On February 3rd, a tragedy occurred in East Ohio when nearly 1 million pounds of the toxic gas Vinyl Chloride was released, due to a train carrying the chemical getting derailed. Vinyl Chloride is an organochloride that does not occur naturally but must be produced industrially for commercial use. It is used to make Polyvinyl Chloride (PVC) pipes, vehicle upholstery, and plastic kitchenware among other things. Although it is used to make many of the products that surround us on a daily basis, exposure to Vinyl Chloride could increase a person's risk of developing cancer, miscarriages and birth defects, and damage to the nervous system.[1]

Fortunately, gas chromatographic (GC) methods were developed in the late 70's because of the risk of exposure to high levels of Vinyl Chloride in the air at workplaces in chemical

plants.[2] Since the spill in Ohio was addressed using a "controlled burn," presence of Vinyl Chloride in the air is of concern to local residents.

Due to the location of the derailment, the entire Ohio river basin has the potential to be contaminated. This would lead to potential contamination throughout the Midwest and all along the Mississippi river down to Louisiana depending on the quantity of Vinyl Chloride released into the waterways. With the widespread use of PVC piping in homes and through the municipal water supplies in the 70's, a GC method was developed to detect Vinyl Chloride in water down to a range of 0.1 – 2500 µg/L.[3]

Environmental spills and chemical plants are not the only places people could be exposed to Vinyl Chloride. Since it is used to make so many of the things we encounter every day, there is a chance that we may be exposed to minuscule levels regularly. PVC materials can be used to make items that come into contact with the foods that we eat, and can be a significant source of food contamination. Because of this concern, a method to detect Vinyl Chloride monomer in food contact materials was developed using solid phase microextraction (SPME) coupled with gas chromatography/mass spectrometry.[4]

Exposure to Vinyl Chloride has the potential to be very dangerous, especially when it comes to accidental release into the local environment or contamination of food products. We have the tools to detect the level of Vinyl Chloride around us, and this will help determine to what degree cleanup efforts need to take place and whether our consumer products are safe.

If detection of chemicals like Vinyl Chloride are of interest to you and your next application, check out these sources:

GC Method Development Guide

GC Troubleshooting Guide

References

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