Summary of work in Radionuclide Field at LNMRI
1999/2000

The Radionuclide Division DIMET/LNMRI, has, as the main activities, the direct standardization of activity, the determination of nuclear decay data and the reference materials study. A summary of its activities will follow:

1- New Measurement System

- Liquid scintillation system / Wallac 1414
- Ionization chamber / IG12 CENTRONIC 2MPa (Nitrogen)

2- Radionuclide Standardization

- Coincidence counting method: ^{54}Mn, ^{58}Co, ^{123}I, ^{152}Eu, ^{166m}Ho, ^{169}Yb.
- CIEMAT / NIST method : ^{89}Sr, ^{14}C, ^{55}Fe, ^{60}Co, ^{99m}Tc, ^{123}I, ^{131}I, ^{67}Ga, ^{204}Tl.

3-Traceability Program

a- National Level

Radiopharmaceutical

The LNMRI have been performing traceability program by means of intercomparison runs with hospitals comprising the following radionuclides: ^{131}I, ^{99m}Tc and ^{123}I. This program started regionally with hospitals placed at Rio de Janeiro and surroundings. After that, it was extended to the whole country.

Low Level Activity

Comparisons of low level activity sources of alpha, beta and gamma emitters with twenty laboratories. Matrix mensured were, air filter, soil, vegetation and water.

b- Key comparisons

- BIPM: ^{152}Eu, ^{89}Sr
- Submissions to SIR: ^{54}Mn, ^{58}Co, ^{131}I, ^{152}Eu.
- Euromet: ^{169}Yb
- APMP: ^{58}Co, ^{88}Y, ^{166m}Ho

4- Study of Nuclear Decay Data

- Determination measurements of photon emission probabilities of ^{169}Yb, ^{166m}Ho, ^{226}Ra
- Half-life measurement : ^{58}Co, ^{169}Yb

5- Services

Routine of calibration of twenty five radionuclide for supplying to the governmental institutes, universities and industries.

6- Scientific Visit

- Dr. B. Coursey from NIST, for evaluation of program of nuclear medicine
- Dr. J. Los Arcos from CIEMAT-SPAIN, to help in the implementation of the CIEMAT/NIST liquid scintillation method

7- Scientific Cooperation

- LNHB in the field of radionuclide measurement

Publications:

J. S. Loureiro, P. A. L Cruz, L. Tauhata and R. N. Alves, "Standardzation of ^{3}H, ^{14}C, ^{55}Fe, ^{60}Co and ^{204}Tl by Ciemat/Nist Method in Liquid Scintillation", published in Metrologia 2000, Proceeding of the II Brazilian Congress of Metrology, Brazil (4-7 December) 2000.

C. J. da Silva, L. Tauhata, A. Iwahara, R. Poledna, J.U. Delgado, R. N. Alves,"Absolute standardization of a ^{58}Co solution using the $4\pi\beta$-γ coincidence method with germanium detector, published in Metrologia 2000, Proceeding of the II Brazilian Congress of Metrology, Brazil (4-7 December) 2000.

D. C. de Barros, R. Poledna, L. Tauhata, J. U. Delgado, G. M. Sigaud, Implementation of $4\pi\gamma$ calibration system, with well type NaI(Tl) for radionuclides with complex decay scheme. published in Metrologia 2000, Proceeding of the II Brazilian Congress of Metrology, Brazil (4-7 December) 2000.

E. M. B. de Oliveira, J.U. Delgado, C. J. da Silva, L. Tauhata, A. Iwahara, R. Poledna, A. Holmium-166m: A multi-gamma standard for Ge spectrometers, published in Metrologia 2000, Proceeding of the II Brazilian Congress of Metrology, Brazil (4-7 December) 2000.

A Iwahara, J.U. Delgado, , R. Poledna, C. J. da Silva, R.T. Lopes, "Absolute measurements of γ–ray emission probabilities of ^{169}Yb", Nucl. Instr. Meth. Phys. Res.A455 (2000)pp. 607-611

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