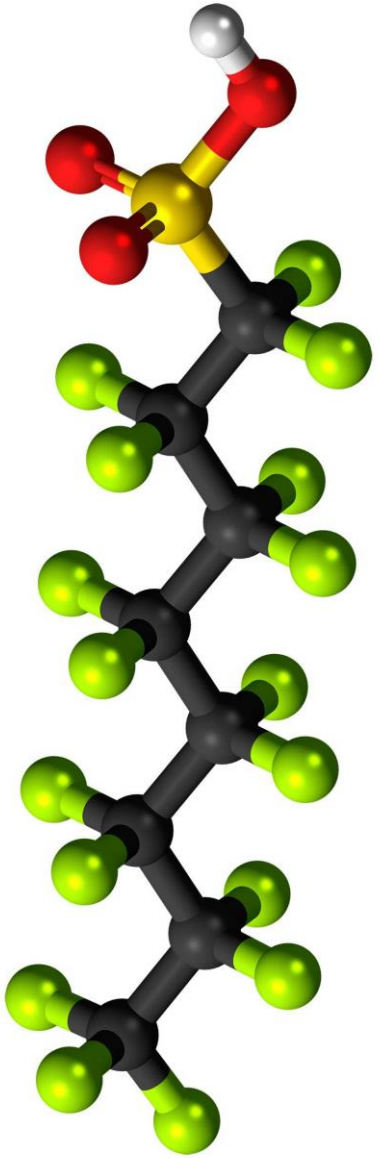
PFAS contaminated water



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What is PFAS

PROBLEM

PFAS & PFOS are 'forever' chemicals used in many common products since the 1940's. They are highly persistent in the environment and the human body, taking up to 1,000 years to break down.

HEALTH EFFECTS OF EXPOSURE

- Cancers, and other chronic health issues
- Severe Covid-19 symptoms
- Decreased vaccine response
- Infant birth issues

CONTAMINATION SITES

- 671 PFAS sites in Australia, 2,337 in USA, and 100,000+ in Europe
- Wastewater treatment plants & drinking water
- Earth, soil, & landfill sites
- Agricultural sites

PLASMALEAP
Technologies


A TODD HAYNES FILM
MARK RUFFALO
ANNE HATHAWAY
TIM ROBBINS
BILL CAMP
VICTOR GARBER
AND BILL PULLMAN
DARK WATERS
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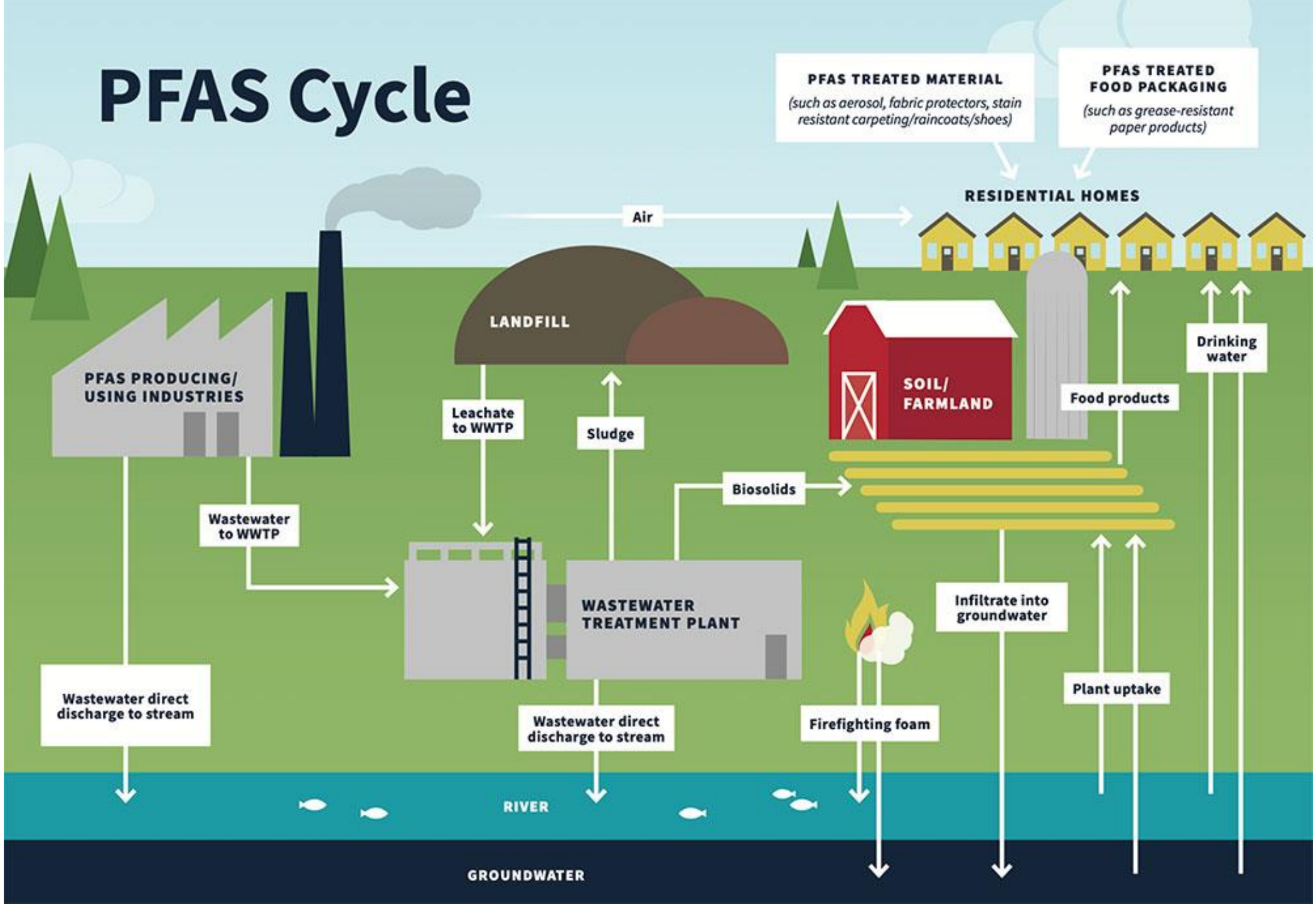
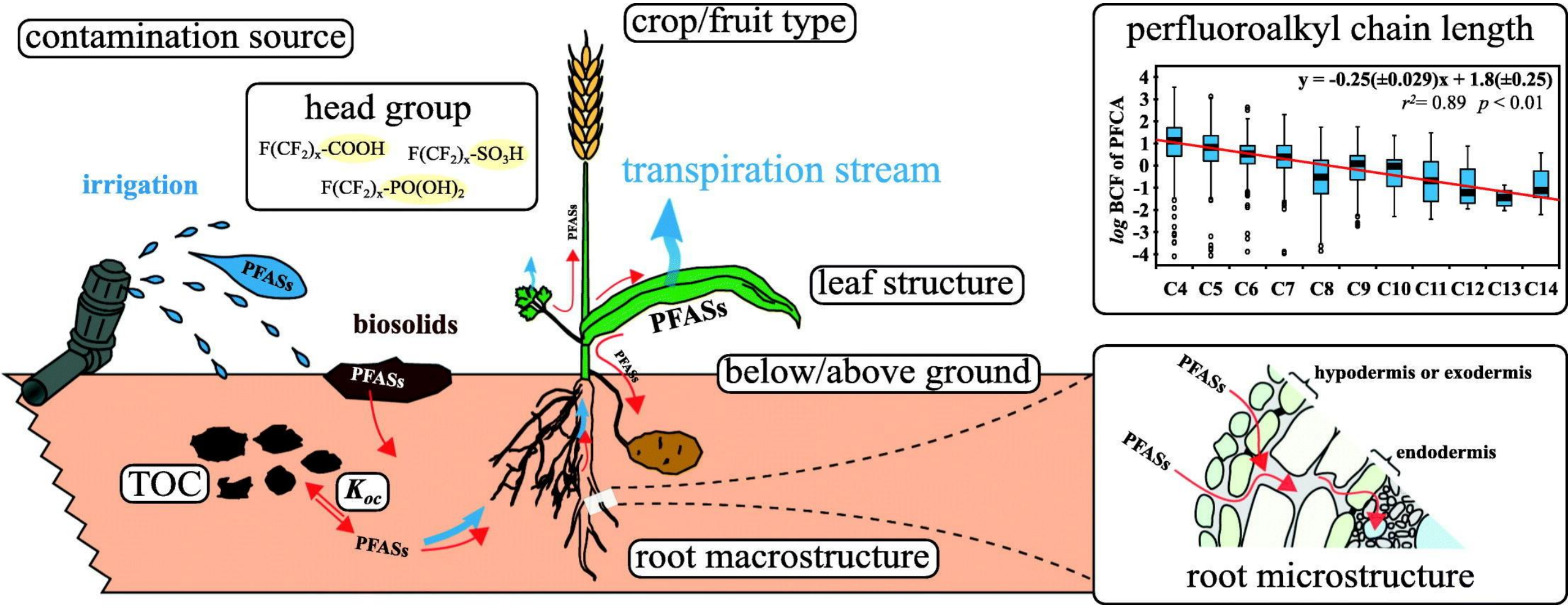
HOLLYWOOD NEWS


