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**A simple and green deep eutectic solvent based air assisted liquid phase microextraction for separation, preconcentration and determination of lead in water and food samples by graphite furnace atomic absorption spectrometry**

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**Abstract**

In this study, an air assisted liquid phase microextraction based on deep eutectic solvent (AA-DES-LPME) method was developed for separation, preconcentration and determination of lead followed by graphite furnace atomic absorption spectrometry (GFAAS). The complexation of Pb(II) was carried out by using 4-(2-thiazolylazo) resorcinol as complexing agent at pH 6. Deep eutectic solvent was prepared by using choline chloride phenol (ChCl-Ph) and was added to an aqueous solution containing analyte, and then mixture was sucked up and injected nine times with the help of a syringe, and a cloudy state was attained. After extraction, the solution was centrifuged and upper layer was separated and Pb(II) ions was determined by GFAAS. Different parameters were investigated and optimized including pH, volume and type of DES, effect of ligand volume, effect of pulling and pushing cycles. Under optimum conditions, the detection limit, limit of quantitation were observed as 0.60 ng L<sup>-1</sup> and 1.98 ng L<sup>-1</sup>, respectively. Preconcentration factor (PF) and relative standard deviation (RSD) were found to be 60 and 2.9 %, respectively. Certified reference materials (CRMs) were used to check the accuracy of

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