

A field-portable colorimetric method for the measurement of peracetic acid vapors: a comparison of glass and plastic impingers_Dataset

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/m^3 (0.077 mg/L) and 0.28 mg/m^3 (0.091 mg/L)), respectively, and Limit of Quantitation (LOQ) (0.79 mg/m^3 (0.25 mg/L) and 0.92 mg/m^3 (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/m^3 (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

Angela L. Stastny, Amos Doepke & Robert P. Streicher (2022): A field portable colorimetric method for the measurement of peracetic acid vapors: a comparison of glass and plastic impingers, Journal of Occupational and Environmental Hygiene, DOI: 10.1080/15459624.2022.2088772

Acknowledgements

This work was supported by NIOSH CAN93908S6.

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