PFAS Cycle
PFAS TREATED MATERIAL
(such as aerosol, fabric protectors, stain resistant carpeting/raincoats/shoes)
PFAS TREATED FOOD PACKAGING
(such as grease-resistant paper products)
RESIDENTIAL HOMES
Air
LANDFILL
PFAS PRODUCING/ USING INDUSTRIES
SOIL/ FARMLAND
Drinking water
Food products
Leachate to WWTP
Sludge
Biosolids
Wastewater to WWTP
WASTEWATER TREATMENT PLANT
Infiltrate into groundwater
Plant uptake
Wastewater direct discharge to stream
Wastewater direct discharge to stream
Firefighting foam
RIVER
GROUNDWATER

In food

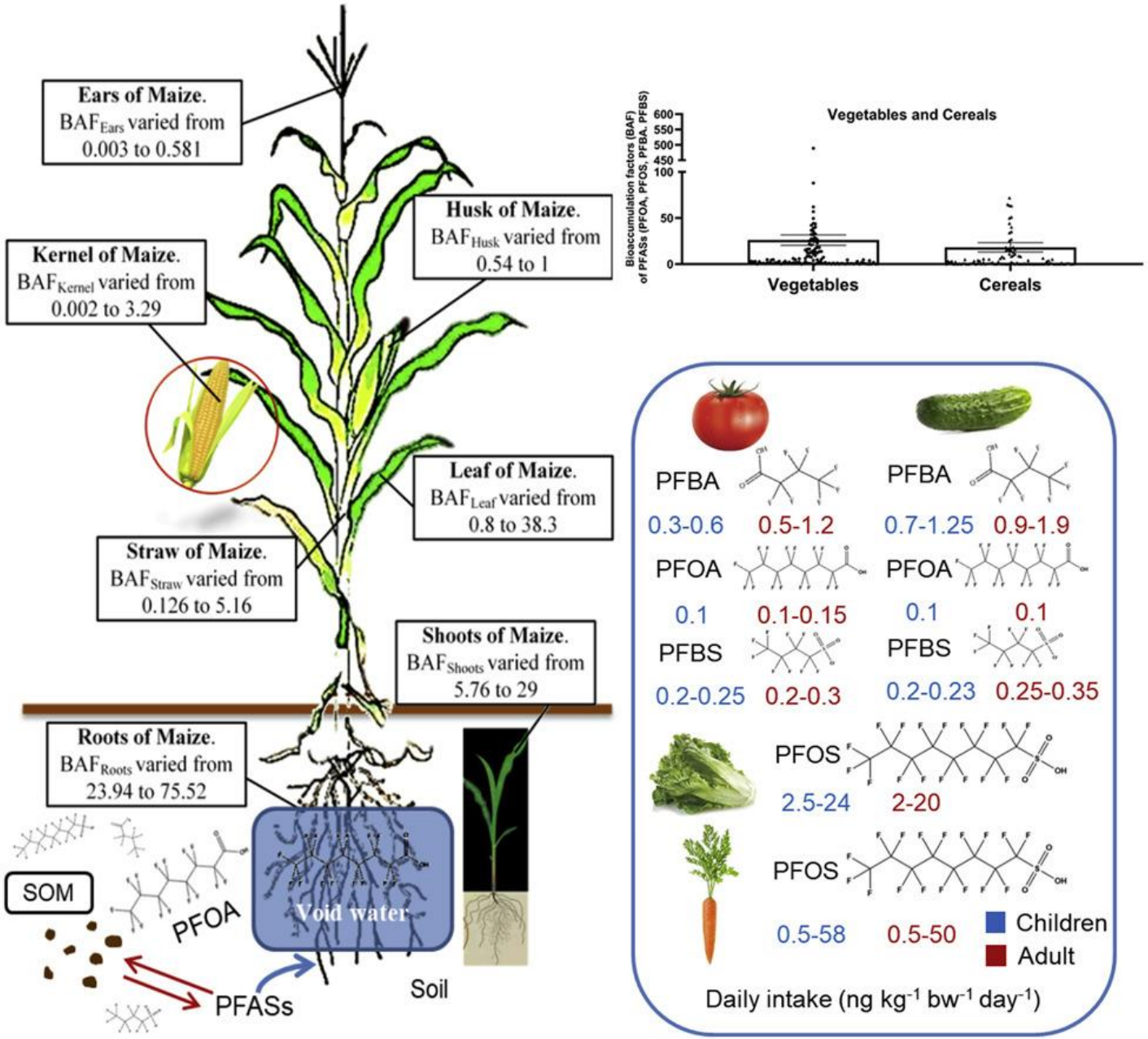
- Solid foodstuffs can be considered as the dietary main uptake route
- In agriculturally grown products transfer of PFAS from contaminated soil into plants.
- Regarding PFAS contamination of soils, different pathways are known, e.g., through amendment with sewage sludge or paper-fiber biosolids, use of PFAS-containing firefighting foams, and atmospheric deposition.
- short-chain PFCAs and PFSAs bioaccumulate less in animals, and yet they bioaccumulate and readily translocate in plants.

