A Field-Portable Colorimetric Method for the Measurement of Peracetic Acid Vapors: A Comparison of Glass and Plastic Impingers\_Dataset

Dataset number: RD-1041-2022-0

**Introductory** **Information**

A method for measuring PAA vapors in air using impinger sampling and field-portable colorimetric analysis is presented. The capture efficiency of aqueous media in glass and plastic impingers was evaluated when used for PAA vapor sampling. Measurement of PAA was done using a *N,N*-diethyl-p-phenylenediamine (DPD) colorimetric method with a field portable spectrometer. The linearity of the DPD method was determined for PAA both in-solution and captured from vapor phase using glass or plastic impingers. The Limit of Detection (LOD) for the glass and plastic impinger (0.24 mg/m3 (0.077 mg/L) and 0.28 mg/m3 (0.091 mg/L)), respectively, and Limit of Quantitation (LOQ) (0.79 mg/m3 (0.25 mg/L) and 0.92 mg/m3 (0.30 mg/L) for the glass and plastic impingers, respectively, are below the threshold limit value (TLV) short term exposure limit (STEL) of 1.24 mg/m3 (0.4 ppm) over a 15 minute period. This impinger method allows for a low cost, easy to use, and rapid in-field measurement for occupational exposure to PAA.

**General Methods** **Collection**

1. Colorimetric determination of PAA concentration from stock solutions
   * PAA was placed into a 0.25-L volumetric flask and diluted to the mark with deionized water.
   * An aliquot of liquid was diluted to 500-mL and measured by Chemetrics or HACH using a V2000 Chemetrics photometer and K-7913 vials or a DR1900 HACH spectrometer with DPD total chlorine reagent powder pills.
2. Colorimetric determination of PAA vapor concentrations as collected by a glass or plastic impinger
   * An impinger was filled with 15-mL of DI water and an Acrodisc® syringe filter was connected to the impinger
   * PAA was added to the filter and air was pulled through impinger at 1 L min-1 for 15 minutes
   * The impinger liquid was diluted to 500-mL and measured by Chemetrics or HACH using a V2000 Chemetrics photometer and K-7913 vials or a DR1900 HACH spectrometer with DPD total chlorine reagent powder pills.
   * To determine impinger collection efficiency, two impingers were connected by tygon tubing. The impingers were filled with 15-mL of DI water and an Acrodisc® syringe filter was connected to the front impinger. PAA was added to the filter and air was pulled through the impingers at 1 L min-1 for 15 minutes. The impingers’ liquid was diluted to 500-mL and measured by Chemetrics V2000 Chemetrics photometer and K-7913 vials.

**Citation**

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