Introduction

The U.S. Transuranium & Uranium Registries (USTUR) study the uptake, translocation and biokinetics of actinides (U, Pu and Am) in humans. Currently α-spectrometry is the primary method for analysis of Pu and Am in human autopsy tissues. However for environmental samples, inductively coupled plasma mass spectrometry (ICP-MS) is now a well established technique for environmental samples, inductively coupled plasma mass spectrometry (ICP-MS) is now a well established technique for analysis of Pu and Am in biological samples from occupationally exposed individuals by the ICP-MS technique, and compare the results with α-spectrometry.

Materials and Methods

Instrumentation

• Sector field ICP-MS @NAU

• α-spectrometry @USTUR

Samples

Fourteen digested samples (6 bones and 8 soft tissues from USTUR Cases 0269, 0425 and 0720) were analyzed for Pu/Am by ICP-MS at NAU. One sample was included as a blind-duplicate.

Results and Discussion

Pu/Am separation procedures for ICP-MS

Fig. 1 Developed procedure for Pu/Am determination with SF-ICP-MS

Figures of merit for SF-ICP-MS

• Limit of detection (LOD, 6

α-spectrometry measurements for

Pu and Am analysis in human bones and soft tissues

Table 3. Results of analysis of 239+240Pu, 241Pu, 241Am and Am with SF-ICP-MS and α-spectrometry

Conclusions

• This study confirmed the suitability of ICP-MS for the analysis of 239+240Pu

• PU/Am separation procedures for ICP-MS

• Figures of merit for SF-ICP-MS

• Benchmark of SF-ICP-MS vs α-spectrometry

References