Ref: Science of The Total Environment, Volume 766, 20 April 2021, 142640

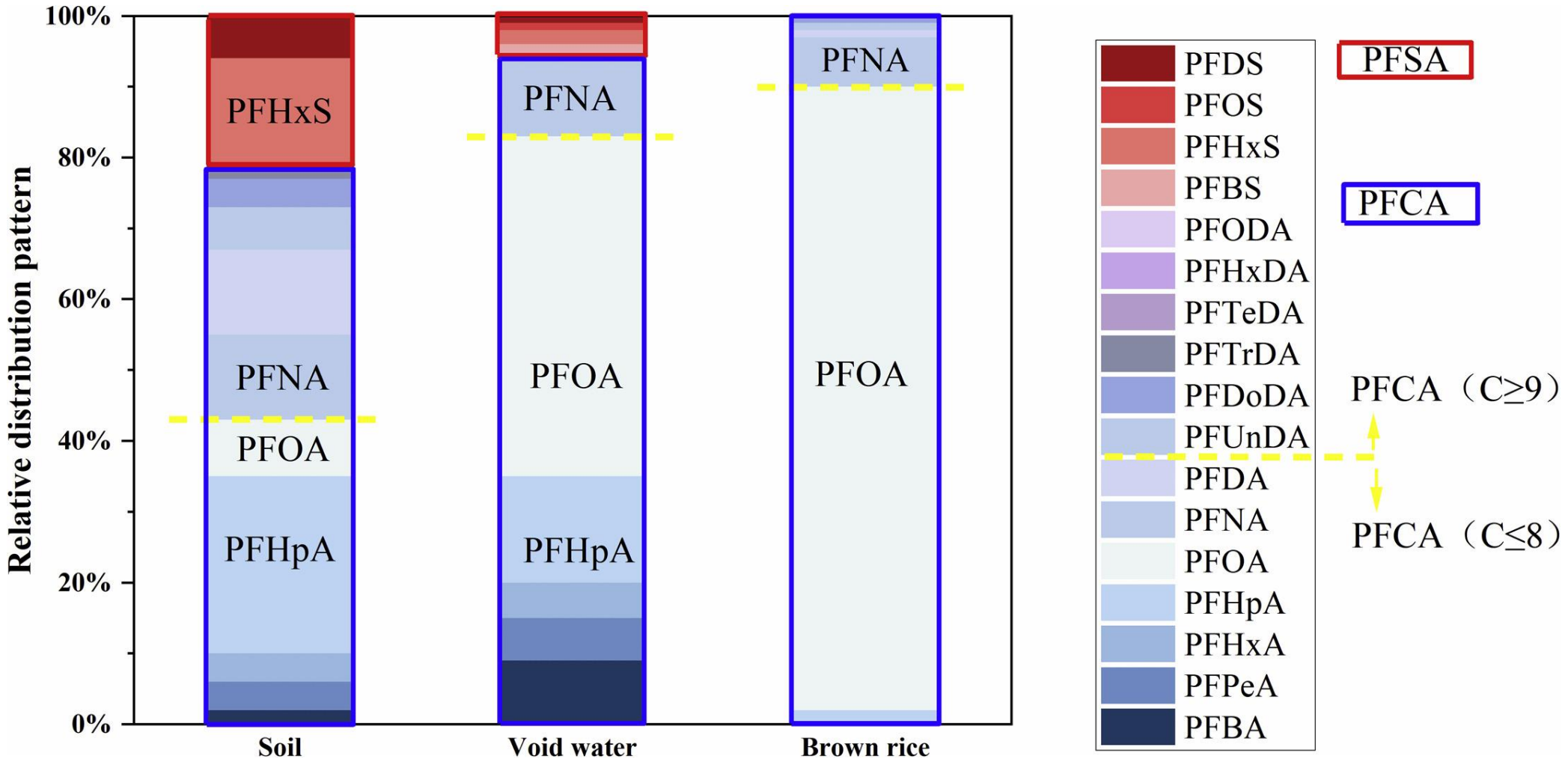


Ref: Science of The Total Environment, Volume 766, 20 April 2021, 142640

Translocation, bioaccumulation, and distribution

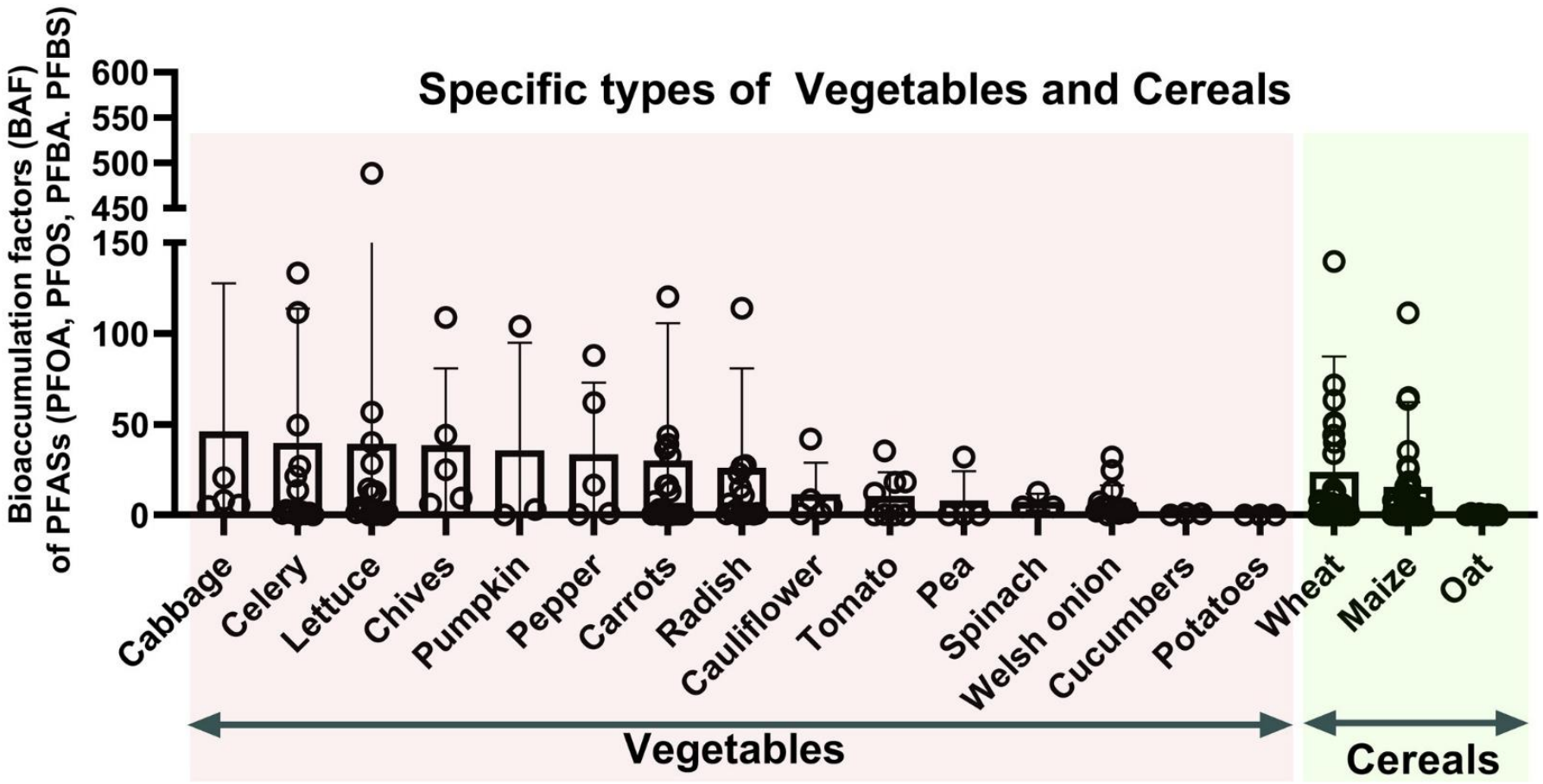


Soil: water : crop (field study)



