

## Abstract

# New HPLC Method for Surfactants Detection in Wastewaters Samples <sup>†</sup>

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**Abstract:** Over the last decade, biocides have received increasing attention due to their widespread use, their transfer to aquatic ecosystems, and their negative effects on aquatic organisms. Alkyl benzyl dimethyl ammonium chlorides are applied as bactericides and disinfectants in sanitary products and used as antistatic agents in the formula of laundry conditioners. The aim of this study was to provide a sensitive and robust HPLC-DAD method for the detection of three biocides (dodecyl- (C12-), tetradecyl- (C14-), and hexadecyl- (C16-) benzyl dimethylammonium chloride) in wastewater samples. The analytes separation was achieved using an Acclaim Surfactant Plus (3  $\mu$ m, 150 mm  $\times$  3 mm) chromatographic column, maintained at 30 °C. The isocratic mode elution using a binary phase of ammonium acetate 0.2 M (A): acetonitrile (B) as mobile phase (50:50, *v/v*) at a flow rate of 0.5 mL/min, and allowed a run time of only 5 minutes. The linearity, accuracy, and intermediate precision were validated. The HPLC-DAD method provides good linearity, with correlation coefficients from 0.9992 to 0.9997 in the concentration range from 1 to 100 mg/L. Very good precision values were obtained, with RSD% ranged from 1.37–2.27% for intra-day measurements and between 6.14 and 6.65% for inter-day measurements. The target biocides were isolated from wastewater samples through the Solid Phase Extraction (SPE) procedure, using polymeric Strata-X Cartridges and acetonitrile and acetic acid (90%/10%) as elution solvent mixture. Recoveries (up to 86%) made possible the quantification biocides at very low levels, the limits of quantification (LOQs) were in the ranged between 4.5 and 7.6  $\mu$ g/L. The method was successfully applied to wastewater samples, obtaining concentration values varying from a few  $\mu$ g/L to a few mg/L.

**Keywords:** HPLC-DAD; biocides; solid phase extraction; wastewater samples



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