

How drying affects the PFAS in biosolids

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Why do we care about biosolids drying?

1. Less mass
(cheaper to haul)

2. Contains
beneficial
nutrients (N, P)
and carbon

3. Prepped for further
thermal treatment
(i.e., pyrolysis,
gasification, etc.)



4. Does it lower
PFAS below
regulatory limits?

Research Approach




Drying reduces the total PFAS concentration in biosolids and alters the PFAS profile†

Patrick J. McNamara  ^{*ab}, Jessica Calteux ^b, Eric Redman ^c, Taryn McKnight ^c, Lynne Moss ^a, Webster Hoener ^a, Scott Carr ^a and Zhongzhe Liu ^d

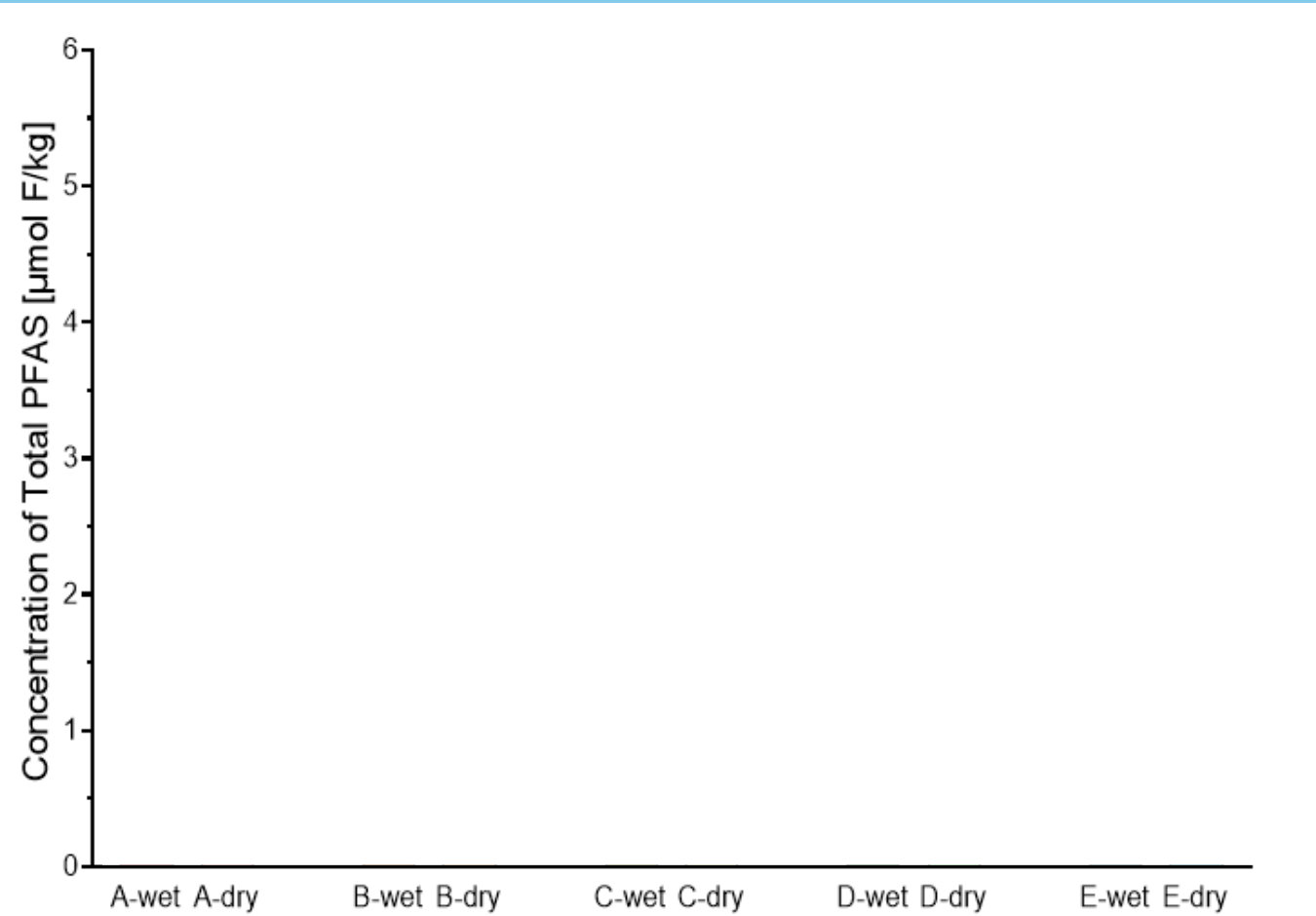


Observed an approximate 80% reduction in concentration of total measurable PFAS during lab-scale drying experiment and from full-scale dryer sampling

PFAS reduction during biosolids drying correlates to initial moisture content and is accompanied by detection of PFAS in dryer condensate

Jessica Calteux ^a, Lynne Moss ^b, Rosely Ayala ^c, Aileen Baza ^c, Zhongzhe Liu ^c, Eric Redman ^d, Taryn McKnight ^d, Fabrizio Sabba