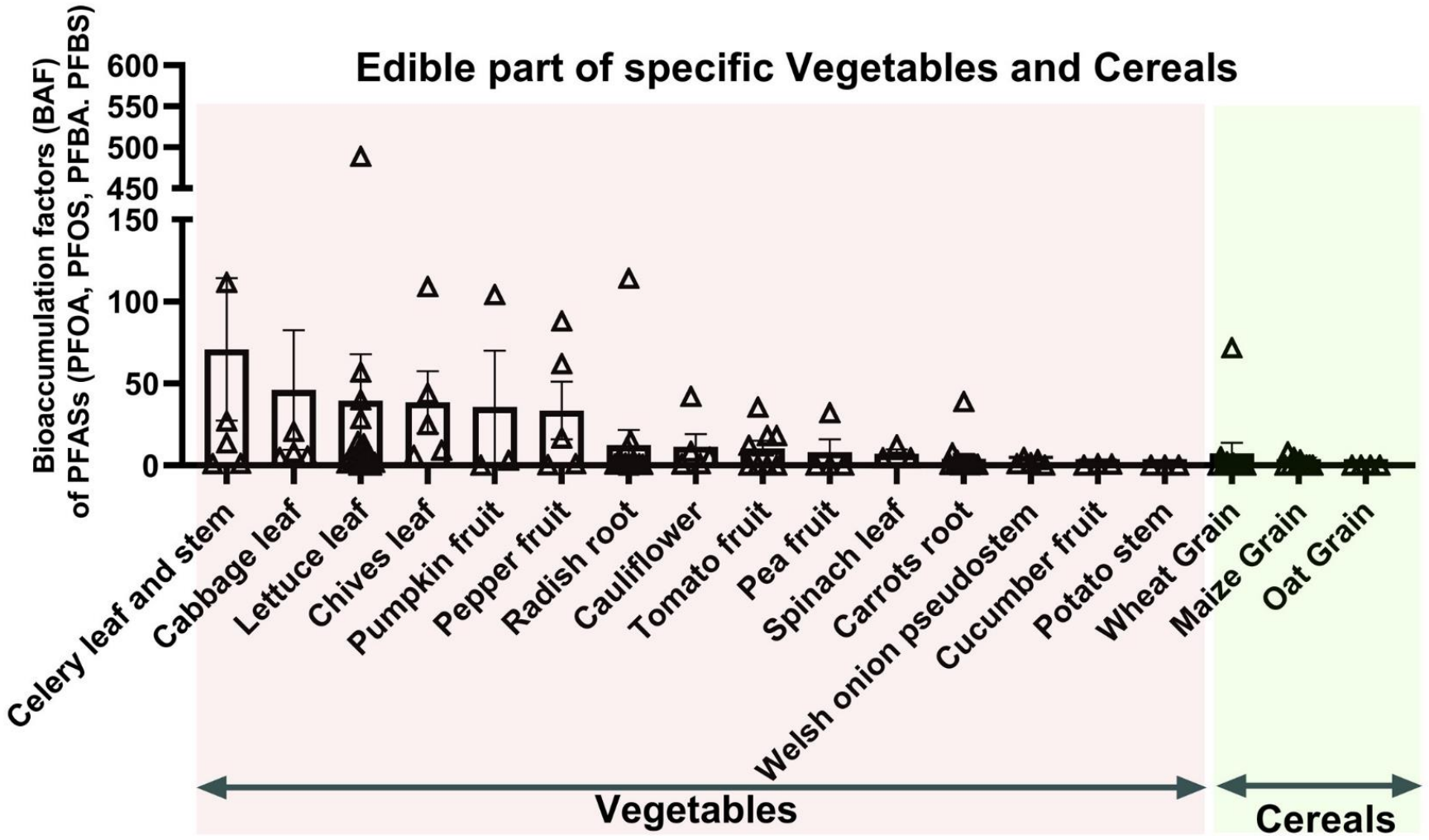
Sci. Total. Environ., 671 (2019), pp. 714-721

Bioaccumulation



Ref: iScience, Volume 25, Issue 4, 15 April 2022, 104061

BAF Edible components



Ref: iScience, Volume 25, Issue 4, 15 April 2022, 104061

Translocation, bioaccumulation and distribution of PFASs in plants

Translocation of PFASs in soil-plant system

1. Soil properties, and the species of PFASs and plants are the main factors.

2. Longer-chain PFASs are preferentially retained in the roots.

Bioaccumulation of PFASs in plants

1. BAF in one plant: root > straw > grain.

2. PFOA is the predominant compound in soil and within plant tissues.

Distribution of PFASs among different plant species

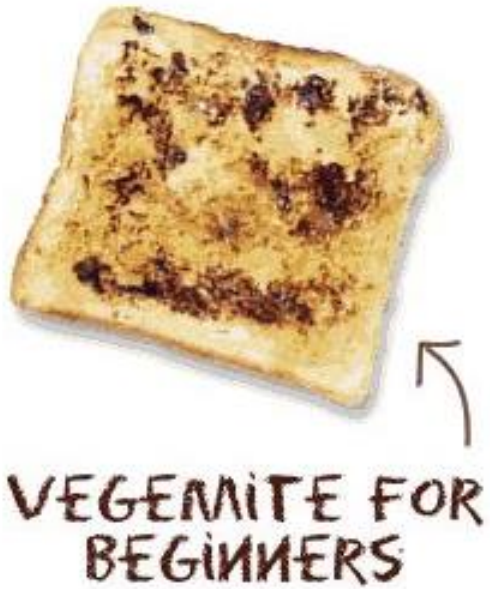
1. BAF in different plants: leaf vegetables > root vegetables > flower vegetables > shoot vegetables.

2. PFOA, PFBA and PFOS have a potential risk to humans due to the dietary exposure.

Ref: iScience, Volume 25, Issue 4, 15 April 2022, 104061

FSANZ (2017)

- Recommended tolerable daily intakes (TDIs) of 20 ng/kg bw/day for PFOS and 160 ng/kg bw/day for PFOA.
- There was not enough information to establish a TDI for PFHxS.



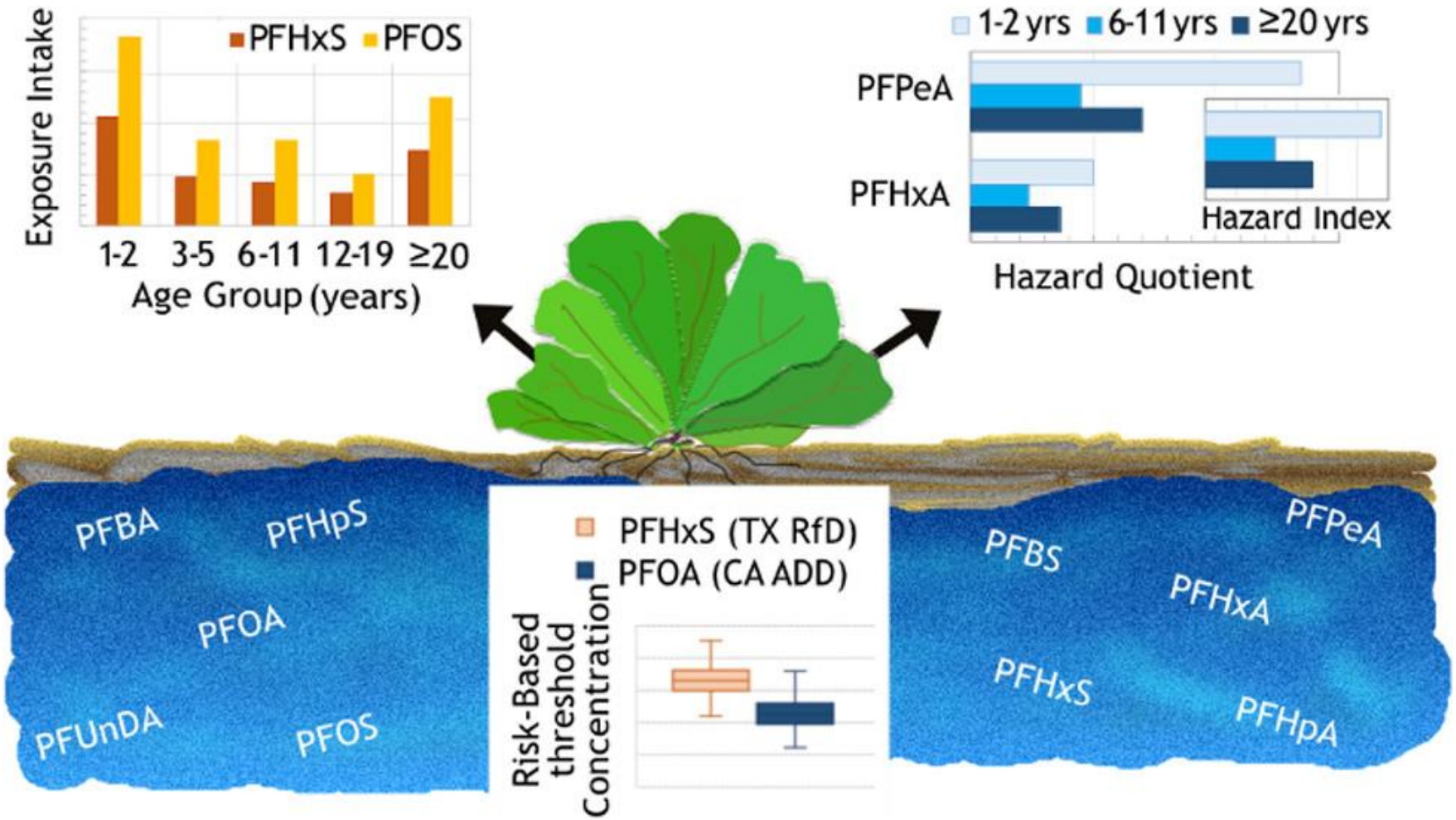
EFSA (2020)

