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Use of UV radiation for the sequential injection spectrophotometric determination of NO_x in natural waters

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The use of sequential injection analysis for key nutrient determination in water has been previously described [1]. This method relies on the use of a copperised cadmium column to achieve the required nitrate reduction to nitrite prior to determination, yielding hazardous waste. In this scenario, a greener alternative is proposed for the nitrate reduction by using a UV lamp, aiming to avoid the use of cadmium. The method was based on the colorimetric Griess reaction for nitrite determination, after the UV reduction of nitrate. The reduction was performed inline during the determination of nitrite, with the same protocol sequence. The application to natural waters such as wells, inland bathing waters and rivers, proved to be effective as the results were comparable to those obtained with the reference procedure. Furthermore, a certified reference sample was analyzed, and a 3% relative deviation was observed.

A limit of detection of 25.8 mM was achieved and enabled the nitrate determination in the dynamic range of 30-500 mM with a determination rate of 24 h⁻¹.

References

¹ R. B. R. Mesquita, M. T. S. O. B. Ferreira, R. L. A. Segundo, C. F. C. P. Teixeira, A. A. Bordalo, A. O. S. S. Rangel, *Anal. Methods*, 2009, 1, 195-202.

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