

Introduction a new preconcentration method termed rotative liquid-liquid microextraction for the determination of pharmaceutical products by fiber optic-linear array detection spectrophotometry

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Background and Aims: A new and fast solvent microextraction technique termed rotative liquid-liquid microextraction (RLLME) has been introduced and the applicability of this technique was evaluated by the determination of cobalt in pharmaceutical products such as Centrum capsule as a nutritive supplement.

Methods: According to RLLME, microvolumes (140 μL) of a high density extractant organic solvent were added into the aqueous sample (5 mL). Afterwards, the test tube contents were rotated around a fixed z axis. Due to different viscosity and density of the organic phase and sample solution, the aqueous phase was rotated with higher velocity over the organic solvent. So, the microextraction was performed by increasing the number of collisions per unit time between two phases. After microextraction, the organic phase was settled to the conical-bottom of the glass test tube. Finally, analysis was carried out by fiber optic-linear array detection spectrophotometry (FO-LADS).

Results: In order to achieve a high recovery and enrichment factor, type and amount of organic solvent, rotation conditions and the other parameters were optimized. Under the optimum conditions, the preconcentration time was 30 s, the recovery was 102%, the calculated calibration curves gave high levels of correlation coefficients (r^2) greater than 0.99 the limit of detection (LOD) of the method was 0.12 ng mL⁻¹ and the relative standard deviation (R.S.D.) was 1.9 %.

Conclusions: A simple, rapid and inexpensive preconcentration technique was introduced and coupled with FO-LADS for the determination of cobalt in pharmaceutical products. The proposed method provides good repeatability, recovery and adaptability to field sampling and automation. It is hoped that the proposed method could be successfully utilized to Pharmaceutical Analysis and Quality Assurance in Pharmaceutical Laboratories.

Keywords: Preconcentration; Rotative liquid-liquid microextraction; Fiber optic-linear array detection spectrophotometry; Pharmaceutical products