

## Activimeter Response Behaviour Analysis Related to Well Depth

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**Abstract.** The activimeter, instrument used to radionuclide activity measure, consist primarily of a well type ionization chamber coupled to a special electronic device. Its response, after calibration, is shown in units of the activity quantity (Becquerel or Curie). It also has a special holder designed to accommodate all kinds of syringes and vials containing the radiopharmaceuticals. Many factors influence the response of an activimeter such as the volume of the sample, its position inside the activimeter well and the geometry of the vials. The idea of this study is to find the better position inside the well to get the best activity values, positioning the holder in different profundity, simulating a clinical procedure. The reference activimeter used was the Secondary Standard NPL-CRC radionuclide calibrator, traceable to the National Physical Laboratory (NPL), England, taking as reference the depth of 400 mm. Two other activimeters were tested: Capintec, CRC-15BT model with the depth of 170 mm and one CRC-25R model with depth of 257 mm. They all belong to the Instrument Calibration Laboratory of IPEN, São Paulo, Brazil. The measurements were made using three radioactive check sources: Co-57, Ba-133 and Cs-137. Sources readings were taken at various depths inside the ionization chamber well. The results shown maximum variation of 14.28% for Co-57, 11.27% to Ba-133 and 8.8% to Cs-137. All measurements were compared with those values found for the reference depth in each activimeter. The variation found show the necessity of include this kind of determination in all quality control programs that are applied to an activimeter used by a Nuclear Medicine Service