Advances in Isotopic Separation by Ion Chromatography and External Scintillation Analysis

Anna Ljungfalk
Ringhals AB, Sweden

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Background

Why is nuclide specific measurements performed?

- **A nuclear power plant daily gives a small contribusion of radioactivity to our environment.**

- **The regulatory Authorities put strict limitations on the amount of releasad activity, and continuos nuclide specific measurements is therefore performed on emissions.**

Background

Today , nuclear power plants usually perform the separation of “difficult to measure nuclides” (e.g. Sr-90, Ni-63) by conventional ion exchange techniques.

- **Time demanding**
- **A lot of work with unhealthy chemicals**

Purpose

The purpose with this project has been:

- **To obtain a less time demanding method for pre-concentration and separation of “difficult to measure nuclides”.**
- **Exclude most of the work with unhealthy chemicals.**

The pre-concentration and separation is performed on a HPIC (High Performance Ion Chromatography)

LSC is used for activity determination

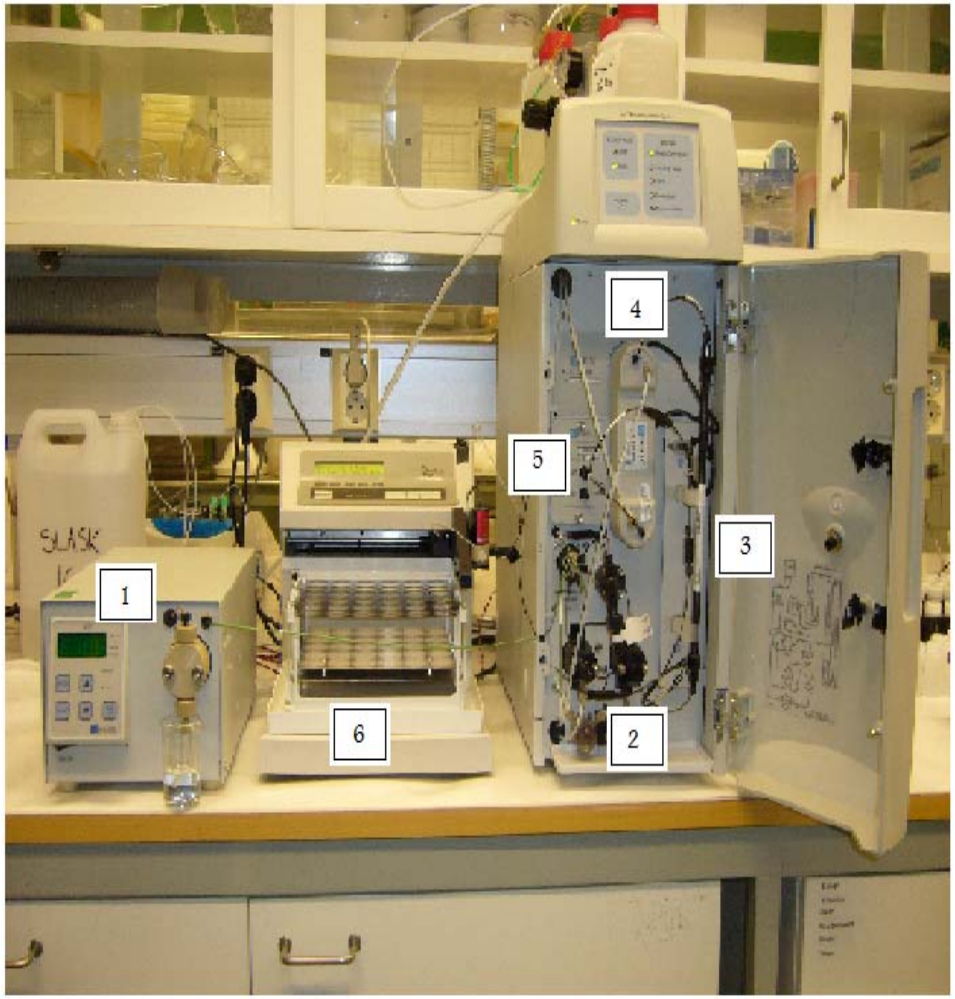
pre-concentration and separation with HPIC

