PRECONCENTRATION AND DETERMINATION OF CADMIUM IN WATER

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Cadmium in water was preconcentrated by adsorption on activated carbon after complexation with potassium ethyl xanthate. The recovery was >90% in the concentration range 10 μg l⁻¹ to 500 μg l⁻¹ with an enrichment factor of 1000. The method was employed for the analysis of cadmium in spiked water samples, by NAA and AAS. The standard deviation and relative mean error was 0.062 and 0.015, respectively.

INTRODUCTION

Cadmium is toxic to living beings. Because of extremely low concentration of the metal in water a preliminary concentration step is usually necessary for its estimation. Activated carbon in combination with various chelating agents¹⁻⁴ have been employed for the preconcentration of trace metals. In the present study cadmium was enriched on activated carbon after complexation with potassium ethyl xanthate. The procedure is simple, fast, sensitive and inexpensive.
EXPERIMENTAL

Materials and methods

All reagents used were of analytical grade. Potassium ethyl xanthate was synthesized and purified. Activated carbon (SDS'AR) was treated with concentrated HF and HCl, washed with water and dried at 110 °C to remove any trace elements.

Standard cadmium metal ion solution was prepared by dissolution of 1 g of metal (SRL AR) in HNO₃ and the solution was diluted to one litre with double distilled water. This solution was further diluted to obtain the required concentration.

A 0.4% aqueous potassium ethyl xanthate solution was prepared and stored in amber colored bottle. ¹¹⁵Cd tracer solution (supplied by Isotope Division, Bhabha Atomic Research Centre, Bombay) was prepared in nitric acid medium. For tracer method standards (10 µg to 100 µg) were prepared by drying an aliquot of ¹¹⁵Cd tracer solution absorbed on filter paper under IR lamp and mounted for counting. In the case of NAA an aliquot of standard cadmium solution was adsorbed on filter paper, dried under IR lamp and triply sealed in polythene. Metal determination was carried out by γ-counting using a Ge(Li) detector.

Neutron activation was carried out in Apsara reactor Bhabha Atomic Research Centre, Bombay in a neutron flux 1x10¹² n cm⁻² sec⁻¹.

PERKIN-ELMER 2380 atomic absorption spectrophotometer was employed for atomic absorption studies.