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VERIFICATION OF RADIOACTIVE CONTAMINATION SURVEYS FOR PRACTICAL USE IN BIOLOGICAL RESEARCH CENTRES

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Unsealed sources are commonly used in science research laboratories. Their manipulation may imply a radioactive contamination hazard. Therefore, adequate and sensitive survey meters must be available, and must have an effective and accurate response to intensity and type of radiation emitted by the used radionuclides to identify and quantify the possible contamination and then be able to avoid any associated or unwanted consequences that may arise.

Periodic surveys are performed to show control, any time, any place radioactive contamination is suspected, and to ensure radioisotopes are being used safely. The immediate work areas must be often checked with portable survey monitors, including the entire lab and particularly bench tops, personnel protective equipment or solely designated equipment for isotope use (microfuges, water baths, incubators). These are carried out with portable survey instruments like Geyger-Müller tubes, proportional counters and scintillation detectors that provide direct or indirect measurements capabilities. The Radiation Safety Office (RSO) as well as the radioactive compounds working laboratories at the *Instituto de Inv. Biomédicas "A. Sols"* (Madrid-Spain) are provided with an adequate radiation measurement instrument. But, before a portable survey instrument is used, several quality checks should be made (batteries, calibration sticker), and the instrument response should be tested with a check source.
This paper aims at determining, with a RSO procedure, these surveys working parameters -detection efficiency, calibration factors and minimum detectable activities-, using reference checking sources (^{14}C, ^{36}Cl, and $^{90}Sr/^{90}Y$) with known radioactivity covering the energy range of beta emitting isotopes used in biological research. No gamma portable monitors have been tested for the RSO has no gamma checking sources.
Therefore, 58 beta monitors were tested, obtaining the efficiency values, the calibration factors (Bq cm^{-2} s) and last but not least, the Minimum Detectable Activity (Bq cm^{-2}) was determined for the different surveys with the above mentioned sealed sources.
Finally, a data comparison was made between the calibration factors of the same monitors, supplied by different official institutions (CIEMAT, AURPO). Results show no significant differences. Although, on the other hand, the Minimum Detectable Activity data obtained are below the established contamination levels in our facilities.
The data in this study allows us to quantify radioactive contamination by directly applying the necessary corrections extracted from the obtained results with the tested contamination portable surveys. The actual purpose is to avoid over/underestimation of radioactive contamination that may potentially increase the personnel contamination risk.

Keywords: contamination surveys, calibration, radioactive contamination, check source.