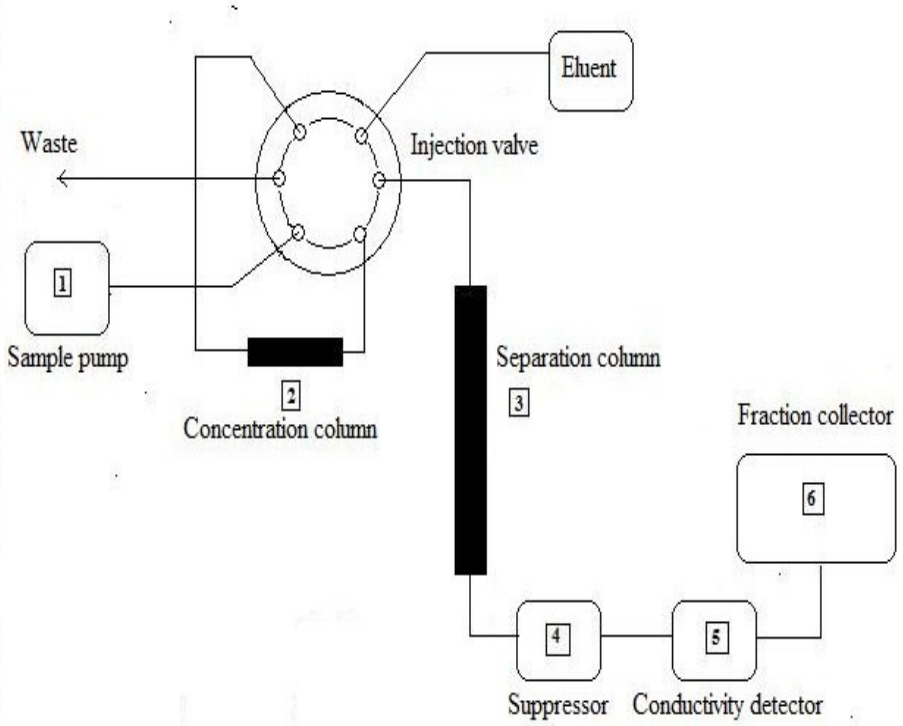
Method for Sr-90:	Concentrator column:	Dionex guard column CG12A
	Separation column:	Dionex cation column CS12A
	Eluent:	20 mM MSA
	Eluent flow rate:	1ml/min
Method for Ni-63:	Concentrator column:	Dionex guard column CG5A
	Separation column:	Dionex cation column CS5A
	Eluent:	7 mM PDCA
	Eluent flow rate:	1ml/min
Software:	Chromeleon	

pre-concentration and separation with HPIC

The function of the concentrator column in these applications is to strip ions from a measured volume of a relatively clean aqueous sample matrix. This process concentrate all cationic analyte species onto the concentrator column leading to volume concentrated.

pre-concentration and separation with HPIC





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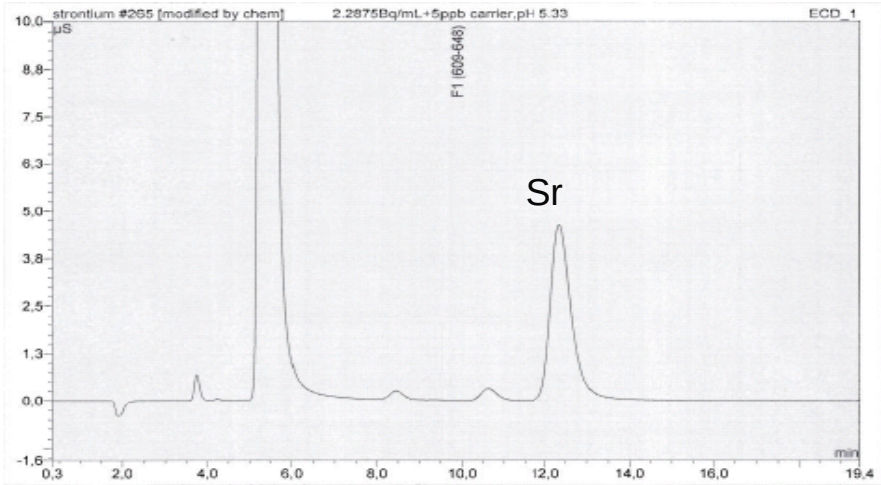
Results

Sr-90:

Retention time: 12 min

Yield: 89 %

Procedure time: Few hours



Ni-63:

Retention time: 6 min

Yield: 95 %

Procedure time: Few hours

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Conclusion

- Analysis time is reduced
- Economical
- The use of Chemical products is minimized
- Simple and fast

Thank you!

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