Flow Injection Sensing Strategy for Determining Cationic Surfactants in Commodity and Water Samples

Abstract:

The formation of stable binary water-soluble sub-micellar aggregates of cetyltrimethylammonium bromide-copper-pyrocatechol violet complex (CTAB-Cu-PCV) diminishes the stability and absorbance of the Cu-PCV complex. A new flow injection spectrophotometric sensing strategy used for the determination of CTAB in commodity personal care antiseptics and water samples has been established relying on the above-mentioned concept. Based on the reduction of the absorption of the Cu-PCV solution by the injection of CTAB solution at pH 6.0 and 430 nm, a linear absorbance decrease was observed over the CTAB concentration range of 2.0 to 100.0 μg mL−1 (r = 0.987). The analysis method showed limits of detection (3.3 σ) and quantification (10 σ) of 0.08 and 0.27 μg mL−1, respectively. The precision (RSD) for five replicate determinations was 7.9 and 3.7% at 10 and 50 μg mL−1, respectively. The developed method was applied successfully to the determination of CTAB in personal care products, namely skin lotion and vaginal wash, in addition to water samples. The corresponding RSD (n = 5) values were ≤8.2%.