



Determination of polyepoxysuccinic acid in circulating water by spectrometric method

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Received 28 July 2014; Accepted 8 December 2014

ABSTRACT

In this article, a simple and sensitive spectrometric method used for determination of polyepoxysuccinic acid (PESA) in circulating water was investigated. The availability of this method depends on the turbidity formed by PESA and dodecyl dimethyl benzyl ammonium chloride (1,227). In order to obtain the optimal experimental conditions, influencing factors such as dosage of 1,227, pH value, and stabilization time were discussed. Interferences of coexisting substances which may hamper the determination of PESA were also studied. The optimal experimental conditions were as follows: 1,227 concentration of 250 mg L⁻¹, pH range of 9–10, and stabilization time of 30 min. Under these conditions, a better linear relationship between absorbance and concentration was observed within a PESA concentration range of 0–16 mg L⁻¹. It was also demonstrated that foreign ions (i.e. PO₄³⁻, SO₄²⁻, Cl⁻, Fe²⁺) and water quality stabilizers (i.e. 1,2,3-benzotriazole and 1-hydroxy ethylidene-1, 1-diphosphonic acid) had no influences on the determination. In addition, interferences of Ca²⁺ and Mg²⁺ can be eliminated by adding a desired amount of ethylenediamine tetraacetic acid disodium salt. To minimize the influence of sodium hexametaphosphate, a proper amount of HCl was added into the solution, and then it was boiled after mixing. In summary, this method is very simple, concise, and accurate with a lower detection limit, which could provide a theoretical and practical guidance for the determination of PESA.

Keywords: Turbidity; Polyepoxysuccinic acid; Dodecyl dimethyl benzyl ammonium chloride; Spectrophotometry; Circulating water

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