2-Flow injection analysis–solid phase extraction (FIA–SPE) method for preconcentration and determination of trace amounts of penicillins using methylene blue grafted polyurethane foam

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Abstract

A simple, fast, and fully automated FIA–SPE method with UV detection for the preconcentration and determination of the investigated penicillins has been developed. This paper provides adequate procedure for the preconcentration and determination of the studied compounds in pharmaceuticals and milk samples. Penicillins (penicillin G, amoxicillin, and ampicillin) are extracted in a mincolumn packed with methylene blue grafted polyurethane foam (MBGPUF) material. The antibiotics are eluted by hydrochloric acid solution to the flow cell of UV–vis spectrophotometer at 230 nm. The analytes are preconcentrated on the sorbent at pH 8.0–9.5 and sample flow rate 3.0 mL/min. Elution was performed with 200μL 0.2 mol L^{-1} hydrochloric acid at 2mL min^{-1}. Sample throughput is 12 h^{-1} at 120 s preconcentration time. High selectivity of the sorbent for the analytes was achieved at the specified pH range. The enrichment factors achieved are 14, 16, and 11 with 3σ detection limits of 12, 15, and 19 ngmL^{-1} for penicillin G, amoxicillin and ampicillin, respectively. The method was successfully applied to the determination of these antibiotics in pharmaceutical control and contaminated milk samples with RSD≤8.8%.
