

A Relative Seed Calibration Technique Using A Mick Applicator Cartridge

The AAPM Task Group #56 report and the ACR's "Standard for the Performance of Manually Loaded Brachytherapy Sources" suggest that a random sample of at least 10% of the sources from each lot with half-lives of less than six months should be calibrated upon receipt. This investigation reports the results of a novel idea to relatively calibrate the total activity of prostate brachytherapy seeds in a Mick applicator cartridge. Fifteen seeds of similar activity were measured individually in a commercially available well ionization chamber and cross-calibrated to a source of known activity. The fifteen seeds were then loaded into a Mick applicator cartridge and positioned in the well chamber by a specially designed insert. A relative calibration factor was determined to achieve a reading identical to the sum of the activity of the seeds measured singly. I-125 seeds from another manufacturer and Pd-103 seeds were also investigated and a statistically different relative calibration factor was determined for each. Additionally, variations due to the type and orientation of the cartridge were investigated. Replacing one of the fifteen active seeds with a dummy seed tested the presence of a "cold" seed. The resultant readings showed a statistical difference between the fifteen active seeds versus the fourteen active seeds. It is thought that the method presented here could satisfy the recommendation for seed calibration for those seeds shipped in a Mick cartridge while staying within suggested guidelines for ALARA considerations.