- a group tolerable weekly intake (TWI) of 4.4 nanograms per kilogram of body weight per week

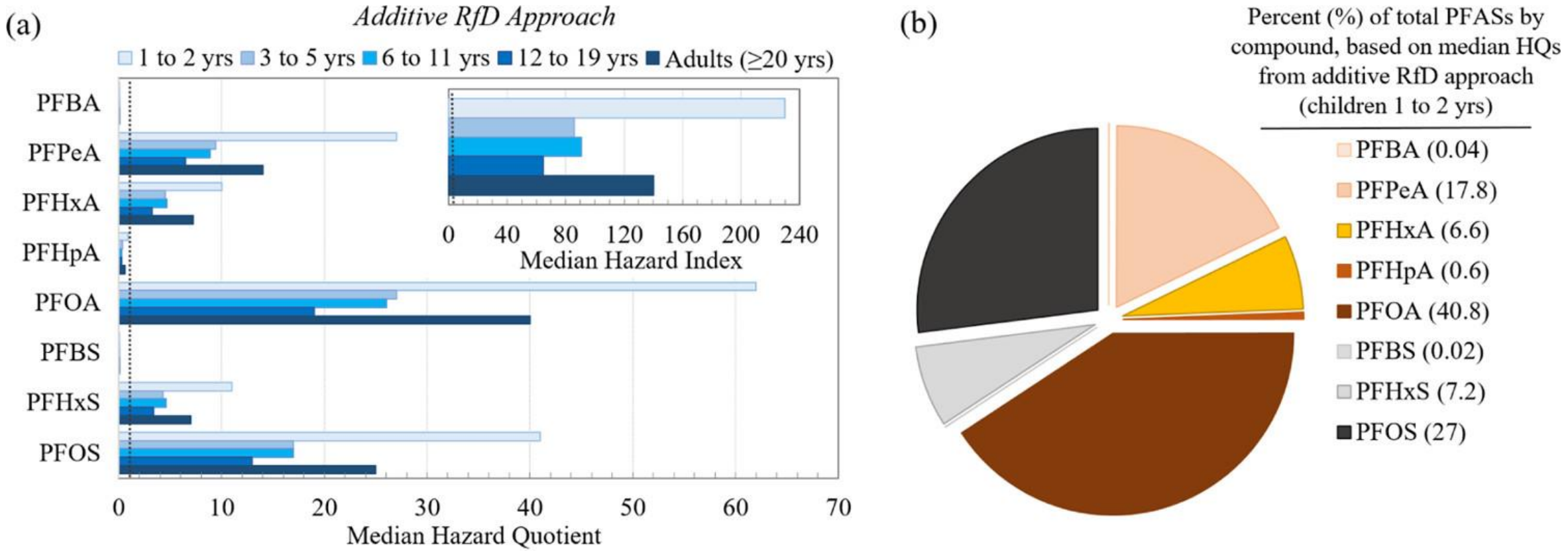
- Decreased response of the immune system to vaccination to be the most critical human health effect when determining the TWI. This differs from EFSA's previous opinion on PFAS from 2018, which used increased cholesterol as the main *critical effect*.

perfluorooctanoic acid (PFOA), perfluorooctane sulfonate (PFOS), perfluorononanoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS)

Assessing Human Health Risks for lettuce irrigation



Ref: Environ. Sci. Technol. 2020, 54, 23, 15202−15214

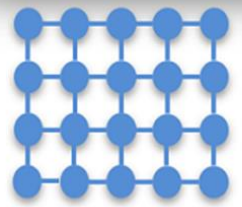


- Using the lowest available human health toxicity reference values (RfDs) & no additional exposure, estimated fifth percentile risk-based threshold concentrations in irrigation water were 38 ng/L (median 180 ng/L) for PFOA and 140 ng/L (median 850 ng/L) for PFOS.
- Thus, consumption of vegetables irrigated with PFAS-impacted water that meets the current 70 ng/L of PFOA and PFOS U.S. EPA's lifetime health advisory for drinking water may or may not be protective of vegetable exposures to these contaminants.

