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Greener alternative for the inline nitrate reduction in the sequential injection determination of NOx in natural waters

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The use of sequential injection analysis (SIA) for key nutrient determination in water has been previously described [1]. This method relies on a copperised cadmium column to achieve the required nitrate reduction to nitrite prior to determination, yielding hazardous waste. In this context, we propose a greener alternative for the nitrate reduction using a UV lamp, aiming to avoid the use of cadmium. The developed method, shown in Fig. 1, used 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 achieved results were comparable to those obtained with the reference procedure.

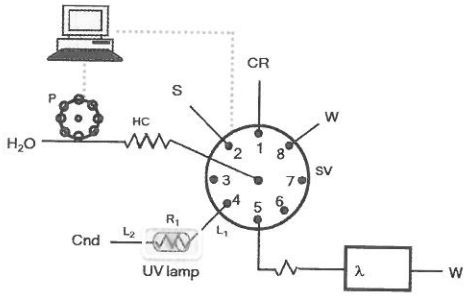

Fig 1. Sequential injection manifold for the determination of nitrate and nitrite; SV, selection valve; P, peristaltic pump; HC, holding coil; CR, colour reagent (20 g/L sulphanilamide, 2 g/L N1NED, in 0.5 M H_3PO_4); S, sample or standard; Cnd, conditioner (20 mM thiosulphate in 1 mM EDTA); W, waste, L_1, coil with 11 cm length; L_2, coil with 100 cm length; R_1, reaction coil with 100 cm length; λ, spectrophotometer at 543 nm.

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