

## البحث الثاني (2)

**Title: “Determination of radium in water by gamma spectrometry using commercial cation exchange resins: comparison and validation”**

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### المخلص باللغة الإنجليزية

A series of laboratory tests have been conducted to evaluate the quantitative retention of  $^{226}\text{Ra}$  by three different strong cation exchange resins under varying conditions. The influence of the maximum flow rate, which could be obtained with the extraction chromatography columns, was tested. The *Radium Selective Complexer* (RSC) showed a relatively higher adsorption capacity for radium with an average  $^{226}\text{Ra}$  recovery of 96.4%. The effect of increasing the amounts of the competing Ca and Mg ions on the uptake of  $^{226}\text{Ra}$  by the three types of resins has been evaluated. The Purolite resin showed a relatively higher adsorption capacity for radium in water samples that have Ca and Mg ions as high as 3000 mg/L. The average radium recovery achieved by the Purolite resin was 90.7%. The influence of Iron (III) on the recovery of radium using the three types of resins was significant. The maximum  $^{226}\text{Ra}$  recovery obtained was 89.9% using the Purolite resin. A groundwater sample was analyzed for  $^{226}\text{Ra}$  and measured by gamma spectrometry using the three types of resins, and also analyzed by alpha spectrometry and a radon detector (RAD-7) for comparison. The recoveries of  $^{226}\text{Ra}$  achieved by the three types of resins were comparable, and the results of comparison with the different techniques were very encouraging for the use of such

water softener resins in the extraction of radium isotopes from large number of groundwater samples, when rapid and inexpensive method is needed.