1. Introduction


The paper presents RML’s actions and results.

2. Development of installations and methods for the primary/absolute standardization of radionuclides, internationally validated, through key or supplementary BIPM comparisons. RML’s results are part of the Key Comparison Data Base (KCCDB) Annex B of the CIPM – MRA and ISBN 978-953-307-802-1.

3. Conclusions

(a) The dial setting modification was done for two old calibrators Picker. For old Curiementor 2 and 3 calibrators, a corrective factor \( \text{Cf} \) was recommended.

(b) For the Curiementor calibration, \( \text{Cf} \) was calculated for different radionuclides and the results were compared with the reference value.

4. Support of RML to the nuclear medicine: delivery of radioactive standards and metrology services

The RML prepares all kinds of radioactive standards for medicine. The most important operation is the calibration of the Radionuclide Calibrators, the legal metrological check was mandatory only until 2010. Therefore, standards of national calibrations on \( \text{I} \), \( \text{Co} \) and \( \text{Tc} \) were organized. The last ones \( \text{Tc} \) were organized within the frame of the IAEA – CRP E2.10.05: "Harmonization of quality practices for nuclear medicine radioactivity measurements" Olosovcova, V., Iwahara, A. Sahagia, M., Zimmerman, B. (2010) National Comparisons of 131I measurement among nuclear medicine clinics of five countries. Appl. Radiat. Isot. 68, 1371 – 1377.

4.1 Calibration operations to be performed.

(i) Measurement of the background indication and decontamination, if necessary.

(ii) Preparation and measurement of standards: solution, gelatin \( \text{I} \) capsules.

(iii) Calibration - Measurement of the standards with the radionuclide calibrator. Two situations can occur:

(a) The difference from reference activity is higher than \( \pm 10 \% \) and the calibration factor (dial setting) is modified, or the correction factor for result is written in the certificate.

(b) The obtained value differs from reference by less than \( \pm 10 \% \); both values are written in the calibration certificate.

4.2 Results obtained in calibration.

(a) The dial setting modification was done for two old calibrators Picker. For old Curiementor 2 and 3 calibrators, a corrective factor \( \text{Cf} = (1.15 \pm 0.03) \) was recommended.

The mean for cases differences less than \( \pm 10 \% \) to the cases Table 1, for the main types of calibrators.

<table>
<thead>
<tr>
<th>Type of calibrator</th>
<th>Mean ratios</th>
<th>Mean</th>
<th>Mean</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>R = A_{\text{meas}} / A_{\text{ref}}</td>
<td>R = \text{Tc}</td>
<td>0.964 ± 0.022</td>
<td>0.973 ± 0.008</td>
<td>1.031 ± 0.001</td>
</tr>
<tr>
<td>Mean Curiementor 3</td>
<td>0.993 ± 0.006</td>
<td>1.009 ± 0.034</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Picker and Picker MicroCal</td>
<td>0.978 ± 0.032</td>
<td>0.995 ± 0.023</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Conclusions

This paper presents the support given by the RML, IFIN-HH, to the Romanian units in nuclear medicine, for ensuring the full metrological traceability chain, from the SI up to the end users, nuclear medicine units.

The most relevant direct support consists in the calibration of radionuclide calibrators.

- Every operation was amplified in volume.
- New, high quality, instruments were purchased by the nuclear medicine units.
- The majority of calibrators’ indication differs by \( < 5 \% \) from the reference; the erroneous results obtained in comparisons are mainly due to the human errors in measurement.

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