

Measurement of Uranium Isotope Ratios in Undigested Urine

Apex Q



Sample Prep Method

U Ratio in Urine*

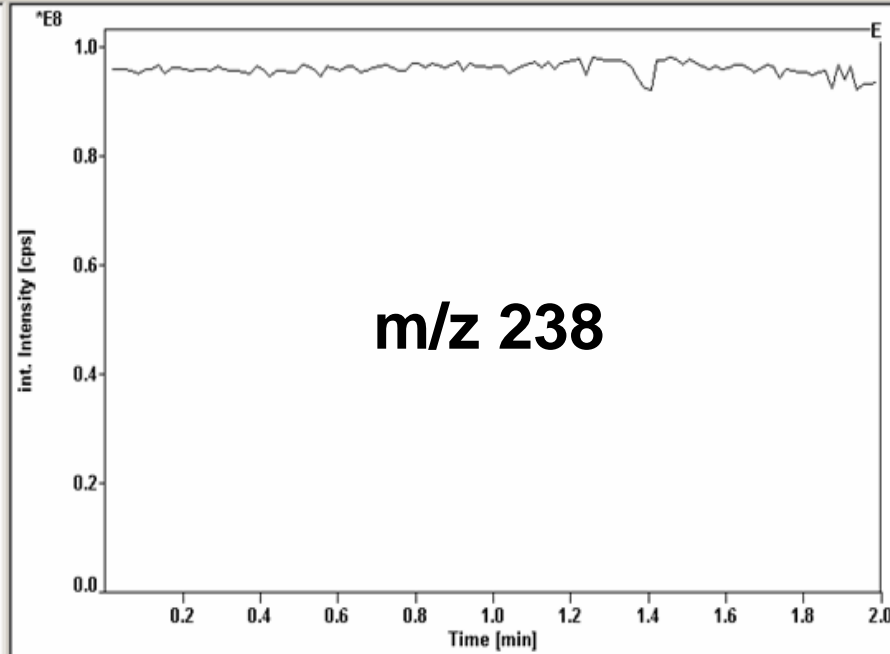
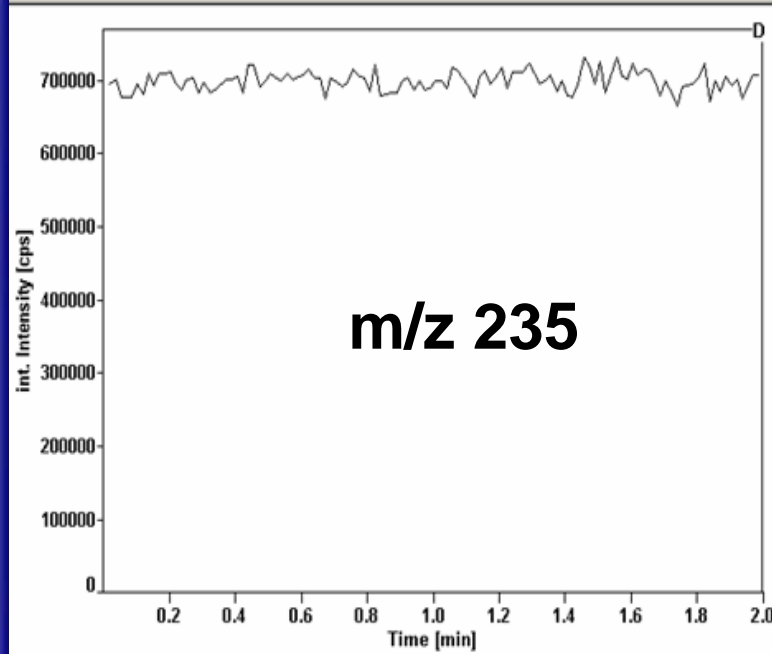
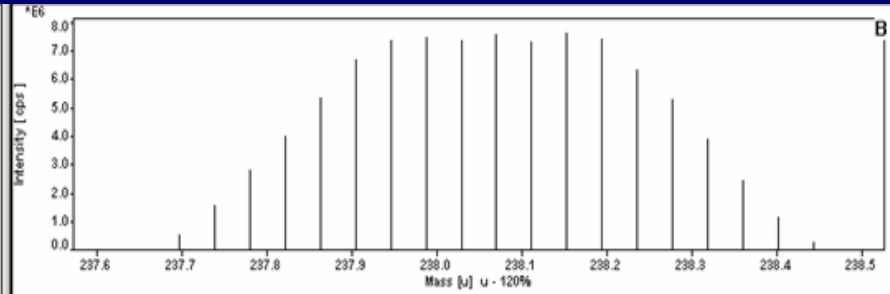
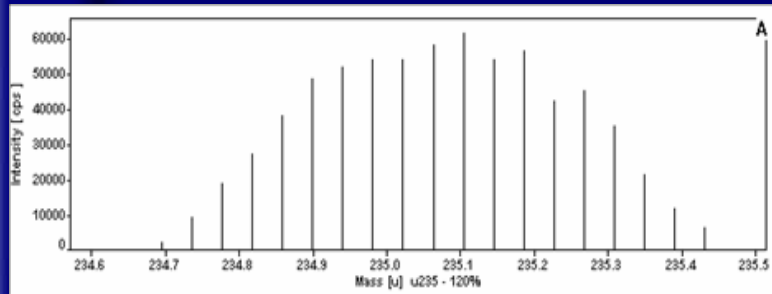
- 100 μL urine diluted 1:10
- Final solution 15% H_2O_2 , 1% HNO_3
- 0.1% surfactant (self-aspirating nebulizer)
- Uranium concentration as analyzed typically few ppt
- Directly nebulized using Apex-PFA-100 nebulizer
- Deviation from CDC method:
 - Apex connected directly to ICP torch.
 - Mass Shift applied

