A NITRATE DETERMINATION PROCEDURE BY SOLID PHASE EXTRACTION- SPECTROPHOTOMETRY USING MODIFIED MAGNETITE NANO-PARTICLES

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Abstract

Quality of water and waste water is an important environmental subject which is vigorously under consideration of the world. Estimation of water and waste water qualities is needed to design plants units for improving water treatment process. Nitrate, the most abundant form of inorganic nitrogen, is formed in waste water treatment process during the nitrification step when waste water is aerated [1, 2].

A highly sensitive and selective solid phase extraction (SPE)-spectrophotometric method has been developed for the determination of ultra trace amounts of nitrate. A nitrate reducing short cooperized-cadmium column which reduces nitrate to nitrite, was prepared and manipulated. Two reactions were considered for monitoring of nitrate. Sulfamethazine-nitrite and metoclopramide-nitrite reactions were used to produce diazonium ions that coupled with 1-naphthyl amine and formed highly absorbing azo dyes. The produced azo dyes were extracted from large volumes of aqueous solutions by benzenedodecylsulfonate and dodecylsulfate modified magnetite nano-particles and then were back-extracted to 0.50 mol l-1 sodium sulfite or 0.30 mol l-1 sodium hydroxide solutions and their absorbances were measured as analytical signals. Different affecting parameters were optimized and different calibration curves were constructed. The effects of foreign ions also recoveries and relative standard deviations were evaluated for prepared sample solutions. Conversion efficiency of the Cu-Cd reducing short column was investigated (95.4±1.9 percent) and it was used together with calibration curves for estimation of ng g-1 or ng ml-1 nitrate levels in soils and waters. The obtained results were compared with the results obtained using a standard method.

References:


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