

Status of the International Reference System

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Since the last CCRI meeting in May 1999 the laboratories have continued to provide the SIR with an increasing number of radionuclides. In parallel with regular submissions ampoules distributed to participants in CCRI(II) international comparisons have been measured allowing the inclusion of the results of these comparisons in the SIR data base.

In particular cases i.e. ^{177}Lu and ^{89}Sr special care was taken to determine the presence of potential impurities and to quantify them with precision by means of Ge spectrometers. The contribution of bremsstrahlung to the response of the ionization chamber has been also investigated. In addition a careful analysis was carried out to characterize more fully the efficiency curve of the ionization chamber.

Two ampoules filled with radioactive gas (^{133}Xe and ^{222}Rn) have been measured. It was also the first attempt to measure ^{222}Rn . Short-lived radionuclides, ^{131}I ($T_{1/2} = 8.021(0.001)$ d), ^{133}Xe ($T_{1/2} = 5.243(0.001)$ d), ^{177}Lu ($T_{1/2} = 6.648(0.010)$ d), ^{201}Tl ($T_{1/2} = 3.044(0.009)$ d) and ^{222}Rn ($T_{1/2} = 3.8235(0.0003)$ d) have also been measured successfully.

ININ has participated for the first time.

The following table summarises number and type of the measured radionuclides as well as the names of the laboratories which provided them.

Radionuclides	Number of ampoules measured	Laboratories	Number of independent	Total number of results in the SIR
^{51}Cr	1+2	NIST, BNM-LNHB	2 ¹	22
^{54}Mn	1+1	BNM-LNHB, LNMRI	2	25
^{57}Co	1+1+1	BNM-LNHB, IRA, NIST	2+1 ¹	34
^{58}Co	1+1	AIST, LNMRI	2	11
^{60}Co	1+1 1+1+1 1	OMH, BNM-LNHB, CIEMAT, NPL, IRA, BARC	6	39
^{65}Zn	1+1	NIST, BNM-LNHB	1 ¹ +1	14
^{88}Y	1+1+1	ČMI-IIR, PTB, AIST	3	24
^{109}Cd	1	IRA	1	15
$^{110}\text{Ag}^{\text{m}}$	1	OMH	1	4
^{131}I	1	LNMRI	1	26
^{133}Xe	1	NIST	1	5
^{137}Cs	2+1	NIM, IRA	2	26
^{139}Ce	1+1	PTB, IRA	2	17
^{141}Ce	1	NIST	1 ¹	5
^{152}Eu	1+1	LNMRI, ININ	2	15
^{153}Sm	1+1	NPL, ANSTO	2	3
^{177}Lu	1+1	PTB, NIST	2	2
^{201}Tl	1	NIST	1 ¹	11
^{222}Rn	1	IRA	1	1
Total				
	19	39	14	37

In addition 30 ampoules prepared for the international comparison of ^{152}Eu and six ampoules of ^{89}Sr of higher

¹ Final result awaited

activity (about 110 times higher than the solution delivered for the international comparison) have also been measured. This represents a total of 73 ampoules measured in the period concerned.

The next table lists the laboratories with their contributions.

Laboratory	Number of ampoules
ANSTO	1
BARC	1
BNM-LNHB	6
CIEMAT	1
ČMI-IIR	1
AIST	2
ININ	1
IRA	6
LNMRI	4
NIM	2
NIST	7
NPL	2
OMH	2
PTB	3 + (30 [*] + 6 ^{**})

* ampoules of ¹⁵²Eu

** ampoules of ⁸⁹Sr

With the inclusions of these contributions :

1. the number of National Metrology Institutes which have participated at least once is now 31,
2. the number of radionuclides measured is 59,
3. the number of ampoules measured is now 800, not including the ampoules of ¹⁵²Eu and ⁸⁹Sr prepared for the international comparisons,
4. the number of independent results is now 571.