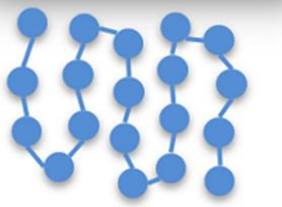
Our solution

What’s PLASMA

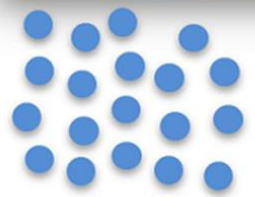
Solid



Liquid



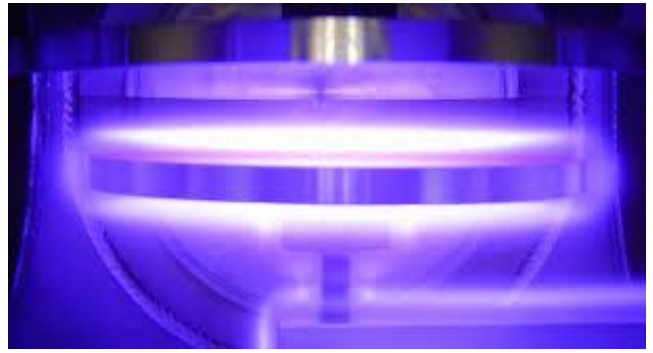
Gas



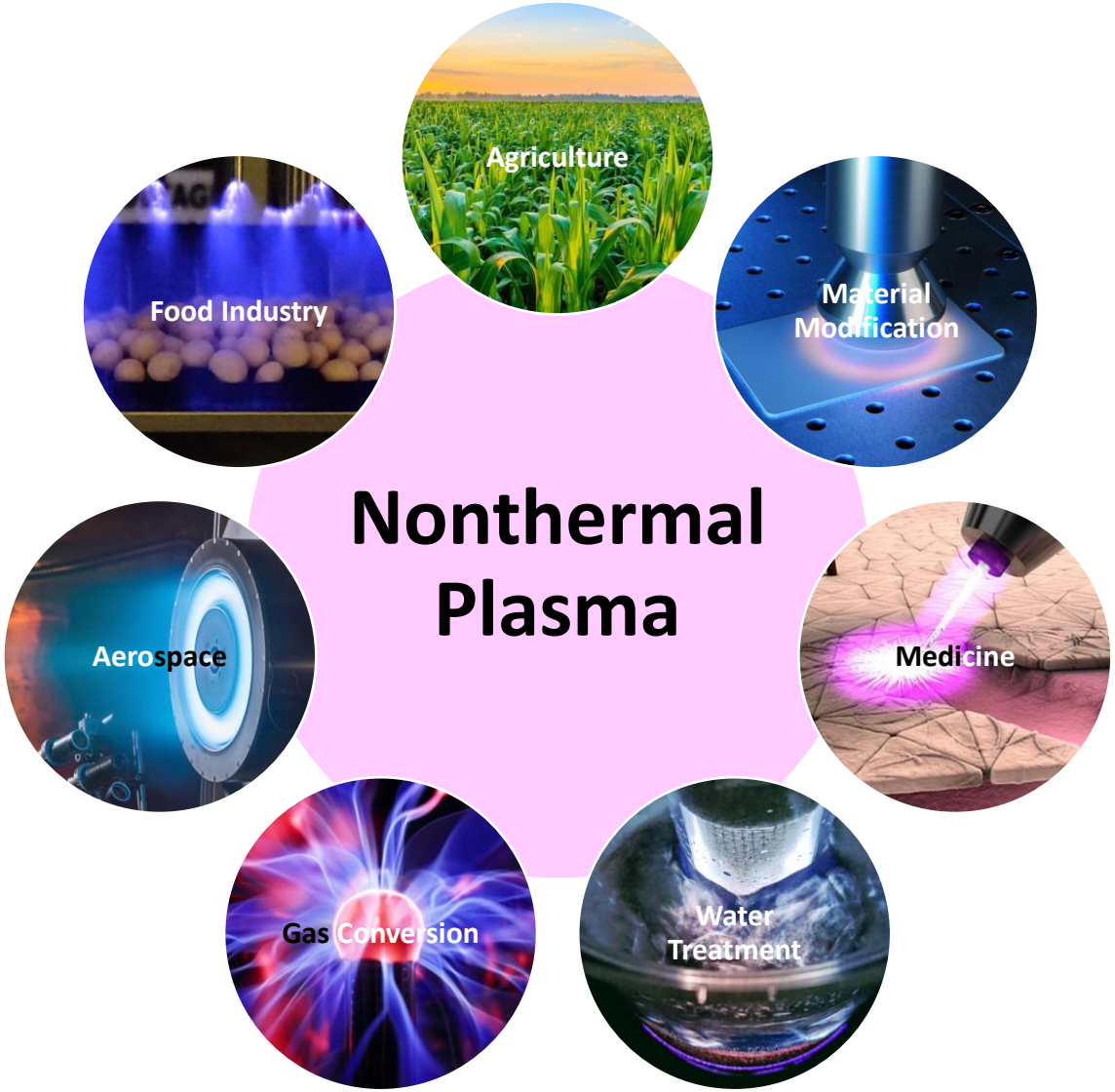
Plasma

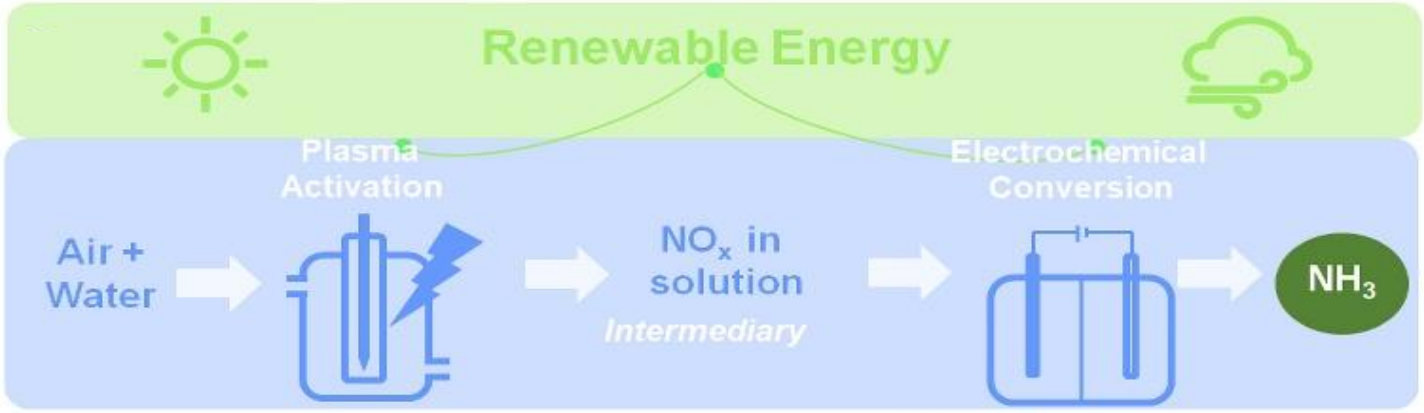
Thermal plasma

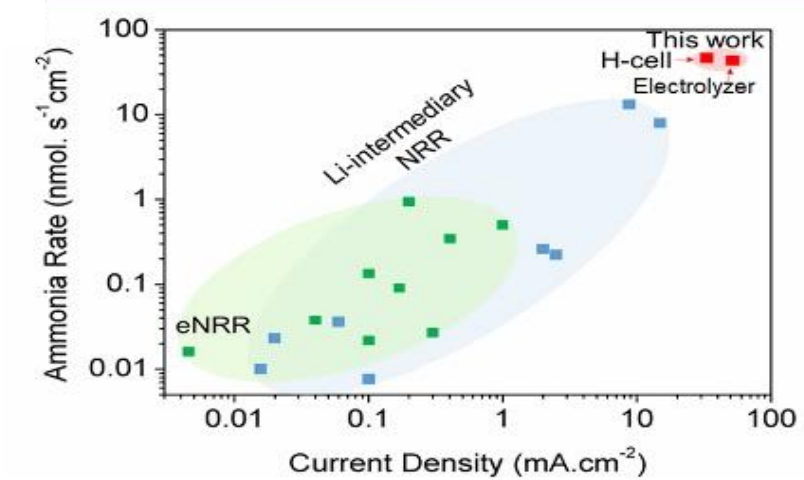
Non-thermal plasma

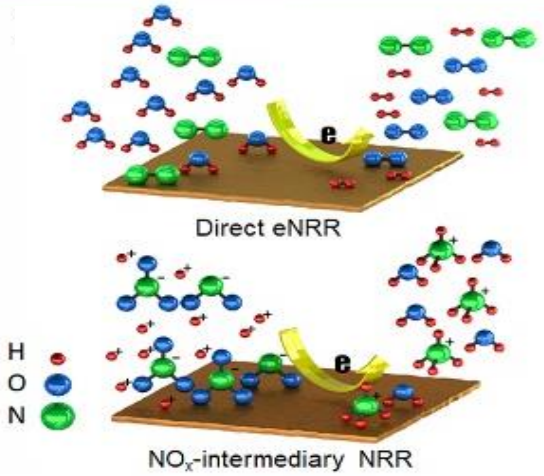


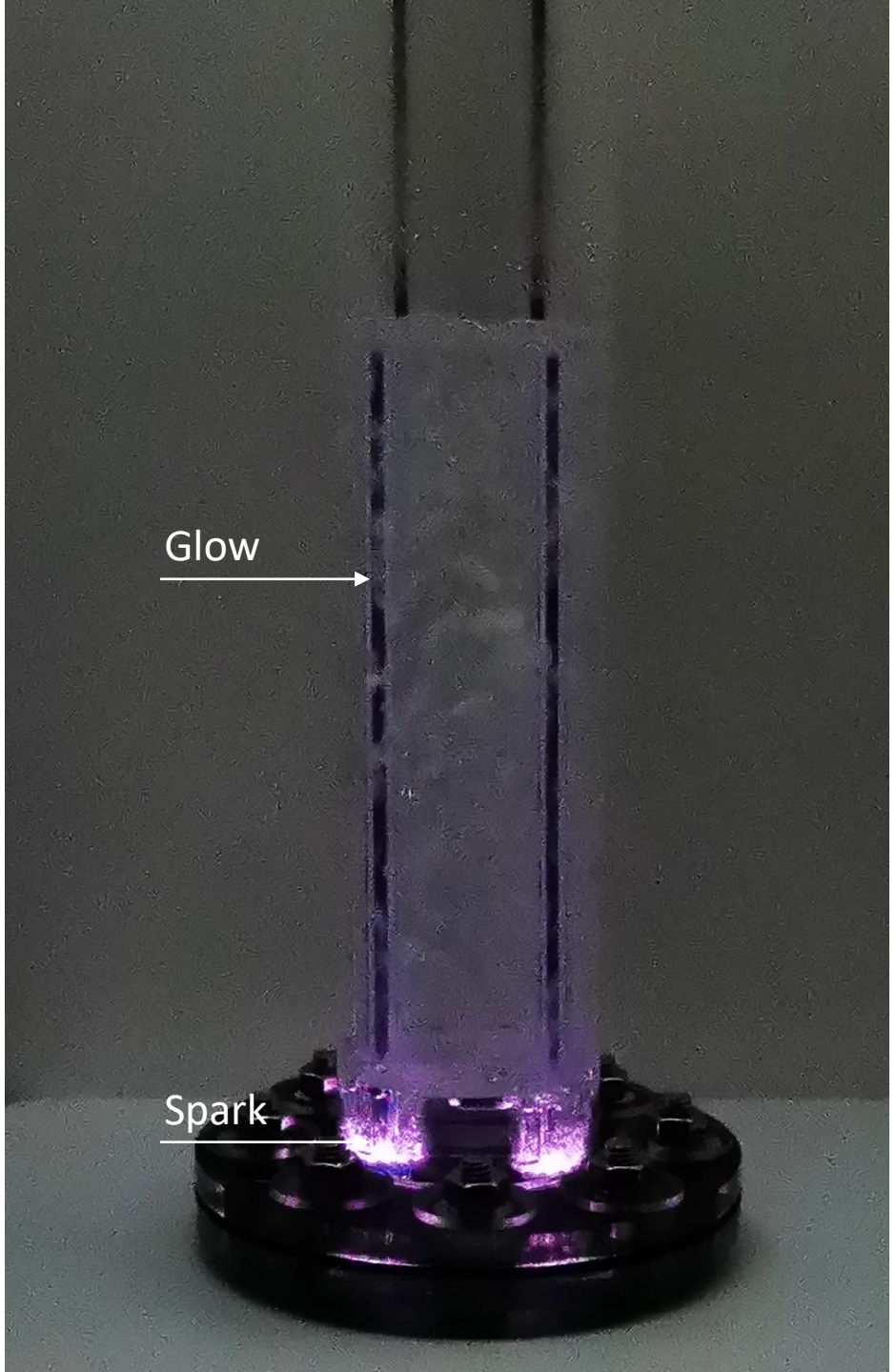
Nonthermal Plasma (NTP) applications











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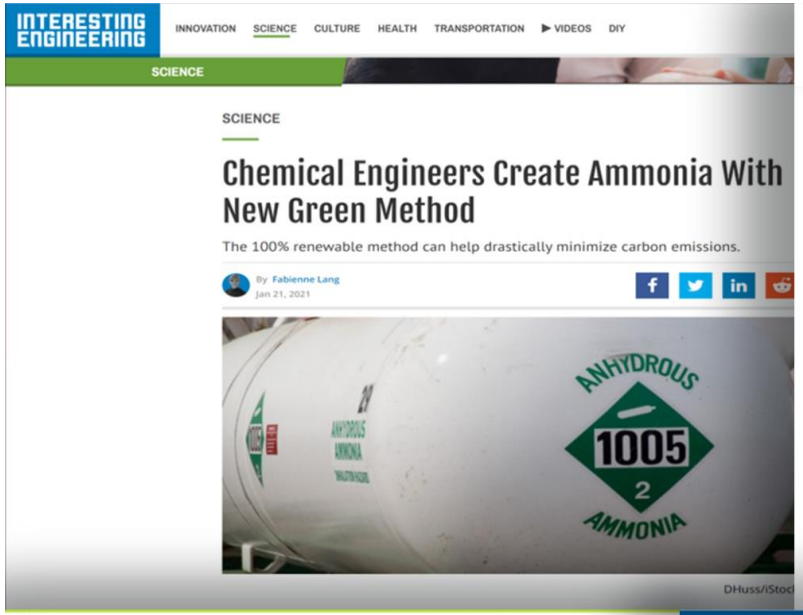
In the news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The 100% renewable method can help drastically minimize carbon emissions.
