Comparison of preconcentration and determination methods of a textile dye by spectrophotometry: cloud point extraction and solid-phase extraction

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Abstract

This study deals with the preconcentration, determination, and removal of Lanaset Blue 2R textile dye from aqueous medium by two different methods. For this purpose, cloud point extraction (CPE) and solid phase extraction (SPE) methods were optimized. Amberlite XAD-1180 resin was used as adsorbent for SPE while Tergitol NP-7 non-ionic surfactant was used as surfactant rich phase for CPE. The common optimization steps were determined as initial solution pH, linear dynamic range, sample volume, equilibrium time and limits of detections were characterized for both SPE and CPE techniques while specific optimization steps such as temperature and surfactant concentration were also determined for CPE. The results showed that the CPE and SPE of dye were quantitative at pH 6. Detection limits were 21-μg L−1 for CPE and 9-μg L−1 for SPE. The enrichment factors were 40 and 10 for SPE and CPE, respectively. The real sample analysis was successfully performed with both techniques. The strengths and weaknesses of the methods were highlighted.

Keywords: Lanaset dyes; Cloud point extraction; Solid-phase extraction; Tergitol NP-7

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