

Letter Report: Emission of Bis(2-ethylhexyl) phthalate (DEHP) from Vinyl Flooring

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Objective: Compare data from passive sampling of bis(2-ethylhexyl) phthalate (DEHP) from vinyl flooring sample using Tenax thermal desorption tubes and a Gerstel TD 3.5+ system.

Methodology: Three to six Tenax thermal desorption tubes were placed vertically on a sample of vinyl flooring for 16 to 24 hours (Figure 1). The Tenax in the tubes was located 15 mm from the end of the tube contacting the vinyl floor material. The tubes were held with adaptors based on designs in Wu et al. (2016). The tested vinyl flooring sample was the same as that tested in Wu et al. (2016).



Figure 1: Sampling apparatus for passive sampling of DEHP emission from vinyl flooring.

The tubes were analyzed using a Gerstel TD 3.5+ thermal desorption system connected to an Agilent 6890 gas chromatogram (GC) and Agilent 5973 mass spectrometer (MS). The TD 3.5+ thermally desorb the tubes using an initial temperature of 30 °C, which was ramped at 360 °C/min to 300 °C where it was held for 8 min. The cooled injection system (CIS) started at 10 °C and was ramped at 720 °C/min to 275 °C. The GC oven temperature was initially 100 °C, ramped at 15 °C/min to 310 °C and held for 3 min. The GC column was an RTX-5 30 m column with a 0.25 mm diameter and 0.50 µm film

thickness. The MS was operated in Scan mode (30 amu to 450 amu). Six point linear standard curves (0.2 ng to 2 ng) were used to quantify the data with deuterated DEHP (DEHP-d4) as an internal standard.

Results: The data obtained to date is intended to demonstrate the ability to replicate experiments by Wu et al. (2016). The mass of DEHP collected on the Tenax tubes after 24 hours averaged 34.9 ng with a standard error of 2.3 ng for the nine samples. This 24 hour data was slightly greater than the results obtained by Wu et al. (2016) as seen in Figure 2. More data will be collected at other time points up to 144 hours to further comparisons between this effort and Wu et al. (2016).

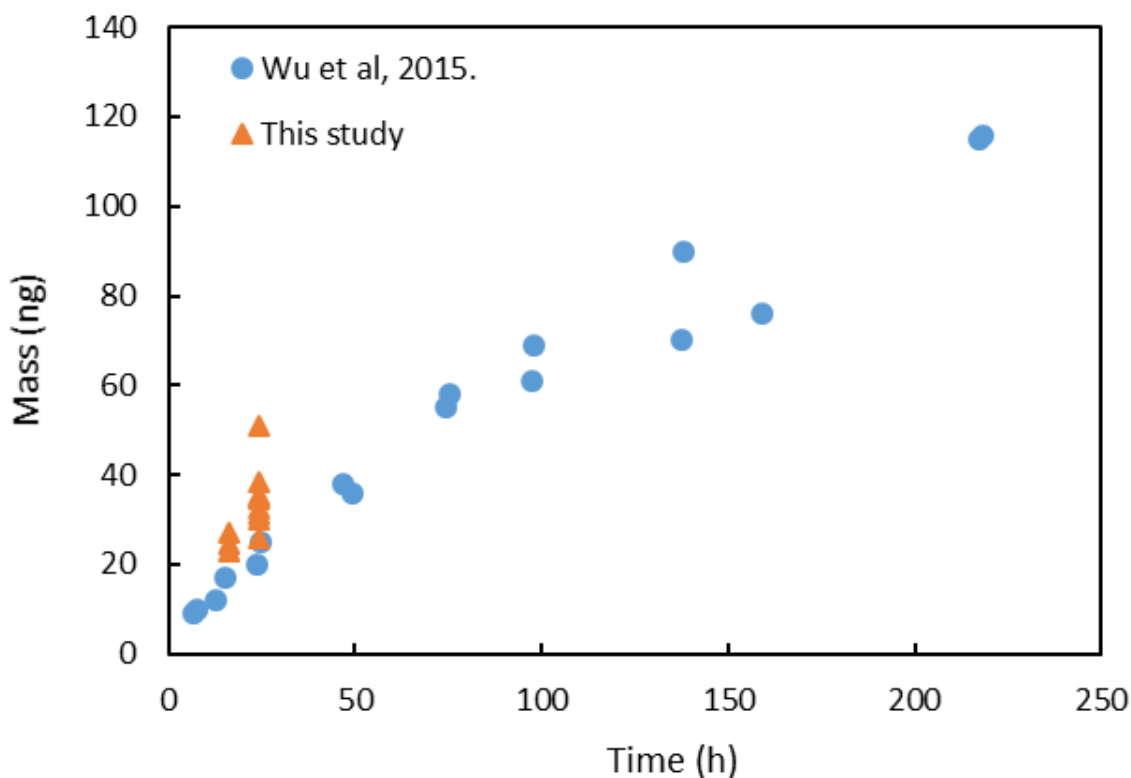


Figure 2: A comparison of mass DEHP release from vinyl flooring from this work (orange) and data from Wu et al. (2016) (blue).

Next Steps: The data in Figure 2 was produced using tubes where Tenax was located 15 mm from the end of the tube contacting the vinyl floor material. To determine if the sorbent depth influences the data, tubes with no Tenax and 8 mm Tenax depth will be tested for 24 h exposure.

Reference: Wu, Y., Xie, M., Cox, S.S., Marr, L.C., Little, J.C. 2016. A simple method to measure the gas-phase SVOC concentration adjacent to a material surface. *Indoor Air*, **26**(6), 903-912.

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