By Fabienne Lang
Jan 21, 2021
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Australian team makes green ammonia production breakthrough
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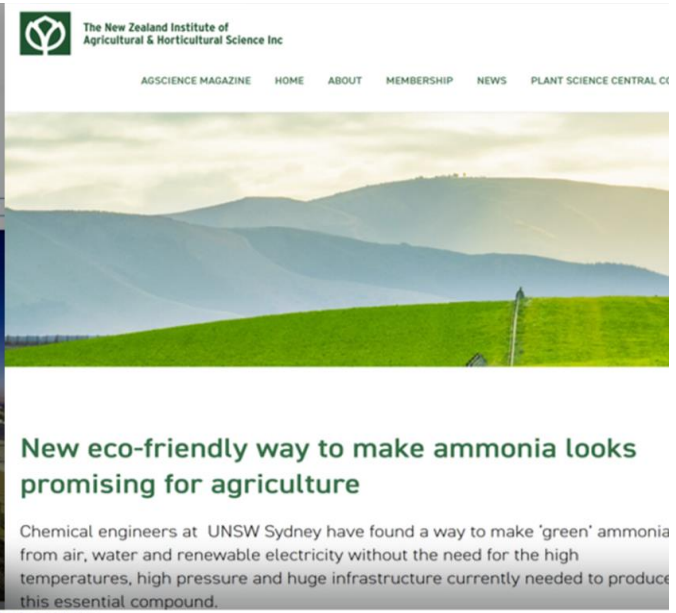
The New Zealand Institute of Agricultural & Horticultural Science Inc
AGSCIENCE MAGAZINE HOME ABOUT MEMBERSHIP NEWS PLANT SCIENCE CENTRAL
New eco-friendly way to make ammonia looks promising for agriculture
Chemical engineers at UNSW Sydney have found a way to make 'green' ammonia from air, water and renewable electricity without the need for the high temperatures, high pressure and huge infrastructure currently needed to produce this essential compound.


