

Project title: Determination of Henry's Law Constants for PCDD

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Project summary:

An internal standard method is developed for the measurement of thermodynamic Henry's law constants (H). In this method, a mixture of the substrate and an internal standard is prepared and used to make a standard organic (pentane) solution and a dilute aqueous solution. Both the standard solution and the headspace sample of the aqueous solution at partitioning equilibrium in a closed system are analyzed by gas chromatography (GC). The Henry's law constant of the substrate can then be calculated from the known H of the internal standard and the GC peak area ratios. The exact concentrations of the compounds in the solutions, the GC injection volumes, and the vapor and aqueous phase volume ratios in the closed system are not critical in this approach. The method works particularly well for compounds having low vapor pressures. Values of H for some low molecular weight aldehydes, ketones, and nitriles have been determined by this method and the temperature dependence of H has been examined. The data agree well with literature values and the measurement of H for PCDD is under way. The applicability of this new approach is limited to compounds having dimensionless Henry's law constants in the order of 10^{-3} or less.

Publications:

A manuscript titled "DETERMINATION OF HENRY'S LAW CONSTANTS FOR SOME LOW MOLECULAR WEIGHT ALDEHYDES, KETONES, AND NITRILES BY AN INTERNAL STANDARD METHOD" has been prepared and will be submitted to Environmental Toxicology and Chemistry.

Presentations:

An abstract titled "DETERMINATION OF HENRY'S LAW CONSTANTS BY AN INTERNAL STANDARD METHOD" has been submitted to ACS for the presentation at the Fall 2006 national meeting.