***Based on method of Bill Ting CDC**

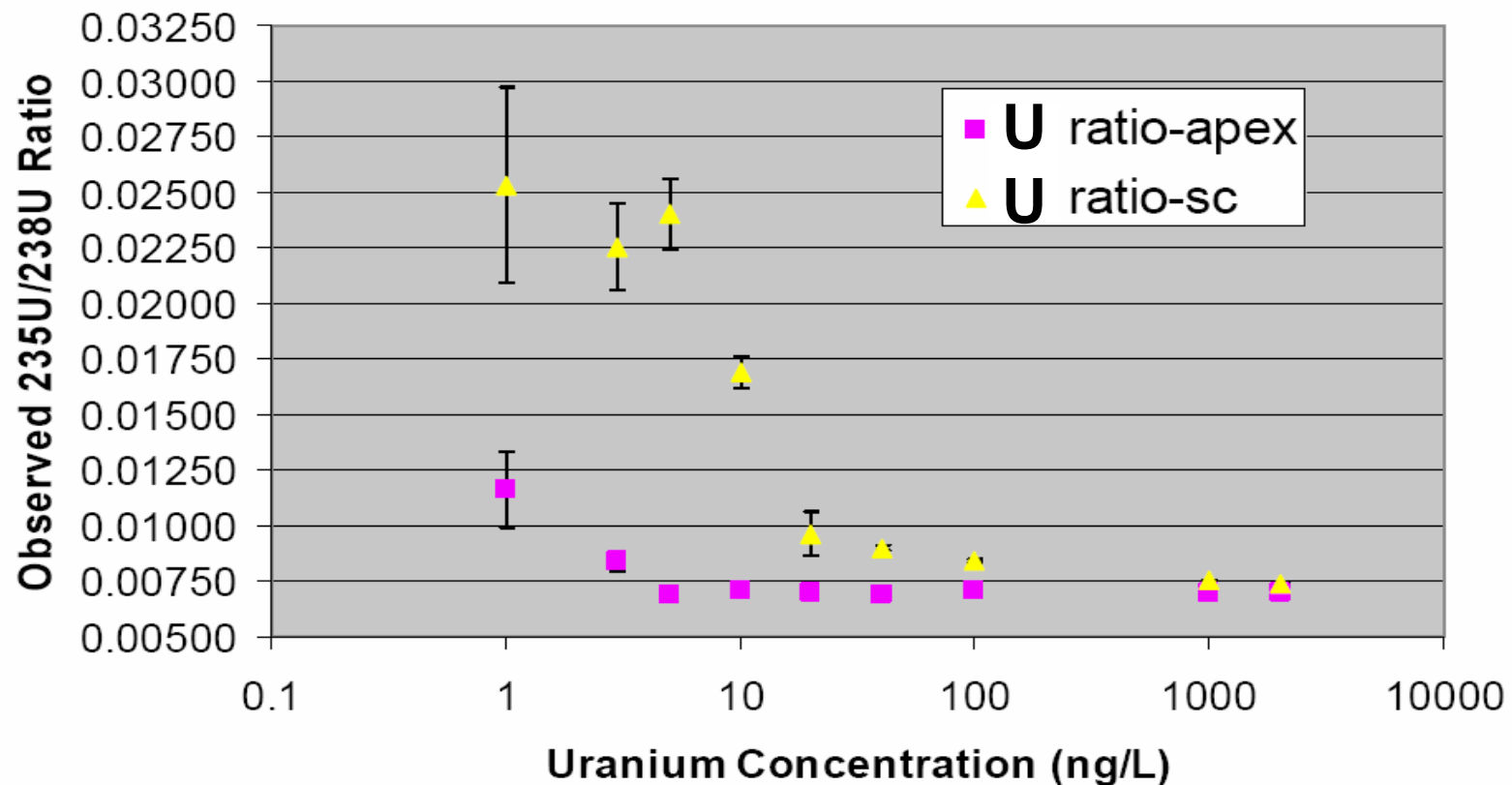


Apex Q

1 ppb Uranium spike in Urine



