



Development of hydrodynamic sequential injection system for online liquid-liquid extraction using mobile phone as the detector

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A cost-effective hydrodynamic sequential injection (HSI) setup which is portable and low chemical consumption was developed for online liquid-liquid extraction process. Based on hydrodynamic injection principle, various solutions could be inserted into the well-defined length of conduit with hydrodynamic pressure while the stream of carrier was halted. Standard or sample was injected into a reagent stream to form a less polar ion-association compound in aqueous phase before merging with organic solvent (CH_2Cl_2) to produce tiny segments of aqueous and organic phases alternately. The extraction occurred at the interface of the two phases while they were flowing through an extraction coil to be collected and separated the phases in a test tube. The test tube was contained in a home-made RGB (red, green, blue) color detection box using a mobile phone as a detector to monitor the color of organic phase. The RGB signals were assessed via the costless downloadable application to obtain RGB values for plotting the calibration curve. The system has been successfully demonstrated for the determination of iron and anionic surfactant in synthetic samples based on 1,10-phenanthroline and methylene blue method, respectively, under the preliminary studied suitable conditions; such reagent concentrations, extraction time and the ratio of aqueous and organic phases.

Keywords: Hydrodynamic sequential injection; Liquid-liquid extraction; Mobile phone