

Urine VOC Metabolites Pilot Study

A summary of published findings

PURPOSE OF THE STUDY

This study was conducted to determine if metabolites of volatile organic compounds (VOCs) were able to be measured in residents living near the site of the train derailment on February 3, 2023 in East Palestine, Ohio. *Metabolites are created as the body breaks down the original chemical.

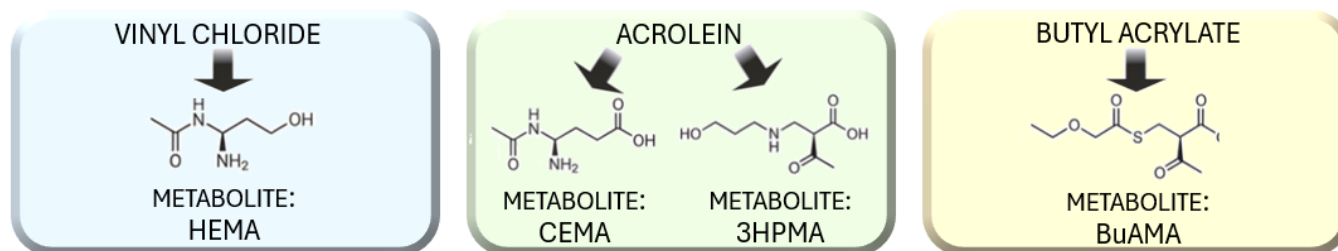
WHAT DID THE STUDY INVOLVE?

Twenty (20) non-smoking adults who participated in the University of Kentucky's East Palestine Train Derailment Health Tracking Study and who lived approximately one mile from the derailment site were invited to participate in a pilot study. The pilot study was held at the First United Presbyterian Church on July 17-18, 2023. Nineteen (19) provided a usable urine sample. Urine samples were sent to Wayne State University for analyses.

The results were compared with levels found in two groups: 1) 13 non-smokers in Marietta, Ohio and 2) over 1,000 non-smokers in a national study by the Centers for Disease Control and Prevention (CDC).

WHAT WAS ANALYZED AND WHY

Measured metabolites potentially related to the derailment including vinyl chloride (HEMA), acrolein (CEMA, 3HPMA) and butyl acrylate (BuAMA).



Metabolites in urine can provide information about exposure to these chemicals. Comparing levels with other populations helps researchers understand whether the levels found in participants were typical or unusual. Understanding exposure is an important step in evaluating possible health impacts.

WHAT DID WE FIND?

- Nearly 75% of the East Palestine participants had a detectable level of the vinyl chloride metabolite, and one participant had a level that was quantifiable. Using the same limit of

detection as our lab, only 5% of the participants in the national CDC study had a detectable level of this metabolite. No Marietta residents had a detectable level of this metabolite.

- One participant had a measurable level of the butyl acrylate metabolite. The CDC's study did not measure this metabolite. No Marietta residents had a detectable level of this metabolite.
- Our team developed the method for measuring butyl acrylate metabolite in order to provide this information to the East Palestine, Ohio community.

WHAT DO THE FINDINGS MEAN?

An unexpectedly high number of East Palestine residents had detectable levels of the vinyl chloride metabolite in their urine 5 months after the derailment. As these VOCs only last a few days in the body and there are no known local sources of vinyl chloride (or acrylonitrile or ethylene oxide which can also cause this metabolite), this suggests that residents were had been recently exposed to vinyl chloride.

WHAT HAPPENS NEXT?

The [East Palestine Health Research Program](#) was designed to answer questions about long-term health following the derailment and vent and burn. This study will also include a comparison community – the Cambridge, Ohio area - a similar community approximately 100 miles away from the derailment site. The research will be used to inform specific health care needs.

WHERE CAN I READ THE FULL STUDY?

The full paper is open-access and available online in the peer-reviewed journal, "[Environmental Science and Technology](#)."

FUNDING

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