^{be}, Leon Downing ^b and Patrick McNamara ^{*ab}

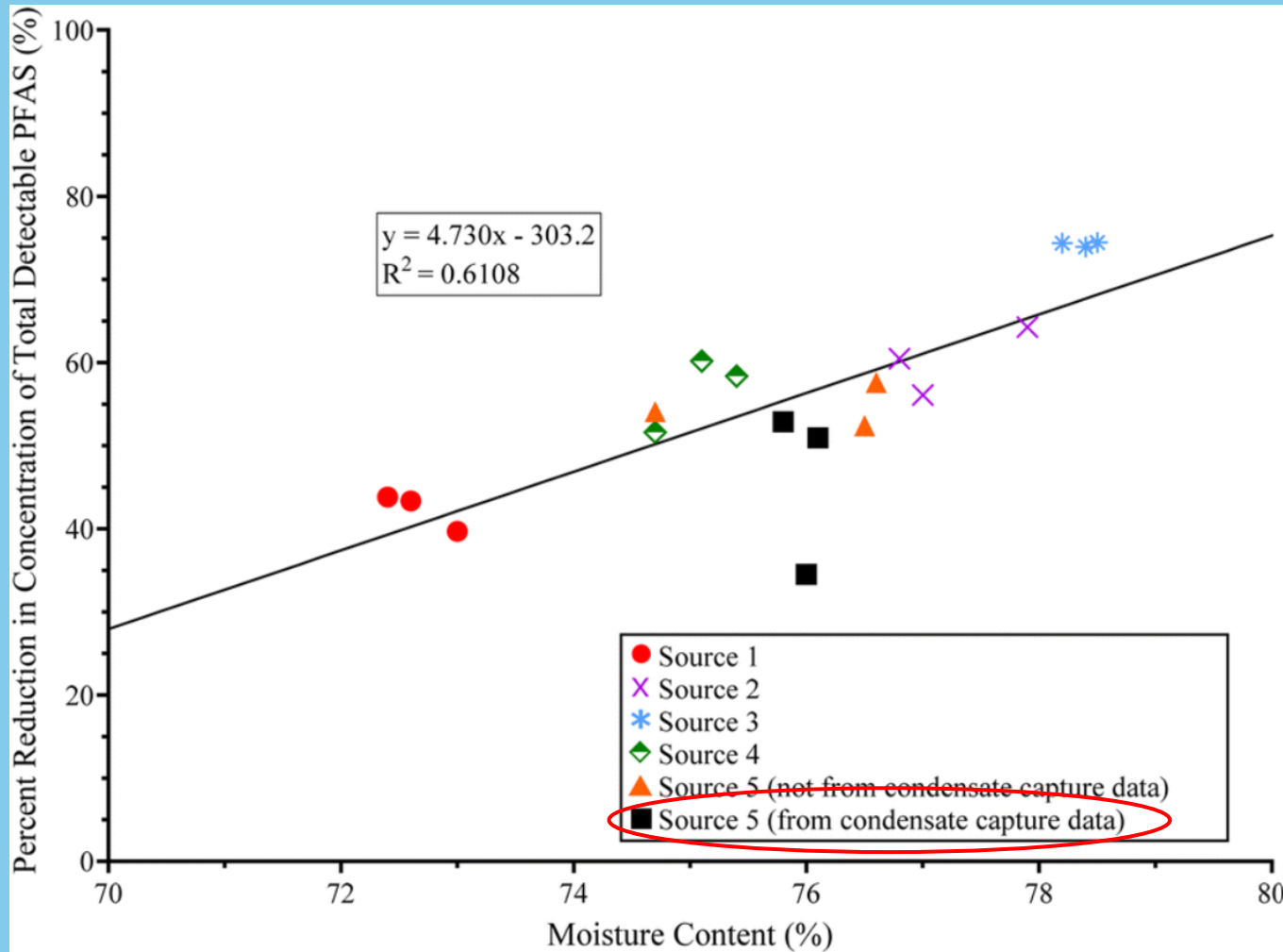


Observed an average of 60% reduction in concentration of total measurable PFAS across lab-scale drying experiments on biosolids from 5 different facilities

PFAS reduction during biosolids drying correlates to initial moisture content and is accompanied by detection of PFAS in dryer condensate

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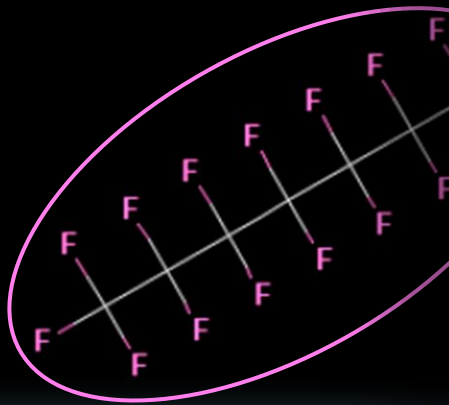


An average of 16% of PFAS was in the condensate and about 40% of PFAS was “unaccounted for”

- Transformed into undetectable species?
- Irreversible sorption?
- Lost in impinger tubing?
- Something else?

PFAS chemical structure gives rise to specific partitioning behavior

Nonpolar
C-C
chain



Perfluorooctanoic acid



philic = **Amphiphilic**

d water,

to partition to the air

o partition to the water

S) prefer to partition to the

PFAS chemical structure gives rise to specific partitioning behavior

Aerosolization

Could explain
“condensate”
fraction

Nguyen, D., et al. (2024).
Removal of per-and
polyfluoroalkyl substances
from wastewater via aerosol
capture. *Journal of
Hazardous Materials*, 465,
133460.

Irreversible Sorption

Could explain
“unaccounted”
fraction

Thank you!

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