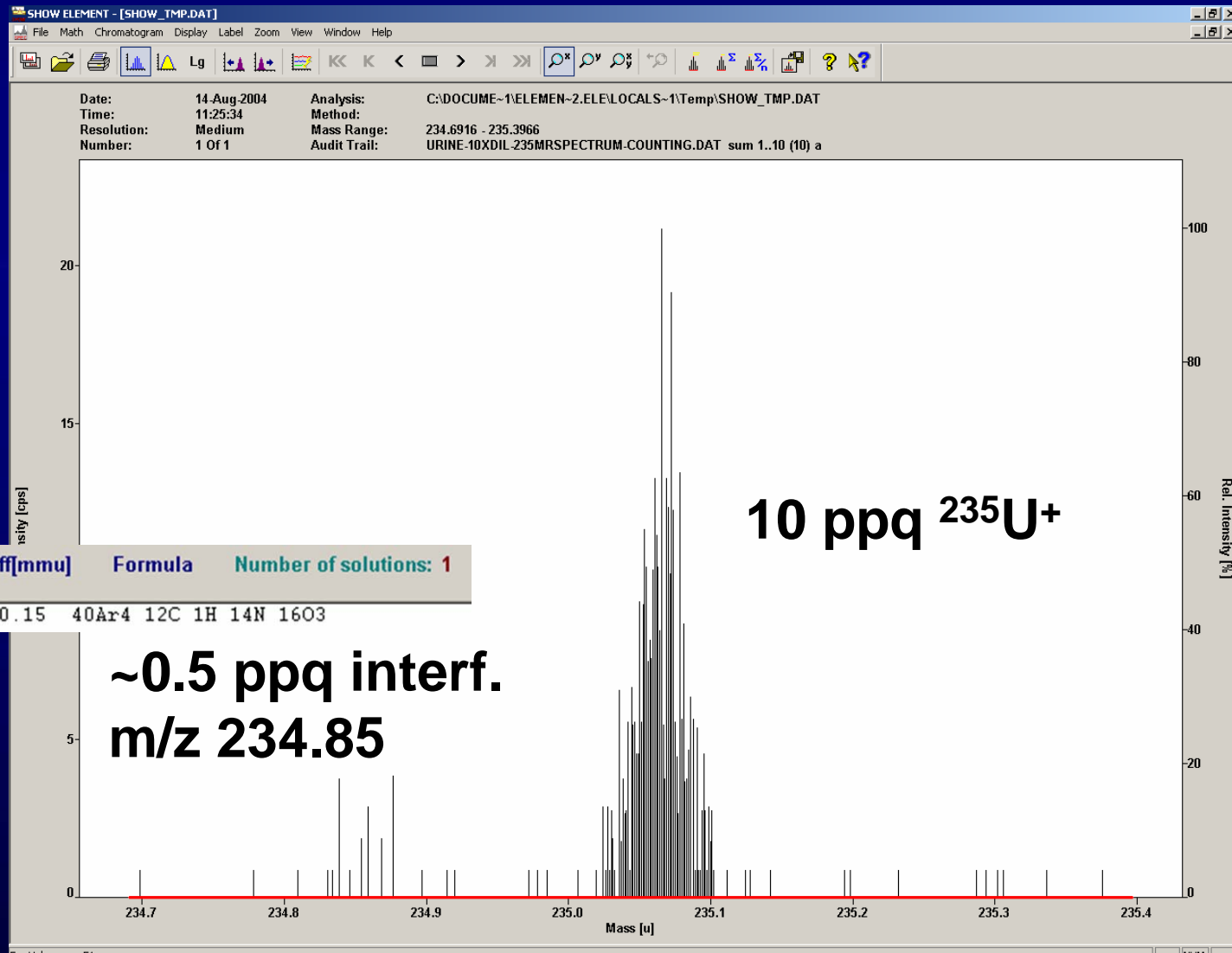
$^{235}\text{U}/^{238}\text{U}$ Measurement in Urine using Apex Q vs. Quartz Spray Chamber*



