Data Brief: Plant Tissue

A Norfolk Southern freight train carrying hazardous materials derailed in East Palestine, OH on February 3, 2023. This is a summary of publicly available data gathered after the derailment about possible impacts on plants as of April 2024.

Key Points:

- **Plant tissue is an unlikely source of contamination from semi-volatile organic compounds (SVOCs). There was no evidence of SVOCs in potentially exposed plants.**
- **Plants do not readily uptake SVOCs. If higher levels of contaminants were found, researchers would look into other possible pathways.**

Sampling

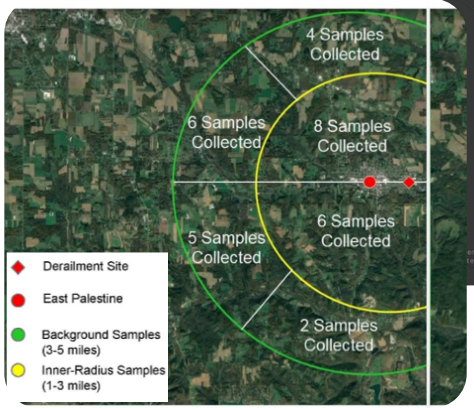
- Data are from the Ohio Department of Agriculture, The Ohio State University, Pennsylvania Department of Agriculture, and Penn State University.
- Sixty-one samples were collected: 31 from Ohio, and 30 from Pennsylvania.
- Sampling focused on semi-volatile organic compounds (SVOCs), which may cause negative health effects, depending on the exposure.
- Sampling was voluntary and collection locations were chosen with the landowner to find possible areas of impact.
- Crops that were in-ground during the derailment were sampled, including winter wheat, alfalfa and grass mixes, malting barley, rye, grassed waterways, triticale, spelts (grain), garlic, and blueberry bushes.
- At 10% of sites, repeat samples were taken to account for the natural changes in the environment.
- At 5% of sites, an open, empty sampling jar was placed along the field edge to collect air and detect any contaminants or errors during collection, transport, and storage of samples.

For more information about the Ohio sample collection, visit go.osu.edu/epplanttissue

For more information about the Pennsylvania sample collection, visit go.osu.edu/paplanttissue

Conclusions

- In Ohio, none of the 26 tested SVOCs were found above reportable limits within the inner-radius (0-3 miles).
- In the background radius (3-5 miles), only one compound (Benzo[b]fluoranthene) was above reportable limits in 2 of 18 background samples.
- In Pennsylvania, none of the tested SVOCs were found above reportable levels.



OH Sampling Map

PA Sampling Map

Plant tissue analysis for selected SVOCs from actively growing plants in fields of Columbiana County, Ohio (April 10-12, 2023), and Beaver and Lawrence Counties of Pennsylvania (late April 2023) following the Norfolk Southern train derailment.

SVOC	CAS No. (1)	Reporting Level (ppm)(2)	OH/PA Sampling Results (ppm)
2,4,5-Trichlorophenol(3)	95-95-4	0.42	<0.42
2,4,6-Trichlorophenol(3)	88-06-2	0.40	<0.40
2,4-Dichlorophenol	120-83-2	0.43	<0.43
2-Chlorophenol	95-57-8	0.31	<0.31
2-Methylnaphthalene	91-57-6	0.66	<0.66
4-Chloro-3-methylphenol	59-50-7	0.59	<0.59
4-Chlorophenyl phenyl ether(3)	7005-72-3	0.48	<0.48
Acenaphthene(3)	83-32-9	0.21	<0.21
Acenaphthylene(3)	208-96-8	0.69	<0.69
Anthracene	120-12-7	0.36	<0.36
Benzo[a]anthracene	56-55-3	0.29	<0.29
Benzo[a]pyrene	50-32-8	0.15	<0.15
Benzo[b]fluoranthene	205-99-2	0.28	**<0.28 - 0.37(4)**
Benzo[g,h,i]perylene	191-24-2	0.20	<0.20
Benzo[k]fluoranthene	207-08-9	0.26	<0.26
Chrysene	218-01-9	0.25	<0.25
Dibenz(a,h)anthracene	53-70-3	0.41	<0.41
Fluoranthene	206-44-0	0.36	<0.36
Fluorene(3)	86-73-7	0.79	<0.79
Hexachlorobenzene	118-74-1	0.28	<0.28
Indeno[1,2,3-cd] pyrene	193-39-5	0.41	<0.41
Naphthalene	91-20-3	0.70	<0.70
Pentachlorophenol	87-86-5	0.74	<0.74
Phenanthrene	85-01-8	0.24	<0.24
Phenol	108-95-2	0.34	<0.34
Pyrene	129-00-0	0.32	<0.32

(1) CAS is a unique number assigned by the Chemical Abstracts Service to identify a specific compound.

(2) ppm=µg/g.

(3) Only spike-recovery used (Ohio sampling).

(4) 2 of 18 background-radius samples were above the reporting limit. Detection is not believed to be associated with train derailment (Ohio sampling).

Reporting Level: The lowest level at which researchers can be confident about the measurement of the SVOC in plant tissue.