IFLSCIENCE!
Lightning In A Bottle Might Allow Farmers To Make Eco-Friendly Ammonia Fertilizer
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Green ammonia breakthrough a potential boon for solar-powered exports
Scientists from the University of New South Wales and the University of Sydney have made a breakthrough in the development of green ammonia. Their findings could alter the global industry with the help of solar to produce green ammonia for export to countries like Japan and Germany, instead of straight hydrogen.
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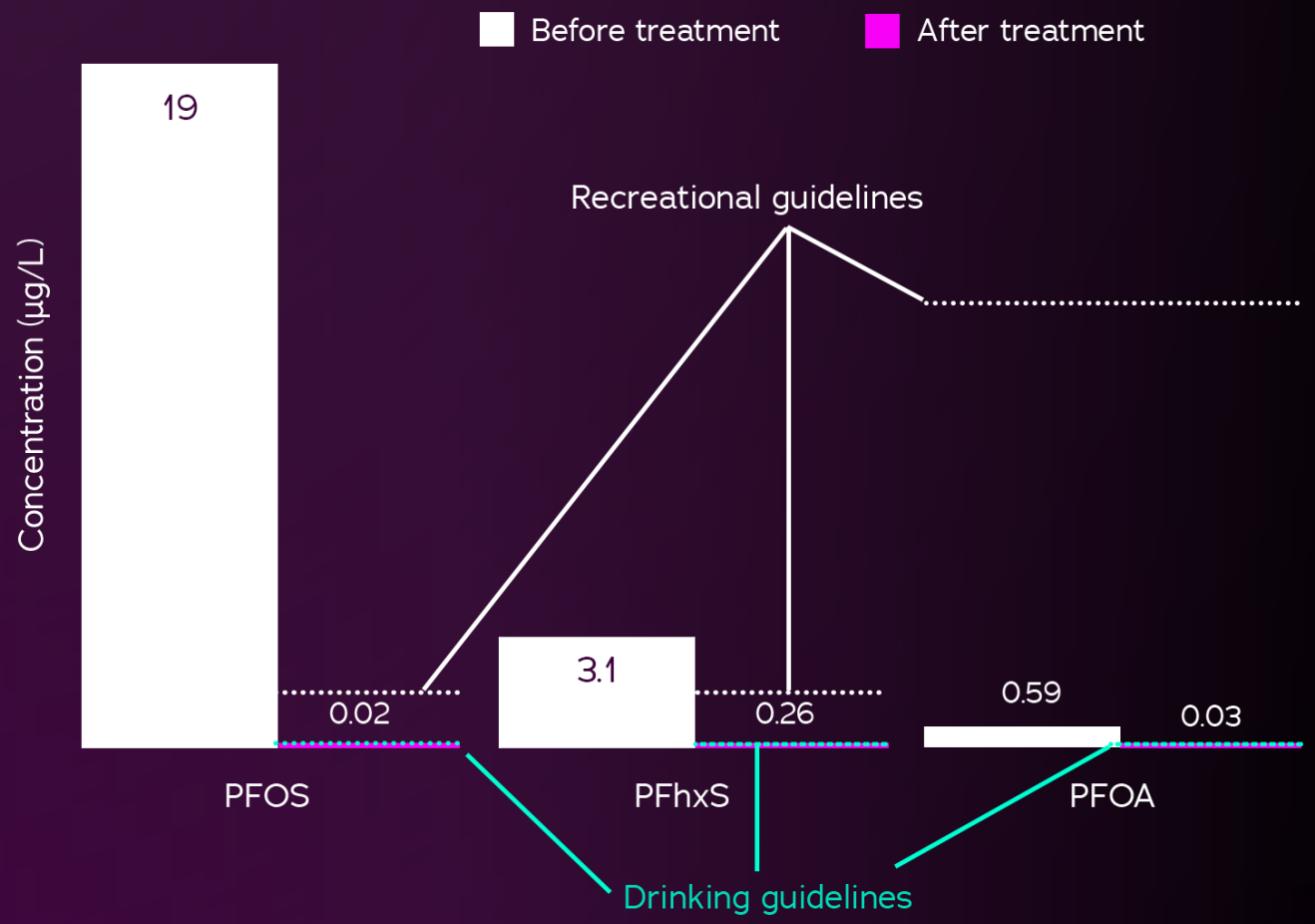
Eco-friendly Way to Make Ammonia Could be Boon for Hydrogen, Agriculture
Monday, January 25, 2021
Chemical engineers at UNSW Sydney have found a way to make "green" ammonia from air, water and renewable electricity that does not require the high temperatures, high pressure and huge infrastructure currently needed to produce this essential compound.
The new production method, demonstrated in a laboratory-based proof of concept, has the potential to play a role in the global transition towards a hydrogen economy, where ammonia is increasingly seen as a solution to the problem of storing and transporting hydrogen energy.
AMMONI

RESULTS

We can remediate PFAS contaminated water to drinking water standards



PLASMALEAP Technologies

PFAS MODULAR BASE UNIT

Self-contained.
Waste is processed 100% on site, with no transportation, and no incineration.

Electron-driven. Green.
No input chemicals or consumables are required, just access to electricity.

High capacity.
Each unit can process 250,000 litres of PFAS water daily, and up to 1,000,000 litres daily for optimised systems.

Smart & Connected.
Units are monitored, sampled, and controlled remotely by PlasmaLeap's cloud infrastructure for efficiency and safety.

Cost effective.
The energy efficiency and streamlined process makes our service 10x cheaper than traditional PFAS remediation services.

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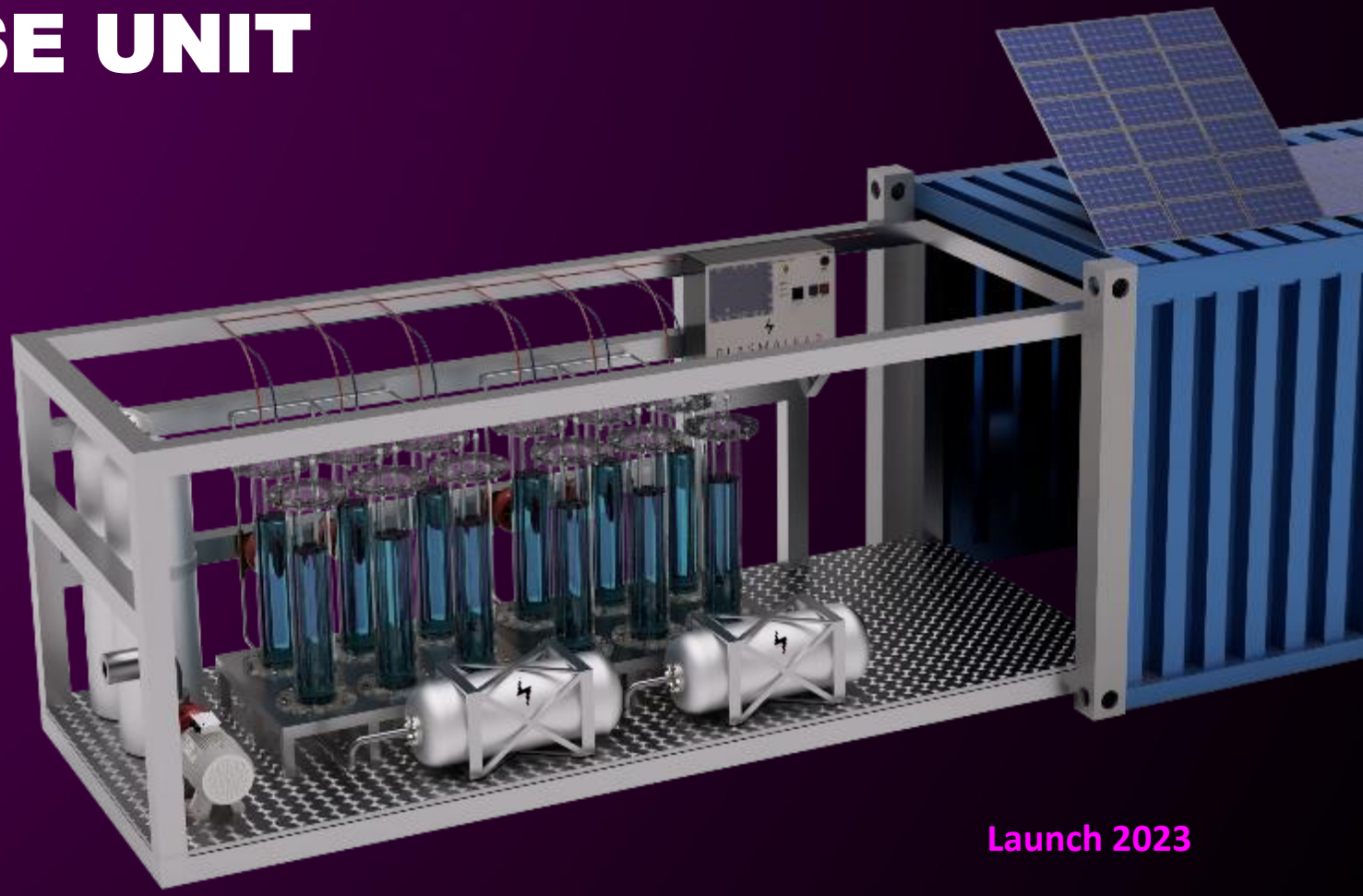

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Quentions

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