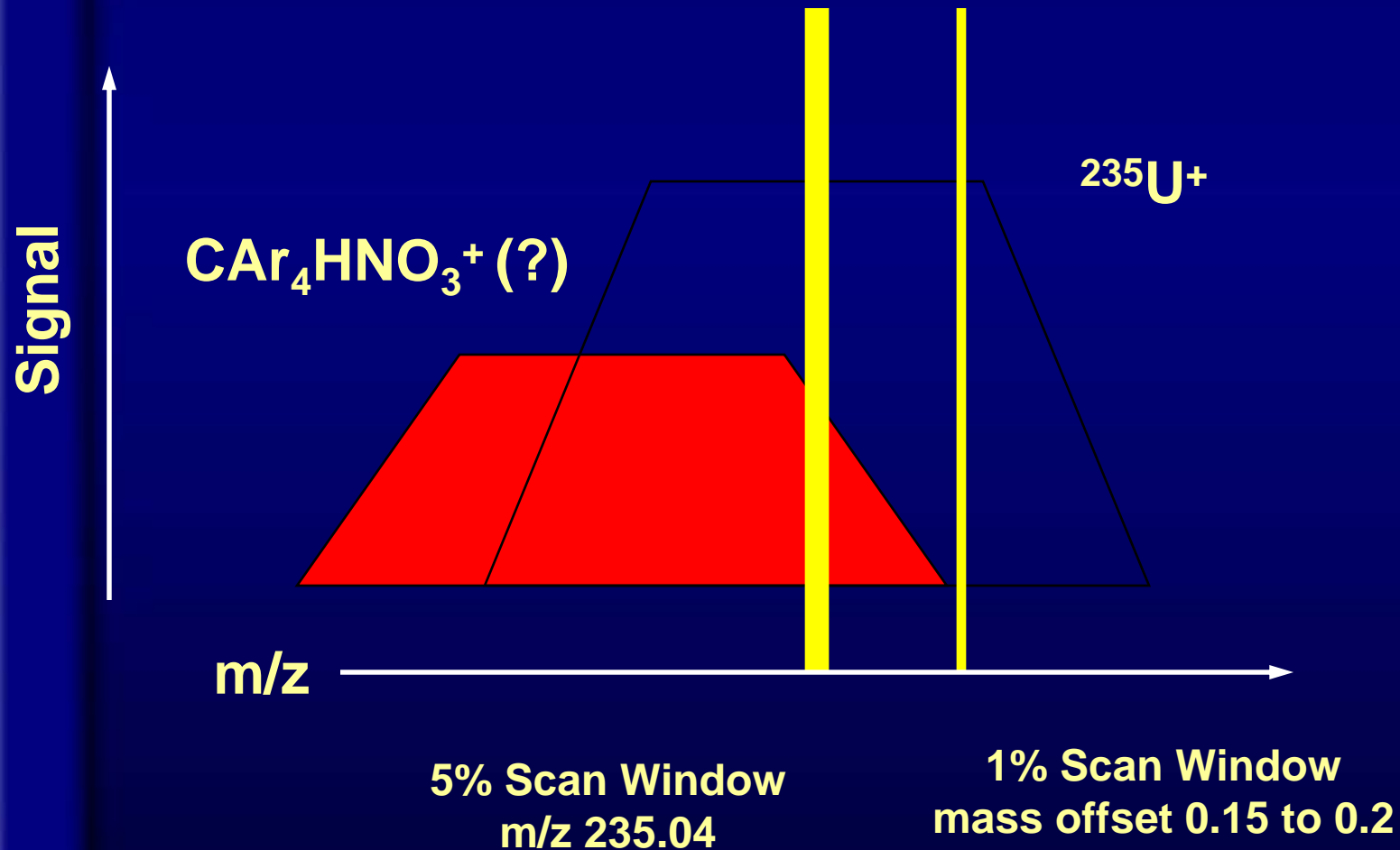
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MR ^{235}U Spectrum in Urine



LR Mass Offset Eliminates Interference



ELEMENT2 Measurement Conditions

Method Data		Interference Correction		Quality Control										
Entry	Locked	Isotope	Accurate Mass	Method Mass Offset	Mass Window	Mass Range	Sample Time	Samples Per Peak	Integration Window	Scan Type	Detection Mode	Acqu Points	Internal Standard	Peak Shift
1	No	U235	235.0434	0.1500	1	235.039 - 235.047	0.5000	500	80	EScan	Counting	10		1.0
2	No	U238	238.0502	0.1500	1	238.046 - 238.054	0.0500	500	80	EScan	Counting	10		1.0
3		U235/U23												

Estimated Time X

Time per Pass [min:sec:ms]	Time per Res. [h:min:sec]
Low Res.: 00 : 03 : 251	Low Res.: 00 : 02 : 43
Med. Res.: 00 : 25 : 300	Med. Res.: 00 : 00 : 25
High Res.: 00 : 00 : 000	High Res.: 00 : 00 : 00
Total [h:min:sec]: 00 : 03 : 10	
<input type="button" value="OK"/>	



$^{235}\text{U}/^{238}\text{U}$ Ratio 10x Diluted Urine 3 ppt total U

$^{235}\text{U}:\text{:}^{238}\text{U}$

0.008061

On-center

0.007409

Mass Offset 0.1

0.007295 ± 0.000064

Mass Offset 0.15

0.007253 reference $^{235}/^{238}$

