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Atomic Absorption Spectrometric Determination of Lead after Extraction and Preconcentration with 5-Br-PADAP

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ABSTRACT: Lead is quantitatively retained on 2-(5-bromo-2-pyridylazo)-5-diethylamminophenol (5-Br-PADAP) -ammonium tetraphenylborate with microcrystalline naphthalene or by a column method in the pH range 4.0-6.0 from a large volume of aqueous solutions of various samples with preconcentration factor of 60. After filtration, the solid mass consisting of the lead complex and naphthalene was dissolved with 5 mL of dimethylformamide and the metal was determined by atomic absorption spectrometry. The calibration curve is linear in the range of 1.9-180 $\mu\text{g/mL}$ in DMF with a relative standard deviation of 1.7%. The interference of a large number of anions and cations has been studied.

KEY WORDS: Trace lead determination, 2-(5-Bromo-2-pyridylazo)-5-diethylamminophenol, Atomic absorption spectrometry, Alloys and biological samples

INTRODUCTION

Lead is the most important element which affect the physical properties of steel, alloys and high purity metals. It is highly toxic to man and animals and causes environmental disease when released in the atmosphere. Very low concentrations (about $\mu\text{g/mL}$) of this metal are normally present in various matrices such as plants, soils, food and water. Therefore, it is very important from an analytical point of view to develop sensitive, selective, rapid and economical method for its quantitative determination when present in trace amounts. Spectrophotometric methods are simple and economical but are not

sufficiently sensitive and selective [1,2]. Graphite furnace atomic absorption spectroscopy, neutron activation analysis, inductively coupled plasma-atomic emission spectroscopy, inductively coupled plasma-mass spectrometry and direct current plasma atomic emission spectrometry may be used for the determination of lead at trace level [3-8] but these instruments are expensive, day-to-day maintenance is high and they are not free from various types of inherent interferences [3-8].

Sodium tetraphenylborate (TPB) and its derivatives have been used in the estimation of alkali and univalent