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Laura Domínguez-Henao, Andrea Turolla,
Damiano Monticelli, Manuela Antonelli



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Assessment of a colorimetric method for the measurement of low concentrations of peracetic acid and hydrogen peroxide in water

Laura Domínguez-Henao^a, Andrea Turolla^a, Damiano Monticelli^b, Manuela Antonelli^{a,*}

^a Politecnico di Milano, Department of Civil and Environmental Engineering (DICA) - Environmental Section, Piazza Leonardo da Vinci 32, 20133 Milano, Italy

^b Università dell'Insubria, Department of Science and High Technology, Via Valleggio 11, 22100 Como, Italy;

* Corresponding Author: **Manuela Antonelli**. manuela.antonelli@polimi.it

ABSTRACT

The recent growing interest in peracetic acid (PAA) as disinfectant for wastewater treatment demands reliable and readily-available methods for its measurement. In detail, the monitoring of PAA in wastewater treatment plants requires a simple, accurate, rapid and inexpensive measurement procedure. In the present work, a method for analyzing low concentrations of PAA, adapted from the US EPA colorimetric method for total chlorine, is assessed. This method employs N,N-diethyl-p-phenylenediamine (DPD) in the presence of an excess of iodide in a phosphate buffer system. Pink colored species are produced proportionally to the concentration of PAA in the sample. Considering that PAA is available commercially as an equilibrium solution of PAA and hydrogen peroxide (H_2O_2), a measurement method for H_2O_2 is also investigated. This method, as the one for the determination of PAA, is also based on the oxidation of iodide to iodine, with the difference that ammonium molybdate Mo(VI) is added to catalyze the oxidation reaction between H_2O_2 and iodide, quantifying the total peroxides (PAA+ H_2O_2). The two methods are suitable for concentration ranges from about 0.1 to 1.65 mg L⁻¹ and from about 0.3 to 3.3 mg L⁻¹, respectively for PAA and H_2O_2 . Moreover, the work elucidates some relevant aspects related to the operational conditions, kinetics and the possible interference of H_2O_2 on PAA measurement.

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